





T H E

C L O U D








THE CLOUD

An anthology for teachers, mediators,
and aficionados of the 9th Bienal do
Mercosul | Porto Alegre



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INTRODUCTION

PATRICIA FOSSATI DRUCK

Taking place in Porto Alegre, Brazil, the Bienal do Mercosul has stood out for the creativity, originality, and depth with which each edition addresses new themes and concepts through art, education, and the promotion of a creative economy in culture.

Furthermore, its efficient management system and intensive relations program, along with the support from the federal, state, and municipal governments, and also from businesspeople and the local community, have led the Bienal do Mercosul to fully meet its curatorial challenges and allowed for a strong integration between different cultural agents and society; the knowledge and application of the best practices in management and cultural production; a fertile atmosphere for the arts and the recognition of the significant role they play in the formation of citizenship.

We are very pleased to be launching with this publication the 9th Bienal do Mercosul | Porto Alegre and its educational program, which is today an important

reference in art education and the creation of audiences in Brazil. Having served more than one million students in the eight editions so far, it has a very special place in this edition.

In English, the title of the 9th Bienal is *Weather Permitting*. I'm positive the weather will permit and we will, indeed, have a memorable show—continuing the excellent job done by the Fundação de Artes Visuais do Mercosul in other editions—which will welcome all the people from Porto Alegre—as well as all those who might be here by then—below the Cloud and will send, as a windstorm, the good news from Latin American art to the four corners of the world.

ON CLOUDS AND ATMOSPHERIC DISTURBANCE

SOFÍA HERNÁNDEZ CHONG CUY

What is affection? Is it measured love, a form of caring, a balanced emotion? If it is, or feels something like that, why is it that weather affects us? It's simply unheard of that the weather loves us, cares for us, or feels anything for us. And yet, a weather condition is felt. Its effects affect. Curiously, talking about the weather is typically considered small talk, a quintessential form of phatic communication, so-called useless chatter, unless of course, the conversation turns to the topic of global warming. This latter approach implies a certain command over the weather—at least a more evident relation between culture and nature, an affective reciprocity between social behavior and the weather's conduct.

There is no doubt that the weather moves, and that it moves people, be it minimally or intensely. The sight of a sunray can elicit the squint of an eye and prompt a grin. An overcast sky may yield gloom. Thunder can cause a quiver; lightning distresses. And clearly, extreme weather conditions provoke different kinds of movement.

Hurricanes displace communities, torrential rains cause floods, droughts destroy harvests, and earthquakes dismantle cities. This first kind of movement we tend to call effect; weather as cultural experience. It's personal—physical and psychological. The second kind of movement we tend to call disaster; weather as natural phenomenon. It's social—ecological and economical.

Weather also acts as language, as ideas rendered in images or articulated in figures of speech that express emotional atmospheres and political climates. It is these kinds of atmospheric disturbances—which come with their own inner and external forces, whether as singular stances or social movements—that influence, that propel, the 9th Bienal do Mercosul | Porto Alegre. The title of this edition of the Bienal is, in Portuguese, *Se o clima for favorável*; in Spanish, *Si el tiempo lo permite*; in English, *Weather Permitting*. These titles are an invitation to ponder when and how, by whom and why, certain artworks and ideas gain or lack visibility at a given moment in time.

The title of this book, *The Cloud*, also has a story behind its name, but first some words to you, its reader. This book is specially conceived for educators, mediators, and all those would-be aficionados of the 9th Bienal do Mercosul | Porto Alegre. It's an anthology of texts (narrative and essay, philosophical treatises and artists' statements) that have informed the conceptualization of the Bienal, and, more importantly, that can inspire ways of experiencing and articulating contemporary art and culture in general.

The book's title refers to two intrinsic if intangible currents of this Bienal. First, it refers to the recent development of cloud computing, specifically to the digital server where our curatorial research was archived,

cataloged, and accessed by team members in any location, at any time. It is, so to say, a place for shared information, a common treasure. Secondly, *The Cloud* also refers to rain as a condensation of information made knowledgeable, turned into ideas through the pleasures of brainstorming—an activity embraced by the Bienal team. Not surprisingly, in the first stages of organizing the Bienal—which inaugurates its exhibition several months after the release of this book—many of the brainstorming sessions focused on the role of information in the public presentation of art. While this concern seemed overly introspective at first, in hindsight it made perfect sense; after all, if expression and communication are the tenets of art-making, sharing and making public are those of exhibition-making.

The Cloud is only one instance where we invite you to reflect on the presentation mechanisms and spatial environments in which insights and findings are created, communicated, and publicly shared. This book and the forthcoming publications, exhibitions, and program initiatives that make up the 9th Bienal do Mercosul | Porto Alegre, cast attention on existing and imagined work cultures. This involves looking at and thinking about aspects of seclusion and openness, as well as privacy or publicity in processes involving experimentation, whether in the art field or elsewhere. In each of its iterations, the 9th Bienal do Mercosul | Porto Alegre approaches art and ideas as portals, tools and triggers to more consciously and sensually experience our contemporaneity.

The promise of the 9th Bienal do Mercosul | Porto Alegre is to identify, propose, and repurpose changing belief systems and appraisals of experimentation and

innovation. It intends to raise ontological and technological questions through artistic practice, object making, and nodes of experience. This edition of the Bienal can be considered an environment in which to encounter natural resources and material culture in a new light, and to speculate on the bases that have marked distinctions between discovery and invention, as well as the values of both sustainability and entropy.

To achieve this, the 9th Bienal do Mercosul | Porto Alegre brings together visual art and other kinds of contributions to address the meeting points of nature and culture. It gathers works together that explore different kinds of atmospheric disturbances propelling travel and social displacement, technological advancement and world development, vertical expansions in space, and transversal explorations through time. This project involves looking at the affections these movements provoke, and the affects that manifest themselves. It entails dwelling, mining, investigating, and exploring what is below and above the social realm—what is palpable and tenuous, what is undersea and in the atmosphere, what is underground and in outer space.

The Cloud also marks the launch of the 9th Bienal do Mercosul | Porto Alegre's public activities. For making this possible, for bringing these materials together for you, I thank the curatorial team of the 9th Bienal do Mercosul | Porto Alegre—Raimundas Malašauskas, Mônica Hoff, Bernardo de Souza, Sarah Demeuse, Daniela Pérez, Júlia Rebouças, and Dominic Willsdon. I also thank the Bienal's participating artists who inspired our readings or suggested authors and texts included here. Most especially, I thank Mônica Hoff for taking the lead on this anthology, and Luiza Proença and Ricardo

Romanoff for their editorial attention and care. Finally, this book and ultimately this Bienal overall wouldn't be possible without the indefatigable support of Patricia Fossati Druck, president of the Fundação Bienal de Artes Visuais do Mercosul, and the dedicated work of its board members and staff. Together, they form a dream team that leaves me, and would leave you, pleasantly floating like a cloud.

FROM BRAINSTORMS TO CLOUD FORMATIONS

MÔNICA HOFF

Every anthology is above all a brainstorm. *The Cloud* is no different. Devised with both immediate and long-term goals in mind, it does not relate to one single topic or correspond to a single voice; neither does it impose a linear reading on its reader. Like a cloud forming in the sky to produce rain for watering the earth, this anthology is a set of idea particles condensed from a particular phenomenon, the 9th Bienal do Mercosul | Porto Alegre.

Like ideas, the formation of clouds presages a change in the weather and, as we know, these changes can be subtle like autumn drizzle, or overpowering like a summer hailstorm.

Popular sayings tell us: “Red sky at night, shepherd’s delight. Red sky in the morning, shepherd’s warning,” “March winds, April showers,” “Rain before wind, your sheets you must mind. Wind before rain, soon make sail again.”

Like the cloud, rain never represents just an end in itself, but something that might come afterwards, instead.

The intense, torrential summer rain might cleanse the soul and refresh the day, but it never sends the heat away. Fine winter drizzle increases the sensation of cold and warns of a heavy frost at night. Strong rains favor the harvest, but excess ruins the crop. What, then, might a brainstorm announce? Could it be the harbinger of a great storm, might it guarantee a good harvest?

With a primary purpose of providing material for investigation, reading, and enjoyment for educators, mediators, artists, and art lovers, this anthology is a heavy brainstorm, forming a scientific-literary journey—from the moon to indigenous cosmology; from nature to communications; from the revolutions of science to the ethics of curiosity; from satellites to ecological crisis; from natural disasters to art—that announces the field of knowledge relating it to the 9th Bienal do Mercosul | Porto Alegre. Understood as a network, it takes shape as a transversal publication with many beginnings, countless middles, and endless ends.

Which is why it starts with the outer space.

The opening text in this anthology, “The Romance of the Moon” was written by Jules Verne in 1865. Here, the great French writer and one of the fathers of science fiction minutely ‘strips bare’ the moon as if it were an object of desire. In language that is sometimes scientific and sometimes poetic, appealing to the reader through its wealth of detail, Verne announces a project for conquering the moon which, in practice, would be achieved exactly one century later. Next, and still with a literary tone, we move from outer space towards the field of science and language. The second text, published in Brazil in 1979 by Vilém Flusser, addresses the moon as a cultural construct, in a humorous essay revealing a

multicultural intelligence that outlines a network of relationships for discussing the existence of the moon as an element of nature and as a product of culture.

Annette Hornbacher discusses the cultural dimensions of the ‘ecological crisis’ based on an investigation of the modern conception of science—with a consequent process of industrialization—and the western concept of nature, to question the place of the crisis itself. As a kind of poetic infiltration of Hornbacher’s essay, but no less political if we analyze it in depth, the following text, by Walter De Maria offers a short reflection on the beauty and importance of natural disasters, telling us “we should be thankful for them.”

In the fifth text of this anthology, “Waiting for Gaia,” Bruno Latour hurls us, with a degree of sarcasm and wisdom, into the eye of the storm of the debate about the ecological crisis, taking as a starting point what he calls a series of disconnections around the moral relationship we establish with nature (or with the idea we have of it). As a kind of eulogy to the disappearance of the sublime (that which makes us infinitely less than “Nature” and offers a sense of melancholy), Latour ironizes guilt (and the lack thereof) and suggests that we should be aware of the measure of (and how to measure) things. Rather than understanding scale, we have to understand how it is produced. He sees nature as an assemblage of contradictory entities that need to be put together jointly. “No one sees the Earth globally and no one sees an ecological system from Nowhere, the scientist no more than the citizen, the farmer, or the ecologist—or, lest we forget, the earthworm,” says Latour.

And on reading Latour’s comment, Thomas Kuhn would probably say that what is an earthworm today

could be a duck tomorrow. In the sixth text in this huge cloud, “Revolutions as Changes of World View,” the North American physicist and philosopher of science provides a valuable reflection on scientific revolutions and the way in which they change the world itself, rather than our perception of it. Just as the world is no longer the same, neither are we. And if we are no longer the same, neither is the world. Taking as example spectacles with inverted lenses, Kuhn discusses the ‘construction of perception’ and says that scientific revolutions are also revolutions of the senses. Kuhn’s thinking is an important gateway into understanding the relationships of similarity between art and science.

Artists’ passion for science is nothing new, as we know. Starting with Renaissance experiments in the 14th century and reaching its conceptual apogee in the post-Industrial Revolution period of the first half of the 20th century, with the futurists, those lovers of machines, adventure, speed, and heights, the relationship between art and science has since narrowed to the naked eye. Eduardo Kac’s “The Satellite and the Work of Art in the Age of Telecommunications,” published in 1986, reflects on how artists have begun to relate to and make use of satellite communication systems in their practice. Rocket building, DNA code manipulation, and the sending of objects, messages, and images into space have become actions in the creative processes of many artists.

For Sundar Sarukkai, the connection point between these two historically separate fields of knowledge is curiosity. This Indian physicist and philosopher sees curiosity as a catalyst of knowledge. In “Science and Ethics of Curiosity,” Sarukkai tells us, “Because we are dissatisfied with the answers we get, we come up with

new ways of thinking. Because we are curious, we discover methods. We discover science.” Recent studies have proved that children and scientists have very similar ways of thinking and learning. Children more than adults are believed to be able to invent unusual theories for solving problems. Thinking hypothetically, ‘youngsters’ are as astute and innovative in their arguments and questions as scientists are. But, when it comes to art, why do most educational experiences still orbit galaxies billions of kilometers away from science?

Lindy Joubert attributes this physical distance to contemporary thinking that seeks to separate art and science into two distinct spheres of learning. In “Science and Art: New Paradigms in Education and Vocational Outcomes,” the Australian artist and educator proposes a revision and relocation of current educational models in the light of the connections between art and science, basing her essay on experiments with this relationship. Like Sarukkai, Joubert believes in curiosity as a driving force behind human intelligence and therefore as a mainspring of scientific and artistic experience.

And what if we were talking about the relationship between science and craft instead of art? Would it make any difference? How can we establish what science is—a western concept—in the light of the material and immaterial production of a particular community or ethnic group? In “Recent Crafts,” the Mexican artist and educator Abraham Cruzvillegas, a descendent of the Purépecha people, uses traditional binominals such as individual and mass, manual and industrial, art and craft to reflect on the survival of craft in the contemporary capitalist context, questioning its functionality, scientific nature (natural or social), and cultural purity. Cruzvillegas’

text seems to be constantly asking us how to mediate this relationship.

The Swedish critic and curator Maria Lind changes the focus and subject of the question to ask *Why mediate art?* in an essay that stresses that artists and curators should show greater commitment and responsibility when thinking about how to communicate their ‘object,’ their message and thinking, against a possible ‘excess of didacticism’ coming from (art) education in the context of cultural institutions today. As Lind says, “It is a seeming paradox: an excess of didacticism and simultaneously a renewed need for mediation.” So I ask myself how one might mediate different perspectives.

Finally, bringing the network of voices behind this anthology and the thinking of the 9th Bienal to a close, we come to mediation itself. Or ‘de-mediation.’ In an interview with the Brazilian anthropologist Eduardo Viveiros de Castro about his career researching indigenous societies in northern Brazil, we enter both to the depths of what makes us living beings—human and nonhuman—and to the heavens, to once again reposition our understanding of nature and culture. And while what Eduardo Viveiros de Castro does (to us) seems to be mediation, on the other hand, it is complete de-mediation, telling us that, unlike the binary logic of building knowledge that we are accustomed to in western culture, indigenous societies, particularly in the Alto Xingu, have a kind of interaction between the physical and moral, natural and cultural, and organic and sociological dimensions. Everything is part of one and the same body, and this body is both individual and collective: corporeal body and social body at the same time. Viveiros de Castro uses his theory of Amerindian perspectivism in this

interview to constantly put us in the place of the other, seeing the other—animal, human, or thing—always as a subject, and therefore as something that has purpose, something to relate with.

Enabling encounters, activating relationships, acting as corporeal body and social body is what the 9th Bienal do Mercosul | Porto Alegre educational program is proposing through its Cloud Formations Program. As an integrated training initiative for educators, mediators, and art lovers, education at the 9th Bienal is expanding in time and space to create, in one single network, a dialog between agents usually situated in isolated networks. So, weather permitting, between May and November 2013, the 9th Bienal educational program open discussions, workshops, university exchanges, residencies for educators and mediators, and field trips will be “fusing” Porto Alegre with Manaus, Osório with Montevideo, Vila Mário Quintana with Rotterdam, to mention just a few, in a huge network of knowledge and friendship.

The Cloud is our gentle and discursive way of making a start to it all!

From a brainstorm to an effective network of forming knowledge and friendships—that’s all we can wish for. Weather permitting, of course.

(1865)

THE ROMANCE OF THE MOON

JULES VERNE

AN OBSERVER ENDUED with an infinite range of vision, and placed in that unknown center around which the entire world revolves, might have beheld myriads of atoms filling all space during the chaotic epoch of the universe. Little by little, as ages went on, a change took place; a general law of attraction manifested itself, to which the hitherto errant atoms became obedient: these atoms combined together chemically according to their affinities, formed themselves into molecules, and composed those nebulous masses with which the depths of the heavens are strewed. These masses became immediately endued with a rotary motion around their own central point. This center, formed of indefinite molecules, began to revolve around its own axis during its gradual condensation; then, following the immutable laws of mechanics, in proportion as its bulk diminished by condensation, its rotary motion became accelerated, and these two effects continuing, the result was the formation of one principal star, the center of the nebulous mass.

By attentively watching, the observer would then have perceived the other molecules of the mass, following the example of this central star, become likewise condensed by gradually accelerated rotation, and gravitating round it in the shape of innumerable stars. Thus was formed the *Nebulae*, of which astronomers have reckoned up nearly 5,000.

Among these 5,000 nebulae there is one which has received the name of the Milky Way, and which contains eighteen millions of stars, each of which has become the center of a solar world.

If the observer had then specially directed his attention to one of the more humble and less brilliant of these stellar bodies, a star of the fourth class, that which is arrogantly called the Sun, all the phenomena to which the formation of the Universe is to be ascribed would have been successively fulfilled before his eyes. In fact, he would have perceived this sun, as yet in the gaseous state, and composed of moving molecules, revolving round its axis in order to accomplish its work of concentration. This motion, faithful to the laws of mechanics, would have been accelerated with the diminution of its volume; and a moment would have arrived when the centrifugal force would have overpowered the centripetal, which causes the molecules all to tend toward the center.

Another phenomenon would now have passed before the observer's eye, and the molecules situated on the plane of the equator, escaping like a stone from a sling of which the cord had suddenly snapped, would have formed around the sun sundry concentric rings resembling that of Saturn. In their turn, again, these rings of cosmical matter, excited by a rotary motion

about the central mass, would have been broken up and decomposed into secondary nebulosities, that is to say, into planets. Similarly he would have observed these planets throw off one or more rings each, which became the origin of the secondary bodies which we call satellites.

Thus, then, advancing from atom to molecule, from molecule to nebulous mass, from that to principal star, from star to sun, from sun to planet, and hence to satellite, we have the whole series of transformations undergone by the heavenly bodies during the first days of the world.

Now, of those attendant bodies which the sun maintains in their elliptical orbits by the great law of gravitation, some few in turn possess satellites. Uranus has eight, Saturn eight, Jupiter four, Neptune possibly three, and the Earth one. This last, one of the least important of the entire solar system, we call the Moon; and it is she whom the daring genius of the Americans professed their intention of conquering.

The moon, by her comparative proximity, and the constantly varying appearances produced by her several phases, has always occupied a considerable share of the attention of the inhabitants of the earth.

From the time of Thales of Miletus, in the fifth century B.C., down to that of Copernicus in the fifteenth and Tycho Brahe in the sixteenth century A.D., observations have been from time to time carried on with more or less correctness, until in the present day the altitudes of the lunar mountains have been determined with exactitude. Galileo explained the phenomena of the lunar light produced during certain of her phases by the existence of mountains, to which he assigned a mean altitude of 27,000 feet. After him Hevelius, an astronomer

of Dantzic, reduced the highest elevations to 15,000 feet; but the calculations of Riccioli brought them up again to 21,000 feet.

At the close of the eighteenth century Herschel, armed with a powerful telescope, considerably reduced the preceding measurements. He assigned a height of 11,400 feet to the maximum elevations, and reduced the mean of the different altitudes to little more than 2,400 feet. But Herschel's calculations were in their turn corrected by the observations of Halley, Nasmyth, Bianchini, Gruithuysen, and others; but it was reserved for the labors of Beer and Maedler finally to solve the question. They succeeded in measuring 1,905 different elevations, of which six exceed 15,000 feet, and twenty-two exceed 14,400 feet. The highest summit of all towers to a height of 22,606 feet above the surface of the lunar disc. At the same period the examination of the moon was completed. She appeared completely riddled with craters, and her essentially volcanic character was apparent at each observation. By the absence of refraction in the rays of the planets occulted by her we conclude that she is absolutely devoid of an atmosphere. The absence of air entails the absence of water. It became, therefore, manifest that the Selenites, to support life under such conditions, must possess a special organization of their own, must differ remarkably from the inhabitants of the earth.

At length, thanks to modern art, instruments of still higher perfection searched the moon without intermission, not leaving a single point of her surface unexplored; and notwithstanding that her diameter measures 2,150 miles, her surface equals the one-fifteenth part of that of our globe, and her bulk the one-forty-ninth part of that of

the terrestrial spheroid—not one of her secrets was able to escape the eyes of the astronomers; and these skillful men of science carried to an even greater degree their prodigious observations.

Thus they remarked that, during full moon, the disc appeared scored in certain parts with white lines; and, during the phases, with black. On prosecuting the study of these with still greater precision, they succeeded in obtaining an exact account of the nature of these lines. They were long and narrow furrows sunk between parallel ridges, bordering generally upon the edges of the craters. Their length varied between ten and 100 miles, and their width was about 1,600 yards. Astronomers called them chasms, but they could not get any further. Whether these chasms were the dried-up beds of ancient rivers or not they were unable thoroughly to ascertain.

The Americans, among others, hoped one day or other to determine this geological question. They also undertook to examine the true nature of that system of parallel ramparts discovered on the moon's surface by Gruithuysen, a learned professor of Munich, who considered them to be "a system of fortifications thrown up by the Selenitic engineers." These two points, yet obscure, as well as others, no doubt, could not be definitely settled except by direct communication with the moon.

Regarding the degree of intensity of its light, there was nothing more to learn on this point. It was known that it is 300,000 times weaker than that of the sun, and that its heat has no appreciable effect upon the thermometer. As to the phenomenon known as the "ashy light," it is explained naturally by the effect of the transmission of the solar rays from the earth to the moon, which give the appearance of completeness to the lunar disc, while it

presents itself under the crescent form during its first and last phases.

Such was the state of knowledge acquired regarding the earth's satellite, which the Gun Club undertook to perfect in all its aspects, cosmographic, geological, political, and moral.

(1979)

THE MOON

VILÉM FLUSSER

UNTIL RECENTLY, THE Moon belonged to the class of things that are visible, but inaccessible to our hearing, smell, touch, or taste. Now, some men have touched it. Has this made the Moon less dubious? Descartes states that we must doubt our senses because, among other reasons, they are mutually contradictory. Until now, the Moon had been perceived by only one of our senses. Therefore, there was no contradiction between the senses. Now, such a contradiction has become possible. Thus we may doubt the Moon, but in a different way. For example: how do we know that someone has touched it? By having seen the event on TV and reading about it in newspapers. Images on TV are dubious, they could be tricks. If they also have a subtitle “live from the Moon,” they become not only dubious, but also suspect. Whoever says, “it is raining, and that is the truth,” says less than one who simply says, “it is raining.” As for the newspapers, their credibility is not absolute. Hence we may doubt that the Moon has been touched. But this doubt

would be even less reasonable than the following: is the Moon fiction or reality? It is less reasonable, because it is less reasonable to doubt culture than to doubt nature. If done methodically, to doubt nature is reasonable, because it results in the natural sciences. But apparently, to doubt culture (TV and newspapers), results in nothing. Since the Moon (according to the TV and newspapers) has left the field of nature and entered into that of culture, it is better to no longer doubt it. It no longer remains within the competence of astronomers, poets, and magicians, and is now handed over to the competence of politicians, lawyers, and technocrats. And who could doubt them? The Moon is therefore the immovable (although mobile) property of NASA. The Moon is “real estate” = in a state of reality, and any doubts about it have ceased. However, there are still some problems that are relative not so much to the Moon itself, but to our own being-in-the-world. These are confusing problems. I shall speak about some of them.

On a clear night, when I look at the Moon, I do not see NASA’s satellite. I see a *C* or a *D*, or a luminous circle. I see “the phases of the Moon.” The Moon changes shape. But I have learned that these changes are apparent, that the Moon itself does not change shape. Why are they “apparent”? Is the Earth’s shadow not as real as the Moon? Common sense tells me to see changes, not of “the Moon itself,” but of “my perception of the Moon.” The same common sense does not apply to primitive people. They see the Moon rising, setting, and rising again. Not only do I see the Moon with my eyes, but also through my culture’s common sense. A common sense that tells me to see “the phases of the Moon” and not (as yet), “NASA’s property.”

Would vision be the most common of all senses, more common than common sense? That is: common to all who have eyes? Can all those who have eyes see the Moon? Photographic cameras and ants? Is it not anthropomorphic to say that the Moon is seen by ants? If I were to build a lens that is structurally identical to an ant’s eye, would I see the Moon? Or is there a common sense that relates only to human eyes, which tells humans to see the Moon? Could there be an eye disease in the West that tells me to see “the phases of the Moon,” and another more general human disease that tells me to see the Moon?

On a clear night, when I look at the Moon, I do not see NASA’s satellite, although I know that what I see is NASA’s satellite. I still see the Earth’s natural satellite; my vision does not integrate my knowledge. Such a lack of knowledge integration by the sense of vision characterizes particular situations, the so-called “crises.” It is probable that Hellenic Greeks knew that the Moon is a sphere, however, they continued to see it as a Goddess. It is probable that the Melanesians know that the Moon is NASA’s satellite, however, they continue to see it as a symbol of fertility. In a situation of crisis, our worldview cannot integrate our knowledge.

In order to see the Moon, it is necessary to look at it. I do not need to listen to the wind in order to hear it. I may, but I do not need to. In order to see, I need to gesticulate with my eyes and my head. “To lift my eyes to the sky.” I need to do what dogs do in order to listen and smell: they gesticulate with their nose and ears. Their world must be different from ours. For us, odors and sounds are *given*, but lights are provoked by the attention (gesticulation) we pay to it. For dogs, odors and sounds are equally provoked. We live in two worlds: one that is

given and the other that is provoked by the attention we pay to it. In this sense, sight is similar to touch: it is drawn toward the phenomenon that is to be provoked. The “objective” explanation that eyesight is the reception of electromagnetic wave emissions (just as hearing is the reception of sound waves) conceals the fact that eyes are closer in similarity to arms than to ears. They seek, they do not stand still. This is important in cases such as the Moon, which is visible but not audible. It has been sought, and not passively perceived.

Cultures that do not lift their eyes to the sky, but concentrate their attention on the ground (the so-called “telluric” ones) do not seek, do not “produce” the Moon. Cultures that spend their time looking at the sky (the so-called “uranic” ones) “pro-duce” the Moon, which then occupies an important role in such cultures. The Moon is, in this sense, a “product” of such cultures. How then may I affirm that NASA has transformed the Moon from a natural phenomenon into a cultural one (into an instrument of astronautics) by having touched it, if the Moon has always been a product of our “uranic” culture? In order to answer this question, I must look closer at the Moon.

What does it mean, “to look closer”? It could mean to get closer to the Moon by climbing a mountain or by rocket. It could mean to get closer with a telescope or similar tricks. But this is not what I am trying to get at. Since the Moon is not a given fact, but one that is sought by the attention given to it, “to look closer” could mean to look at it with greater attention in order to see it more clearly. So that, if on clear nights I should look at it with more attention, I will see why I see it as a natural phenomenon. I cannot see it whenever or wherever I want.

Even though in order to see it, I must want to see it, the Moon itself conditions my will. The Moon is provoked by my will to see it, however, this will becomes actualized within the rules of the Moon’s game. The Moon imposes its rules of the game onto me. That is why it is difficult to doubt it or manipulate it. The Moon is not of my imagination; it is a thing of nature.

My gaze has proven that the Moon is not of my imagination, but it has not yet proven anything in relation to it being nature or culture. Or in fact it has. The Moon is stubborn. It imposes its own rules of the game. I only see where it is because of its own need, a need called “the laws of nature.” Cultural things are not as stubborn. They are where they ought to be in order to serve me. If I want to see my shoes, I look in the direction where they ought to be, I see them and make use of them. This is the essence of culture. If I want to see the Moon, I am necessarily obliged to look in its direction. This is the essence of nature. That is why I see the Moon as a natural phenomenon, although I know that currently the Moon is no longer where it is by necessity, but is where it ought to be in order to serve as a platform for trips to Venus. I am still not able to see the utility of the Moon. I see it as stubbornly useless. I still see it as if it were the Earth’s natural satellite.

But my gaze does not give a satisfactory answer to my question. I do not ask why I see the Moon as a natural thing, despite NASA, but why do I see it this way, despite the fact that it has always been a product of the “uranic” aspect of my culture. Therefore, I do not ask because of my inability to integrate new knowledge, but because of my inability to memorize origins. I must help my gaze in order to provoke it to answer to such a difficult

question. Why do I not see that the Moon was originally provoked by my culture, but see it as given? The answer starts to articulate itself. Because I am ambivalent in relation to my culture. On the one hand, I admit that my culture is composed of things faithfully waiting to be used by me. On the other hand, I must admit that I cannot be without these things. This is why the Moon is the exact opposite of my shoes. The Moon is necessary, but dispensable. The shoes are deliberate (unnecessary) but indispensable. The Moon imposes its rules over me because of its stubborn necessity. The shoes oppress me because of their unnecessary indispensability. This is why I cannot see that the Moon was originally provoked by my culture; why would my culture have provoked something that is necessary but dispensable?

My view is deformed by a prejudice that is part of my culture's common sense: all that is necessary and dispensable I call "nature," all that is unnecessary and indispensable I call "culture." Progress is about transforming necessary and dispensable things into unnecessary and indispensable ones. Nature is anterior to culture, and progress is to transform nature into culture. When NASA touched the Moon and transformed it into a platform, one more step toward progress was taken.

Such a prejudice, which stems from our common sense, is logically contradictory, ontologically false, existentially unbearable, and must be abandoned. And if I manage to push it away, I shall see the Moon more clearly. I see now, surprisingly, that the Moon, far from being a natural phenomenon on the way of becoming culture, is, and always has been, a cultural phenomenon that is starting to become nature. Here is what culture really is: a set of necessary things that become

progressively more indispensable. And here is what nature is: a set of unnecessary and dispensable things. Nature is a late and luxurious product of culture. My gaze toward the Moon proves this in the following manner:

For one moment, let us imagine that NASA had really transformed the Moon from nature into culture. This would have been an exceptionally happy case of a "return to nature." We would only need to cut NASA's budget and the Moon would return to being a subject for poets and escape the technocrats' competence. Because Romanticism (from Rousseau all the way to the hippies) is this: to cut NASA's budget. But would this be a "return"? No, it would be an advance. Before NASA, the Moon was a product of Western, "uranic" culture, which had as a projected aim the ultimate manipulation of the Moon by NASA. Our Neolithic ancestors looked at the Moon (and thus "pro-duced" it) with the aim of eventually transforming it into a platform to Venus. And that is what we, their descendants, see when we look at it; a fertility symbol, goddess, and natural satellite, these are several phases toward the path of becoming a platform. We always see the moon as a potential platform, although we do not know it consciously. NASA already existed in germinal form within the first gaze directed at the Moon.

Therefore, to cut NASA's budget would be a step beyond NASA. It would transform the Moon into an object of "art for art's sake," unnecessary, dispensable, to be sung by poets. Such an object we could call a "natural object" in an existentially bearable sense. This transformation of culture into nature is happening everywhere: in the Alps, beaches, and in the suburbs of big cities. The 18th-century Romantics "discovered" nature (that is, they invented it), and the Romantics of our "fin de siècle" are

realizing nature. One of the methods of this transformation is called “applied ecology.” If this method were applied to the Moon, it would become nature. So that if we were to look at the Moon during clear nights, and see it as a natural phenomenon, we would not be seeing the Moon’s pre-NASA past, but its post-NASA state. Our vision would be prophetic, that is, inspired by Romanticism. And in effect, this is what we always do: we look at the Moon romantically. That is why we see it as if it were already a natural object, and not as we know that it is: the object of a culture that aims to transform it into a platform.

This is a disturbing answer. The Moon is seen as a natural object, that is, as our culture’s ultimate product. How then, in such a situation, can I engage myself in culture, if it tends to transform itself into its own betrayal, into Romantic nature? This question, however, does not touch the Moon. It continues unperturbed in its necessary, and for the moment, as yet dispensable way. To inquire in this way is of little use. It is useless to lift our eyes toward it. “Lift not your eyes to it, for it moves impotently just as you and I.”¹

NOTE

- 1 This last sentence, which is rendered in English in the original text, could be a reference to the *Rubaiyat* of Omar Khayyam (1048–1123). There is one specific quatrain from the fifth edition of Edward Fitzgerald’s translation of 1889 that has the same essence of this sentence, however this is only my own suggestion as Flusser left no reference to this.—Trans.

(2008)

SURVEYING THE WORLD

ANNETTE HORNBACHER

IN A RARE case of unanimity, representatives of World Politics and Natural Science are ascribing the threat of world climate warming to *human influence*, i.e., to the massive emission of greenhouse gases which, in turn, are a direct consequence of industrialization.

It is true that this insight has only recently been officially acknowledged by World Politics, but the negative effects of industrialization on the natural environment of human beings have been recognized and denounced from the beginning. Already in the 19th century—above all in the USA—a movement to protect nature began, that led to a clarifying change in the construction of a “Nature” untouched by Man and in need of protection. This led to establishing nature reserves that were removed from industrial exploitation, and also to the idea of “primitive peoples,” who live in their shelter—representing equally the beginning of the history of humankind—in harmony with a “Nature” that is in eternal equilibrium. However, just as the idea of “primitive people” proved to be a

Eurocentric myth, in future also the idea of protection of nature may be shown to be insufficient: both remain in the framework of a modern design of reality which is part of the problem—not its solution.

To explain what this specific modern design consists of and how it is different from other world conditions, first of all we must translate the natural science finding of climate change and industrialization into categories of history of culture. Here it soon becomes clear that the causes of climate change are not simply “anthropogenic,” but real consequences of a modern European culture, whose conception of the world and of humans led to modern industrialization. The global ecological crisis, therefore, expresses the actual dominance of the Eurocentric conception of the world and model of life—i.e., of the Western culture—over other life forms, on which they mercilessly blame their side effects.

Sustainability of the Eurocentric Scientific Conception of the World

On the other hand, the growing awareness of an ecological crisis shows that more is at stake than the erosion of distant coastlines: nothing less is at stake today than the extent and sustainability of the Eurocentric scientific conception of the world that was for centuries the paradigm of progress and the driver of an industrialization that saw itself as the state of the art of human development. This proud self-awareness is crumbling, since it has become clear that modern natural science is indeed opening up undreamed-of dimensions of the domination of nature, but unfortunately also produces side effects that can be neither anticipated nor controlled. In order to solve the contradiction between technical domination of

nature and uncontrollable climate change, according to this, is it necessary to have more than an exclusively technical solution—possibly a change of paradigm of the Eurocentric world and life design that would involve, not least of all the concept of nature itself?

Let us first of all ask what culturally specific design of the world is born from modern industrialization, and in what way this is distinguished from the world conditions of societies that are not in Europe.

Francis Bacon's Utopia

Usually the Modern European conception of the world is defined by its objective, methodical knowledge of nature. However it is important that this is not founded on any rational knowledge, but basically reflects a culture-specific program, and, consequently, only that which is possible to explain and manipulate as having a legitimate connection is still acknowledged as real. Empirical natural science, thus, from the beginning had an ideological and at the same time Utopian essential characteristic, since the required rational control is an endless project. In the fable *New Atlantis*, written by Francis Bacon, the founder of empirical natural science at the beginning of the Modern Era, this Utopia is very clear: Pain, illness, and failed crops, thanks to eager research, have disappeared from Bacon's scientifically marked and technically oriented ideal world, because Nature in humankind and around them, is completely controlled for their use and happiness. The scientist here replaces the saints and also replaces political decisions, by eliminating technically all the human potential for conflict in the form of diseases, scarce resources, and natural catastrophes.

What makes Bacon's fable so interesting is the precision with which he emphasizes the Utopian character of Natural Science and Mechanization. The effort to create a situation of human freedom from suffering by means of the completely rational exploration of nature, just shows a culturally specific motive, that continues to have an effect on the dynamics of global industrialization, and its promise consists of "humanizing" nature, transforming it into a Paradise on Earth.

Meanwhile, this ideal is broken down through the unwished-for and uncontrollable side effects of industrialization, and therefore Western societies are experiencing irreversible climate change, above all as a profound crisis of their cultural identity.

Romanticization of Ecocentric Life Forms

It is not by chance that, in this sense, preindustrial tribal societies in the jungles from Latin America to Southeast Asia were discovered as "Guardians of the Earth," whose way of life is presented as an "ecocentric" alternative to the "anthropocentric" technical domination of nature. This romanticizing alternative, however, is based on questionable premises. It assumes that lack of industrialization means the same as adaptation to a timeless ecological balance and rules out massive human interventions. Here one not only underestimates the fundamental differences between the modern concept of nature and non-European conceptions of the world, but it is also rashly assumed that the ecological crisis is to be considered generally an alienation of human society from Nature itself.

Actually, Bacon's Utopia suggests rather the opposite conclusion, that ecological misery is not rooted in the

distance of man from nature, but on the contrary, in the specifically modern will to humanize nature as completely as never before. The modern concept of nature is distinguished precisely by the fact that there is an oscillation between the extremes of total domination of nature by Man, and total adaptation of Man to an ecological situation of balance, or, in other words: significance of nature and protection of nature are two sides of the same conception of the world.

The world designs of non-Western societies, however, run contrary to this alternative, since they cannot imagine any nature or "environment" that could exist regardless of Man, and consequently do not look to dominate or adapt to a static ecosystem. What we see here is rather a constant interrelationship between human and nonhuman actors, where the latter are considered in relation to a changing history, and in no way as a timeless or even "untouched" nature. This is proved, for instance, by the Australian aboriginals who—although they have a very modest technology—have shaped their natural living space as it looks now through massive interventions and especially by targeted bushfires. Here we cannot speak of a passive adaptation to an existing nature, rather, we are dealing with a coevolution guided with the help of people, and in this case the desertification of the Australian continent and possibly the extermination of various animal species.

The fact that these interventions were less destructive than those of the European colonizers is mainly because the aboriginals did not consider their world to be a "nature" that could be systematically dominated, to which Man relates as an object. Their world vision is marked by relationships between the different clans and

certain phenomena of the common world they live in that are interconnected with the social structure: special trees, water holes, or rock formations are living traces and remnants of strange, mythical beings that must be respected and remembered, because they marked the world and people in their present aspect as a meaningful living space which cannot be replaced by general laws or improved on by man.

Nature as an Ambivalent Aspect of Human History

This design is distinguished from the modern conception of the world basically by the fact that it does not require its own world to live in as a nature that is defined according to rules without any empty spaces, but rather recognizes it as a *historically changeable* coexistence of human and nonhuman actors. Human praxis here is guided not by universal laws of nature through which human interventions are possible, but by respect for single phenomena that are experienced as the limit of human control. For the traditional aboriginal culture, therefore, the systematic exploitation of natural resources is as meaningless as protecting nature. What must be protected here are always the specific circumstances of a lifeworld that has always been influenced by human interventions.

Based on this, it would be useful to consider whether the modern concept of a nature that is regulated in a timeless way by universal laws, and with it the alternative of rational *domination of nature* and *adaptation of nature*, forms the conceptual framework of the ecological crisis. Both variants oppose the human freedom to a nature that can be controlled by law while the irreversible climate change confronts us with the irritating

problem of *unpredictable historicity*—and with this also the unavailability of nature. In the dynamics of climate change, Man himself becomes part of an experimental ranking that long escaped him, and so unexpectedly a basic insight of Australian myths imposes itself: Nature is no longer the timeless opposite pole or foundation, but an ambivalent aspect of human history. As this experiment continues, it remains to be seen whether the Western conception of nature still offers a solution to the unsolved contradictions of global industrialization, or whether, rather, it must change in a debate with other concepts that are closer to reality.

(1960)

ON THE IMPORTANCE OF NATURAL DISASTERS

WALTER DE MARIA

I THINK NATURAL disasters have been looked upon in
the wrong way.
Newspapers always say they are bad, a shame.
I like natural disasters and I think that they may be the
highest form of art possible to experience.
For one thing they are impersonal.
I don't think art can stand up to nature.
Put the best object you know next to the Grand Canyon,
Niagara Falls, redwoods.
The big things always win.
Now just think of a flood, forest fire, tornado, earthquake,
typhoon, sand storm.
Think of the breaking of the ice jams. Crunch.
If all of the people who go to museums could just feel
an earthquake.
Not to mention the sky and the ocean.
But it is in the unpredictable disasters that the highest
forms are realized.
They are rare and we should be thankful for them.

(2011)

WAITING FOR GAIA. COMPOSING THE COMMON WORLD THROUGH ARTS AND POLITICS

BRUNO LATOUR

Abstract: There is no single institution able to cover, oversee, dominate, manage, handle, or simply trace ecological issues of large shape and scope. Many issues are too intractable and too enmeshed in contradictory interests. We have problems, but we don't have the publics that go with them. How could we imagine agreements amid so many entangled interests? We will review several attempts to tackle ecological problems by connecting the tools of scientific representation with those of arts and politics and present the program of Experimentation on Arts and Politics which has been running at Sciences Po since September 2010.¹

WHAT ARE WE supposed to do when faced with an ecological crisis that does not resemble any of the crises of war and economies, the scale of which is formidable, to be sure, but to which we are in a way habituated since it is of human, all too human, origin? What to do when told, day after day, and in increasingly strident ways, that our present civilization is doomed; that the Earth itself has

been so tampered with that there is no way it will ever come back to any of the various steady states of the past? What do you do when reading, for instance, a book such as Clive Hamilton's titled *Requiem for a species: Why We Resist the Truth about Climate Change*—and that the species is not the dodo or the whale but *us*, that is, you and me? Or Harald Welzer's *Climate Wars: What People Will Be Killed For in the 21st Century*, a book that is nicely divided in three parts: how to kill yesterday, how to kill today, and how to kill tomorrow! In every chapter, to tally the dead, you have to add several orders of magnitude to your calculator!

The time of great narratives has past, I know, and it could seem ridiculous to tackle a question so big from so small a point of entry. But that's just the reason I wish to do so: what do we do when questions are too big for everybody, and especially when they are much too grand for the writer, that is, for myself?

One of the reasons why we feel so powerless when asked to be concerned by ecological crisis, the reason why I, to begin with, feel so powerless, is because of the total *disconnect* between the range, nature, and scale of the phenomena and the set of emotions, habits of thoughts, and feelings that would be necessary to handle those crises—not even to act in response to them, but simply to give them more than a passing ear. So this essay will largely be about this disconnect and what to do about it.

Is there a way to bridge the distance between the scale of the phenomena we hear about and the tiny *Umwelt* inside which we witness, as if we were a fish inside its bowl, an ocean of catastrophes that are supposed to unfold? How are we to behave sensibly when there is no ground control station anywhere to which

we could send the help message, “Houston, we have a problem”?

What is so strange about this abysmal distance between our little selfish human worries and the great questions of ecology is that it's exactly what has been so *valorised* for so long in so many poems, sermons and edifying lectures about the *wonders of nature*. If those displays were so wonderful, it was just because of this disconnect: to feel powerless, overwhelmed, and totally dominated by the spectacle of “nature” is a large part of what we have come to appreciate, since at least the 19th century, as the *sublime*.

Remember Shelley:

**In the wild woods, among the mountains lone,
Where waterfalls around it leap *forever*,
Where woods and winds contend, and a vast river
Over its rocks *ceaselessly* bursts and raves.**

How we loved to feel small when encompassed by the magnificent forces of the Niagara Falls or the stunning immensity of the Arctic glaciers or the desolate and desiccated landscape of the Sahara. What a delicious thrill to set our size alongside that of galaxies! Small compared to Nature but, as far as morality is concerned, so much bigger than even Her grandest display of power! So many poems, so many meditations about the lack of commensurability between the everlasting forces of nature and the puny little humans claiming to know or to dominate Her.

So one could say, after all, that the disconnect has always been there and that it is the inner spring of the feeling for the sublime.

The everlasting universe of things
Flows through the mind, and rolls its rapid waves,
Now dark—now glittering—now, reflecting gloom—
Now lending splendor, where from secret springs
The source of human thought its tribute brings.

But what has become of the sublime lately, now that we are invited to consider another disconnect, this time between, on one side, our *gigantic* actions as humans, I mean as collected humans, and, on the other side, our complete lack of a grasp on what we have collectively done?

Let us ponder a minute what is meant by the notion of “anthropocene”, this amazing lexical invention proposed by geologists to put a label on our present period. We realise that the sublime has evaporated as soon as we are no longer taken as those puny humans overpowered by “nature” but, on the contrary, as a collective *giant* that, in terms of terawatts, has scaled up so much that it has become the main geological force shaping the Earth.

What is so ironic with this anthropocene argument is that it comes just when vanguard philosophers were speaking of our time as that of the “post-human”; and just at the time when other thinkers were proposing to call this same moment the “end of history”. It seems that history as well as nature have more than one trick in their bag, since we are now witnessing the speeding up and scaling up of history not with a post-human but rather with what should be called a *post-natural* twist! If it is true that the “*anthropos*” is able to *shape the Earth* literally (and not only metaphorically through its symbols), what we are now witnessing is *anthropomorphism* on steroids.

In his magnificent book *Eating the Sun*, Oliver Morton provides us with an interesting energy scale. Our global civilization is powered by around thirteen terawatts (TW) while the flux of energy from the centre of the Earth is around forty TW. Yes, we now measure up with plate tectonics. Of course this energy expenditure is nothing compared to the 170,000 TW we receive from the sun, but it is already quite immense when compared with the primary production of the biosphere (130 TW). And if all humans were to be powered at the level of North Americans, we would operate at a hundred TW, that is, with twice the muscle of plate tectonics. That’s quite a feat. “Is it a plane? Is it nature? No, it’s Superman!” We have become Superman without even noticing that inside the telephone booth we have not only changed clothes but grown enormously! Can we be proud of it? Well, not quite, and that’s the problem.

The disconnect has shifted so completely that it no longer generates any feeling of the sublime anymore since we are now summoned to feel *responsible* for the quick and irreversible changes of the Earth’s face occasioned in part as a result of the tremendous power we are expending: we are asked to look again at the same Niagara Falls but now with the nagging feeling that they might stop falling flowing (too bad for Shelley’s *waterfalls around it leap forever*); we are asked to look again at the same everlasting ice, except that we are led to the sinking feeling that they might not last long after all; we are mobilized to look again at the same parched desert, except that we come to feel that it expands inexorably *because* of our disastrous use of the soil! Only galaxies and the Milky Way might still be available for the old humbling game of wonder, because they are beyond the

Earth (and thus beyond our reach since they reside in the part of nature that the Ancients called supralunar—more of this later).

How to feel the sublime when guilt is gnawing at your guts? And gnawing in a new unexpected way because of course *I* am not responsible, and neither are *you*, you, nor you. No one in isolation is responsible.

Everything happens as if the old balance between the contemplation of the moral law *in us* and that of the innocent forces of nature *outside of us* has been entirely subverted. It is as if all the feelings of wonder, together with morality, have changed sides. The real wonder today is how I could be accused of being so guilty without *feeling* any guilt, without having done anything bad? The human collective actor who is said to have committed the deed is not a character that can be thought, sized up, or measured. You never meet him or her. It is not even the human race taken *in toto*, since the perpetrator is only a part of the human race, the rich and the wealthy, a group that have no definite shape, nor limit and certainly no political representation. How could it be “us” who did “all this” since there is no political, no moral, no thinking, no feeling body able to say “we”—and no one to proudly say “the buck stops here”? Remember the rather pitiful meetings in Copenhagen 2009 of all the heads of state negotiating in secret a nonbinding treaty, calling names and haggling like kids around a bag of marbles.

But the other reason why the sublime has disappeared, why we feel so guilty about having committed crimes for which we feel no responsibility, is the added complication brought about by the climate “sceptics” or rather, to avoid using this positive and venerable term, the climate *deniers*.

Should we give those characters equal time to balance the position of the climatologists—in which case we risk rejecting our responsibility and associating ourselves with creationists fighting Darwin and the whole of biology? Or do we take sides and refuse to offer to deniers a platform to pollute what is probably the best certainty we will ever have as to how we wreaked havoc on our own ecosystem—in which case we risk having been enlisted in an ideological crusade to once again moralize our connections with nature and to replay the Galileo trial as though we were ignoring the lone voice of reason fighting against the crowd of experts?

No wonder that, facing this new disconnect, so many of us move from admiration in front of the innocent forces of nature to complete despondency—and even lend an ear to the climate deniers.

As Clive Hamilton argued in *Requiem for a Species*, in a sense we are all climate deniers, since we have no grasp of the collective character—the *anthropos* of the anthropocene, the “human” of the “human made” catastrophe. It is through our own built-in indifference that we come to deny the knowledge of our science. Think of it: it would be so nice to return to the past when nature could be sublime and us, the puny little humans, simply irrelevant, delighting in the inner feeling of our moral superiority over the pure violence of nature. In a way, the disconnect is the real source of the denial itself.

What does it mean to be morally responsible in the time of the anthropocene, when the Earth is shaped by us, by our lack of morality—except there is no acceptably recognizable “we” to be burdened by the weight of such a responsibility—and that even the loop connecting our collective action to its consequence is thrown into doubt?

To sum up my first point, how could you still want to feel the sublime while watching the “everlasting” waterfalls sung by Shelley when, one, you simultaneously feel that they might disappear; when, two, you might be responsible for their disappearance; while, three, you feel doubly guilty for *not* feeling responsible; and given that you sense a fourth level of responsibility for not having dug deeply enough into what is called the “climate controversy”. Not read enough, not thought enough, not felt enough.

Apparently, there is no solution except to explore the disconnect and expect that human consciousness will raise our sense of moral commitment to the level required by this globe of all globes, the Earth. But if we judge by recent news, to bet on consciousness-raising is a bit risky since the number of American and Chinese and even British citizens denying the anthropic origin of climate change is actually waxing instead of waning (even in “rationalistic” France, a former minister of research, with a nice uplifting name, Professor Cheerful, has managed to convince a large part of our most enlightened publics that there is so much controversy about the climate that we don’t have to worry about it after all).

It seems that, as in Lars von Trier’s movie *Melancholia*, we might rather all be quietly enjoying the solitary spectacle of the planet crashing into our Earth from the derisory protection of a children’s hut made out of a few branches by Aunt Steelbreaker. As if the West, just when the cultural activity of giving a shape to the Earth is finally taking a *literal* and not a symbolic meaning, resorted to a totally outmoded idea of magic as a way to forget the world entirely. In the amazing final scene of a most amazing film the hyper-rational people fall back

onto what old primitive rituals are supposed to do—protecting childish minds against the impact of reality. Von Trier might have grasped just what happens after the sublime has disappeared. Did you think Doomsday would bring the dead to life? Not at all. When the trumpets of judgment resonate in your ear, you fall into melancholia! No new ritual will save you. Let’s just sit in a magic hut, and keep denying, denying, denying, until the bitter end.

So what do we do when we are tackling a question that is simply too big for us? If not denial, then what? One of the solutions is to become attentive to the *techniques* through which scale is obtained and to the instruments that make *commensurability* possible. After all, the very notion of anthropocene implies such a common measure. If it is true that “man is a measure of all things” it could work also at this juncture.

It is a tenet of science studies and actor network theory that one should never suppose that differences of scale already exist but instead always look for how scale is produced. Fortunately, this tenet is ideally suited to ecological crisis: there is nothing about the Earth as Earth that we don’t know through the disciplines, instruments, mediations, and expansion of scientific networks: its size, its composition, its long history and so on. Even farmers depend on the special knowledge of agronomists, soil scientists and others. And this is even truer of the global climate: the globe by definition is not global but is, quite literally, a *scale model* that is connected through reliably safe networks to stations where data points are collected and sent back to the modellers. This is not a relativist point that could throw doubt on such science but a *relationist* tenet that explains the sturdiness

of the disciplines that are to *establish*, multiply and do the upkeep of those connections.

I am sorry to insist on what looks like splitting hairs, but there is no way to explore a way out of the disconnect if we don't clarify the scaling instrument that generates the global locally. My argument (actually science studies' argument) is that there is no zoom effect: things are not ordered by size as if they were boxes inside boxes. Rather they are ordered by connectedness as if they were nodes connected to other nodes.

Nobody has shown this better than Paul Edwards in his beautiful book on climate science, *A Vast Machine*. If meteorologists and later climate scientists have been able to obtain a "global" view, it is because they managed to build more and more powerful models able to recalibrate data points elicited from more and more stations or documents—satellites, tree rings, logbooks of navigators dead long ago, ice cores, and so on.

Interestingly enough, this is exactly what leads the climate deniers to their denials: they find this knowledge too indirect, too mediated, too far from immediate access (yes, those epistemological doubting Thomases apparently believe only in *unmediated* knowledge). They are incensed to see that no data point in itself has any sense, that those data all need to be recalculated and reformatted. Exactly as the negationists do about the crimes of the past, climate deniers use, for future crimes, a positivistic touchstone to poke holes into what is an extraordinary puzzle of crisscrossing interpretations of data. Not a house of cards, but a *tapestry*, probably one of the most beautiful, sturdy and complex ever assembled. Of course there are a lot of holes in it, having holes is what weaving knots and nodes is about. But this tapestry is amazingly

resilient because of the way it is woven—allowing data to be recalibrated by models and vice versa. It appears that the history of the anthropocene (climate sciences are by definition a set of historical disciplines) is the best documented event we have ever had. Paul Edwards even argues at the end of his book that we will never know *more* about the present global warming trend since our action modifies the baseline so much, year after year, that we will no longer have any baseline to calculate the deviation from the mean...What a perversity: to witness the human race erasing its deeds by deviating so much that its further deviations can no longer be traced.

The reason it is so important to stress this slow, tapestry-weaving process of calibration, modelling and reinterpretation is because it shows that even for the climate scientists there is no way to measure up *directly* with the Earth. Thanks to the slow calibrating processes of many standardizing institutions, what they do is to carefully watch a local model from the tiny locus of a laboratory. So there is one disconnect we don't have to share: we don't have on one side the scientists benefitting from a globally *complete* view of the globe and, on the other, the poor ordinary citizen with a "limited local" view. There are *only local* views. However, some of us look at *connected* scale models based on data that has been reformatted by more and more powerful programs run through more and more respected institutions.

For those who wish to bridge the gap and fathom the new disconnect, this foregrounding of the instruments of measurement may offer a crucial resource—this time for politics. It is useless for the ecologically motivated activist to try shaming the ordinary citizen for *not* thinking globally enough, for not having a feel for the

Earth as such. No one sees the Earth globally and no one sees an ecological system from Nowhere, the scientist no more than the citizen, the farmer or the ecologist—or, lest we forget, the earthworm. Nature is no longer what is embraced from a far-away point of view where the observer could ideally jump to see things “as a whole”, but the assemblage of contradictory entities that have to be composed together.

This work of assembly is especially necessary if we now are to imagine the “we” that humans are supposed to feel part of in taking responsibility for the anthropocene. Right now there is no path leading from my changing the light bulbs in my home straight to the Earth’s destiny: such a stair has no step; such a ladder has no rung. I would have to jump, and this would be quite a *salto mortale*! All assemblages need intermediaries: satellites, sensors, mathematical formulae, and climate models, to be sure, but also nation states, NGOs, consciousness, morality and responsibility. Can this lesson of assembly be followed?

One tiny way toward such an assemblage is provided by the work done by several scholars of my persuasion around what we call “the mapping of scientific controversies”. Controversies are not what we should escape from but what should be composed, actor after actor, exactly as those who model the climate ad, actor after actor—the role of air turbulences, then the clouds, then the role of agriculture, then the role of plankton, every time gaining a more and more realistic rendering of this true *theatre of the globe*.

Such an attempt at mapping controversies is one example of the instruments that bridge in part the disconnect between the size of the problems we face and

our limited grasp and attention span. Especially if we seize the opportunity offered by digital information to bring together in the same optical space documents coming from science and documents coming from public arenas.

At first, the confusion is horrible as if facts and opinions were mixed up. But that’s just the point: facts and opinions *are* already mixed up and they will be even *more* mixed up in the future. What we need is not to try isolating once again the world of science and the world of politics—how can we even imagine keeping such a program in operation in the time of the anthropocene, that mix up of all mix ups?—but deciphering with a new metrology the *relative* weight of the entangled cosmologies. Since it is now the worlds that are in question, let’s compare cosmologies with one another. Instead of trying to distinguish what can no longer be distinguished, ask these key questions: what world is it that you are assembling, with which people do you align yourselves, with what entities are you proposing to live?

After all, this is just what has recently allowed scholars to follow how the anthropic origin of “climate weirding”, a fact which was taken as well established fifteen or twenty years ago, and that has been reduced in the eyes of millions of people to the level of a mere opinion. Very quickly it became possible for scholars to follow with the same instruments that allow us to trace the production of science (search engines, scientometrics and bibliometric tools, maps of the blogospheres), the people, lobbies, credentials, and money flows of those who insisted on making it a controversy. I am thinking here of the work of Naomi Oreskes or of James Hoggan. How interesting to see the connections made between

big oil, cigarette manufacturing, antiabortionists, creationists, Republicans and a worldview made of very few humans and very few natural entities. If it is cosmograms against cosmograms, then let's compare cosmograms with one another. That's what politics has become. Let's pit the worlds against one another since it is a war of worlds.

I tried to introduce in philosophy the word composition and "compositionism" just for that reason. Not only because it has a nice connection with *compost*, but also because it describes exactly what sort of politics could follow the path of climate science. The task might not be to "liberate climatology" from the undue weight of political influence (this is what Texas governor Rick Perry claims: scientists are in it for grant money and the opportunity to advance a socialist agenda that even Lenin failed to impose on the courageous Yankees). On the contrary, the task is to follow the threads with which climatologists have built the models needed to bring the whole Earth on stage. With this lesson in hand we begin to imagine how to do the same in our efforts to assemble a *political body* able to claim its part of responsibility for the Earth's changing state.

After all, this mix up of science and politics is exactly what is embodied in the very notion of anthropocene: why would we go on trying to *separate* what geologists, earnest people if any, have themselves intermingled? Actually, the spirit of our tongue has said that all along, having already connected *humus*, *humane* and *humanity*. We the Earthlings are born from the soil and from the dust to which we will return, and this is why what we used to call "the humanities" are also, from now on, our sciences.

So far I have insisted on one side of the disconnect, the one that led us toward the helpless human race unwillingly changing its clothes into those of Superman. It is time now to turn our attention toward the other side, what used to be called "nature". The tricky notion of the anthropocene modifies both sides of what has to be bridged: the human side for sure, as we are deprived of the possibility of any longer feeling the sublime, but also the side of the geological forces to which we humans are now aligned and compared. At the same moment when humans have been changing the shape of the Earth without being used to their new Gargantuan clothes, the Earth has metamorphosed of late into something that James Lovelock has proposed to name Gaia. Gaia is the great Trickster of our present history.

In the remainder of this essay, I'd like to explore how different Gaia is from Nature of olden days. When we put together the two mutations, the one on the side of the Earthlings and the one of the side of the Earth, we might find ourselves in a slightly better position to bridge the gap.

First, Gaia is not a synonym of Nature because it is highly and terribly *local*. During the period studied by Peter Sloterdijk as the time of the Globe, that is, from the 17th to the end of the 20th century, there was some continuity between all elements of what could be called the "universe" because it was indeed unified—but unified too fast. As Alexandre Koyré had said, we were supposed to have moved once and for all from a restricted *cosmos* to an infinite *universe*. Once we crossed the narrow boundary of the human polity, everything *else* was made of *same* material stuff: the land, the air, the moon, the planets, the Milky Way and all the way to the Big Bang. Such has

been the revolution implied by the adjectives “Copernican” or “Galilean”: no longer any difference between the sublunar and the supralunar world.

How surprising then to be told, quite suddenly, that there is after all a difference between the sublunar and the supralunar world. Also to be told that only robots and maybe a handful of cyborgian astronauts might go further and beyond but that the rest of the race, nine billion of us, will remain stuck down here in what has become once again, just as in the old cosmos, a “cesspool of corruption and decay”, or at least, a crowded place of risk and unwanted consequences. No beyond. No away. No escape. As I said earlier, we can still feel the sublime, but only for what is left of nature *beyond* the Moon and only when we occupy the View from Nowhere. Down below, no longer any sublime. Here is a rough periodization: after the cosmos, the universe, but after the universe, the cosmos once again. We are not postmodern but, yes, we are post-natural.

Second, Gaia is not like Nature, indifferent to our plight. Not exactly that She “cares for us” like a Goddess or like Mother Nature of so much ecological New Age pamphlets; not even like the Pachamama of Inca mythology recently resurrected as a new object of Latin America politics. Although James Lovelock has often flirted with metaphors of the divine, I find his exploration of Gaia’s indifference much more troubling: because She is at once extraordinarily *sensitive* to our action and at the same time She follows goals which *do not* aim for our well-being in the least. If Gaia is a goddess, She is one that we can easily put out of whack while She in turn may exact the strangest sort of “revenge” (to borrow from the title of Lovelock’s most strident book) by getting rid of

us, “shivering us” out of existence, so to speak. So in the end, She is too fragile to play the calming role of old nature, too unconcerned by our destiny to be a Mother, too unable to be propitiated by deals and sacrifices to be a Goddess.

Remember the energy spent in the past by so many scholars to weed out the difference between “nature” and “nurture”? What happens now when we turn to “nature” and realize that we are the ones that should be “nurturing” Her so as not to be reduced to irrelevance by Her sudden change of steady state. She will last. Don’t worry about Her. We are the ones who are in trouble. Or rather with this enigma of the anthropocene there is some sort of Moebius strip at work here, as if we were simultaneously what encompasses her—since we are able to threaten Her—while She is encompassing us—since we have nowhere else to go. Quite a trickster, this Gaia.

Although in this essay I cannot go through all the features that make up the originality of Gaia, I nonetheless need to conclude with two more.

The third trait and probably the most important is that Gaia is a *scientific* concept. It would be of no interest if it were associated in your mind with some vague mystical entity such as Aywa, the networky Gaia of the planet Pandora in Cameron’s *Avatar*. Even though Lovelock has long been a heterodox scientist and remains largely a maverick, the real interest of the concept he assembled from bits and pieces, is that *it is* assembled from bits and pieces, most of them coming from scientific disciplines—apart from the name suggested to him by William Golding. Developing a concept that was not made mainly of scientific content would be a waste of time since the requirement of our period is to pursue the anthropocene

along lines dictated by its hybrid character. What we mean by spirituality has been too weakened by wrong ideas of science to offer any alternative. The supernatural, in that sense, is much worse than the natural from which it comes. So, in spite of the name, as far as we know from the comparative study of religion, Gaia does not really play the older role of a goddess. As far as I can figure, Gaia is just a set of contingent positive and negative cybernetic loops—as demonstrated in the well-known “Daisy world” model. It just happens that those loops have had the completely unexpected effect, one after the other, of furthering the conditions for new positive and negative loops of ever more entangled complexity. There is no teleology, no Providence, in such an argument.

Of course, we should be careful with the label: when I say that Gaia is a “scientific” concept, I don’t use the adjective in the *epistemological* sense of what introduces a radical and traceable difference between true and false, rational and irrational, natural and political. I take it in the new, and in a way much older sense of “scientific”, as a cosmological (or rather a *cosmopolitical*) term designating the search for, as well as the domestication and accommodation of new entities that try to find their place in the collective *in addition* to those of humans, most often by displacing the latter. The great thing about Lovelock’s Gaia is that it reacts, feels and might get rid of us, without being ontologically unified. It is not a super-organism endowed with any sort of unified agency.

It is actually this total lack of unity that makes Gaia *politically* interesting. She is not a sovereign power lordling it over us. Actually, in keeping with what I see as a healthy anthropocene philosophy, She is no more

unified an agency than is the human race that is supposed to occupy the other side of the bridge. The symmetry is perfect since we don’t know more what *She* is made of than we know what *we* are made of. This is why Gaia-in-us or us-in-Gaia, that is, this strange Moebius strip, is so well suited to the task of composition. It has to be composed piece by piece, and so do we. What has disappeared from the universe—at least the sublunar portion of it—is continuity. Yes, She is the perfect trickster.

The fourth and last trick I want to review is of course quite depressing. The whole disconnect I have reviewed here is built upon the very idea of an immense threat to which we would be slow to react and unable to adjust. Such is the spring with which the trap has been set. Of course, confronted with such a threatening trap, the most reasonable of us react with the perfectly plausible argument that apocalyptic pronouncements are just as ancient as humans. And it is true, for instance, that my generation has lived through the nuclear holocaust threat, beautifully analysed by Gunther Anders in terms very similar to those used today by doomsday prophets—and yet we are still here. In the same way, historians of environment could argue that the warning against the dying Earth is as old as the so-called Industrial Revolution. Indeed, a further dose of healthy scepticism seems warranted when reading, for instance, that Durer, the great Durer himself, was simultaneously preparing his soul for the end of the world expected for the year 1500 while investing a bundle of hard money on printing his beautiful and expensive prints of the Apocalypse in the hope of a hefty profit. So with these comforting thoughts, we could reassure ourselves about the folly of prophesying Doomsday.

Yes, yes, yes. Unless, that is, it's just the other way around and that we are now witnessing another case of having cried wolf too long. What if we had shifted from a symbolic and metaphoric definition of human action to a *literal* one? After all, this is just what is meant by the anthropocene concept: everything that was symbolic is now to be taken literally. Cultures used to “shape the Earth” symbolically; now they do it for good. Furthermore, the very notion of culture went away along with that of nature. Post-natural, yes, but also post-cultural.

Referring to the famous study at the origin of the very notion of “cognitive dissonance” (Festinger, Riecken and Schachter’s *Why Prophecy Fails*), Clive Hamilton argues that we should heed again the study of Mrs. Keech and her prediction of the end of the world. Our disconnect might not reside in expecting the end and then having to reorganize our belief system to account for why it’s *not* coming (as the early Christians had to do when they realised that the End was not that of Christ crashing through the sky in a display of Apocalyptic pyrotechnics but rather the slow earthly expansion of Constantine’s empire). But for us today the disconnect could be in believing that Doomsday is *not* coming once and for all. It would be a nice and terrifying case of *When Prophecy Succeeds!* And denial, this time, would mean that we are rearranging our belief system so as *not* to see the Great Coming.

It is for this reason that Clive Hamilton offers the strange and terrifying assertion that it’s *hope* that we should abandon if we wish to enter into any transaction with Gaia. Hope, unremitting hope, is for him the source of our melancholia and the cause of our cognitive dissonance.

I hope (ah, hope again!) to have shown why it might be important, even urgent, to bring together all the possible resources to close the gap between the size and scale of the problems we have to face and the set of emotional and cognitive states that we associate with the tasks of answering the call to responsibility without falling into melancholia or denial. It is largely for this reason that we have resurrected this rather out of fashion term of “political arts” for the new program we created in Sciences Po to train professional artists and scientists—social and natural—to the triple task of scientific, political and artistic representation.

NOTE

- 1 I thank Michael Flower for many suggestions and for kindly correcting my English.

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THE SATELLITE AND THE WORK OF ART IN THE AGE OF TELECOMMUNICATIONS

EDUARDO KAC

THE FIRST SATELLITE communications system appeared in 1945, from the imagination of the science fiction writer Arthur C. Clarke, who wrote one of the greatest classics of the genre: *2001, A Space Odyssey*. This was the year when Clarke published his visionary essay “Extra-terrestrial Relays” in the October issue of *Wireless World*, anticipating the real launch of artificial satellites, which would take place in 1957 when the Soviet Union’s *Sputnik* went into orbit. Technological development and the space race have developed rapidly thereafter, so that today more than one hundred satellites are spinning around the Earth.

Ideas are intangible. Satellites are real. After radios, they are probably the most important communication tools of the twentieth century. The importance of satellites is just now being felt, yet satellites remain something of a mystery even to people whose work or leisure depends on them. Why? For one thing, satellites

are invisible. When a person makes a phone call, he or she doesn’t really care whether the conversation will be transmitted by cable, microwave, or satellite, as long as it gets through. For another, the cost of operating a satellite is spread over so many customers that none of them seems to have any property rights in it. Then, too, the process of designing, launching, and maintaining a satellite is far beyond the resources of all but the largest corporations or public institutions, so people feel humbled by the enterprise and probably awestruck that anyone can understand it (Glatzer 1983).

Indeed, complete understanding of how a space device works is beyond the knowledge of a layperson. But it is not difficult to understand that the signals are transmitted from land stations, amplified inside the satellite, and received by another station on Earth. Satellites hover beyond gravity, some thirty-six thousand kilometers high, and release a huge amount of information over our heads every day, encompassing the whole gamut of mankind’s interests and activities. News, personal conversations, soap operas, educational programs, documents, ads, sports events, films, disasters, banking services, music, conferences, digital information, wars, shows—they all are transmitted via satellite into a realm that is demarcated as either public or private, national or international.

Teleculture, Videophone, New Art

The problem is that the telecommunications being discussed is mainly of two types. It is either concerned with artists’ access to the “mass-media” of cable or

broadcast television (Art vs. Dallas) or a demonstration of high-tech wizardry (21st century or Buck Rogers telecomm). "Art versus Dallas" telecomm not only suffers from the one-sidedness of the contest but from the fact that the "mass-media" are not, except in the most minimal sense, communicative. The material flows almost entirely in one direction—from program-maker to audience. The viewer body-count of the audience survey companies being just about all that the passive television victim can put into the system. It doesn't really matter what kind of material gets broadcast (Art = Dallas) because the relationship between the parties remains the same. The hierarchies are not disturbed by altering the nature of the transmitted material (Adrian X 1984).

The use of artificial satellites in art therefore deepens the issues raised by other genres of telematic art. While computer memory raises questions of access (the viewer only sees the desired works in their chosen order) and storage (hundreds of works can be stored on the smallest disc), the satellite allows the artist to create a two-way flow of signs in real time; in other words, it allows the artist to create an aesthetic event that is consumed simultaneously with the same informational charge in two distant locations as the result of exchange rather than consultation. The suppression of (physical) space in terms of (real) time sets up a transmaterial relationship between signs (signals) and simultaneous (instantaneous) perception by different audiences. Operating like a videophone (exchanging audio and video signals), the art satellite—or artsat—triggers new forms of telebehavior.

Oddly enough, technological progress sometimes seems to lead perception to extreme states, as a parallel reality, which is commonly called parapsychological. Such is the case of the phenomenon studied by Jung, for example, known as "synchronicity of events," which finds direct correlation in a satellite *interlink*.

Telespace, Teletime

In electronic art, the word *space* loses the meaning it was given by the most radical avant-garde movements, from cubism to abstract expressionism, and even the one suggested by the new developments in sculpture. "Space" no longer refers to strict pictorial space or to the empty space within or around the matter, but rather it refers to a cosmic space in a dialogic relationship with informational space, and made present through holoiconography and the multidimensional perception this demands.

By creating the artsat, the artist works in the space of electromagnetic waves that are virtually integrated through the process of mutual transmission and reception. These waves can neither be visualized *au grand complet* nor experienced *in loco* by the viewer, located either in a vacuum or at one of the two connected points on the Earth's surface. By imagining a connection between two distant regions on the planet, such as Brazil and Japan, the artist works with relative notions of time, since the different time zones must be addressed as expressive elements of the work.

From the perspective of aesthetic research, artsat expands the boundaries of sensory experience and human knowledge. The high-tech artist carries out a type of spatial investigation that is not the same as that of the scientist or that of the ufologist, but takes elements

from both to form a new grammar and a new vocabulary. The work of speculation takes place in the space of the imagination, and uses a new expressive code based on two links (the signal rising and descending) whose main agent is the artificial satellite. Here we have a kind of perceptual “re-semanticization,” since the shortest distance between two points in open space is not necessarily a straight line and because notions of “above” and “below” lose their meaning as the reference points for guiding our *mental* processes disappear.

Our notion of distance also changes in face of the sensation of proximity we experience when looking at the moon. Knowing that the Earth is 380,000 kilometers away from this natural satellite and seeing photographs of the Earth setting on the Moon’s horizon not only replaces the romantic gaze with cosmic awareness but this also forges a new psychological scale. The solar system itself replaces Earth as our reference point, our home. The notion of distance collapses in the face of the great open question posed by the structure of the universe.

Signs in Orbit

Artists’ passion for flying machines began with the Futurists, who were lovers of adventure, speed, and heights. But it was in 1984 that the first art rocket on record, *Leonardo I*, was launched in California by Ginny Lloyd, artist-in-residence at the Alamogordo Space Center in New Mexico, and Mike Mages, artist and rocket technician. Terrence McMahon says of *Leonardo I*, in his article “Suborbital Art,” “We need an artist in space—not just a traditional planet painter, but the avant-garde conceptual artist that will create unusual, oblique

statements reflecting the chaotic and unified elements that make up the soul of space” (McMahon 1985).

The launch of the first art rocket led to other flights, like the one for placing a sculpture or poem (nonutilitarian artificial satellite) into Earth’s magnetic field or sending a holographic artwork to the frontiers of the universe (visible only when light falls at certain angles), to be observed by cosmonauts, settlers, or—who knows?—extraterrestrials. By reflecting light, these works would reach distant viewers as pseudo-stars. Arthur Woods, a North American artist based in Switzerland, has already developed plans for space sculptures.

The artsat therefore directly reformulates the strict notions that structure our awareness. A Henry Moore sculpture weighs the same in any part of the world, while the weight of a body in space is not the same as it is in the Earth’s atmosphere, since its weight depends on its distance from the center of the Earth.

An artist who plans to put a cosmic sculpture or a poem into orbit needs to include in the calculations the classic formula of universal gravity, according to which two bodies attract each other with forces proportional to the product of their masses and inversely proportional to the square of the distance between them. The artist has to measure the centrifugal force that the sculpture or the poem will create, since this force, produced by the spinning of the satellites, will compensate for their weight and sustain their orbit.

In order for the sculpture or poem to maintain the correct speed, the artist has to consider the height of the flight, not the mass, since satellites of different masses fly at the same speed at identical altitudes. The higher a satellite’s flight, the less speed is needed to keep it in

orbit. Another aspect to be taken into consideration is that a work of space art does not need to have an aerodynamic shape: there is no air in space and consequently no friction. This is why satellites can have strange and unusual shapes. In a challenge to our visual system that associates size with weight, an artificial celestial body has little weight due to the height of its orbit and its centrifugal force, and requires only a simple metal part to connect two elements weighing more than one hundred metric tons. This kind of harmony is impossible to achieve in the Earth's atmosphere.

The Spy Who Came in from the Vacuum

The Moon is the nearest spaceport, and the stars are a cheap and lucrative energy source. In the near absence of gravity known as “microgravity,” it is possible to discover perfect crystals, metal alloys, and chemicals that are hard to find on Earth. The sky that was once the limit is now a rich vein of trade and industry. Man's first solo flight in space with a cosmic backpack opened a new existential dimension for the species, breaking its umbilical cord with the mother planet. Not in vain has NASA planned a space station where eight people will live for one or two years, working in a satellite workshop and astronomical observatory, free of heat, pollution, and atmospheric distortions. Human life in space is slowly leaping from the drawing board to become a reality.

Meanwhile, back on Earth, the natural apprehension of the senses is being replaced by intermediary systems. Nature itself has given way to a new landscape involving technoimages and new hardware, with video-text terminals and satellite dishes. In this telesociety, the artist seizes the satellite as a fundamental vehicle to

create new experiences in the little-tested technospatial reality. By creating works of satellite art, the artist broadens the boundaries of the senses and acts as a driving agent of a future world on technoscientific, sociocultural, and political and economic levels.

The creative use of the artificial satellite takes on a particular symbolic importance in the social and political spheres. The institutional control of planetary means of communication is in fact control of the collective imagination and, therefore, of social and individual awareness, since this mechanism filters the words, sounds, images, and “syntaxes” to which the general audience has access and imposes a worldview that is limited and limiting. The artist, however, uses the same media freely, releasing the imagination (of the artist and audience) in the spectrum of frequencies used by terrestrial and spatial telecommunications. By acquiring mastery of hardware and systems, the artist not only restores to art a little of the characteristic spontaneity of interpersonal conversation—in which each stimulus responds to another in a chain reaction of improvisations—but also balances it with the rational and programmatic use of technology. This harmony results in a new experience that can only really be sensed within art's realm, which is not obliged to communicate closed messages or to use systems in a conventional way.

It's important to note that great scientific discoveries and technological innovations are the fruit of military funding, since the satellites themselves can operate as real electronic spies, capturing signs of troop movements, of missile bases under construction, and of other secret communications circulating through the stratosphere. The threat of a global conflict hangs in the air, therefore,

and the artistic use of artificial satellites reinforces their pacific use, as a signal launched into infinity in the defense of life.

Gigahertz to the Stratosphere

The artist suggests new relationships between art, hardware, and systems. The artist creates new connections and produces the “aesthetic” at the moment when the unlikely is converted into an acausal connection of possible situations. Artsat, therefore, affirms its specific and irreducible nature in relation to video, performance, and televisual arts. Appreciation of an aesthetic state does not require the apprehension of the object, since the artsat’s purpose is not the production of any kind of artifact. This appreciation takes place—unlike other non-objectual aesthetics such as “conceptual art”—in the use of the logic (syntax) of telecommunications systems, which are displaced from their social context to an individualized network that stresses its own structure.

So, just as Mozart mastered the newly-invented clarinet, the satellite artist must compose his art from the beginning suitable to physical conditions and grammar. Satellite art in the superior sense does not merely transmit existing symphonies and operas to other lands. It must consider how to achieve a two-way connection between opposite sides of the earth, how to give a conversational structure to the art, how to master differences in time, how to play with improvisation, in-determinism, echoes, feedbacks, and empty spaces in the Cagean sense, and how to instantaneously manage the differences in culture, preconceptions, and common sense that exist between various nations.

Satellite art must make the most of these elements (for they can become strengths or weaknesses), creating a multitemporal, multispatial symphony (Paik 1984).

Real art always redefines its parameters, questioning its rules and breaking down historicized barriers and assimilated codes. The creative use of the artificial satellite or artsat offers the projection of interpersonal subjectivity over the technological complex, in contrast to the objectivity that the technotronic landscape imposes on humankind and its categories of thought. The real issue is the revelation of human significance in the electronic context of a new telematized society. Thus, words, images, and actions involved in an artsat work do not simply aim for information exchange between two transmitters/receivers, but rather for the expression of this exchange. In art and in life, we are in tune with the unknown. On Earth, as it is in heaven.

REFERENCE LIST

Adrian X, Robert. 1984. "Die Kunst der Kommunikation / Communicating / L'art de communiquer." In *Art + Telecommunication*. Western Front, Canada, and Blix, Austria.

Glatzer, Hal. 1983. *The Birds of Babel: Satellites for a Human World*. Indianapolis: Howard W. Sams&Co.

McMahon, Terrence. 1985. "Suborbital Art." *Light Works* (17), Michigan.

Paik, Nam June. 1984. "Satelliet/Kunst/ Art/Satellite." In *HetLumineuzeBeeld / The Luminous Image*. Amsterdam: Stedelijk Museum.

(2009)

SCIENCE AND THE ETHICS OF CURIOSITY

SUNDAR SARUKKAI

The Troubled Relationship Between Science and Ethics

What does ethics have to do with science? After all, for over centuries there has been a sustained belief that science is not answerable to ethical concerns. Science as a specific kind of activity (and discourse) is often seen to be independent of ethics. This belief is so much ingrained into the science community that even today prominent scientists as well as students of science echo the belief that science only discovers truths, and the ethics are only in the context of how the products of science are used or misused. The most common example is that of the knife: a knife is used to kill but it is also used for other useful purposes. When used to kill, one should not blame science (as far as the knife is seen as a product of science). This is an oft-repeated argument for shifting the ethical responsibility from science to the larger set of users of science—this might include the ordinary citizen as well as governments. In doing so, what is reiterated is the fact that the truths of science are

transcendental truths, outside human interests and therefore, outside ethical concerns.

The philosophers supply ammunition to this position by distinguishing between facts and values, a distinction that has a long intellectual history. This philosophical distinction offers one possible way to argue for science's independence from ethics. Science is a discourse of facts—facts about the universe. Ethics is about values—values held by humans. Scientific truth and facts are not human-centric. In fact, their exalted status arises primarily because they are thought to be independent of human subjects and thus it is reasonable to expect that they are not concerned with ethics. This distinction is reinforced by what is called the 'naturalistic fallacy' by philosophers. This is the fallacy of confusing the world of facts and values, the 'is' with 'ought'. The world of 'is' is the world of facts and the world of 'ought' is the world of normative ethics. How one ought to behave is an ethical question whereas how the world is a matter for science.

But, even if we subscribe to the view that facts and values should not be conflated, there is still a problem for the science–ethics relation. Science is not merely a descriptive enterprise. It does not just list out the facts of the universe. Science is as much about intervention as it is about description.¹ In fact, explanation, which is an important category for modern science, is privileged in science because it affords a greater control over intervention in the world. In other words, science understands the world in order to intervene in it, to 're-form' the world to suit our needs and desires. Many contemporary discussions on ethics and science—for example, the ethics of cloning and stem cell research—centre around this interventionist strategy of science.

By intervening in the world, scientists deflect the question of ethics from the 'pure' to the 'applied' domain. The creation of these two categories of the pure and applied is itself an interesting move within the sciences. Pure science is often placed in 'opposition' to applied science (including engineering). The privilege given to pure sciences has had significant impact on the growth of scientific institutions. The hierarchy in which the pure is 'above' the applied is commonly reflected in the practice of science even today.

How is this distinction tenable? One way to understand this distinction is by invoking the idea of 'disinterestedness'. This idea has been used by philosophers in effective ways. For example, Kant uses this idea as a defining marker in his definition of art. Disinterestedness is another way of expressing the absence of human interest in any belief or claim. It also suggests lack of prior motivation, 'ulterior motives', in doing something. The claim is that pure science reflects this disinterestedness. Its discoveries are about the way the world is and therefore cannot be influenced by human interests and desires. Pure science captures this character of science that it uncovers a set of human-independent truths. Applied science is application of these discoveries and scientists do not have much trouble in accepting that such applications can be influenced by individuals, state, religion and so on.

The very distinction of the pure and applied is already value-laden. The usual opposites of pure are 'impure', 'contaminated', and so on. Applied is not exactly contrary to pure but has elements of these contraries. The value given to the image of pure is indeed very significant—purity is associated with the mind in certain

states, to austere practices of the body, to high ethical action, to individuals who perform certain heroic acts and so on. Pure has high ethical value in religious systems. It has similar value even in areas such as chemistry where the isolation of the pure substance can be a worthwhile challenge. Racially, the idea of the pure has significant connotations and has spawned various fundamentalist challenges to society. It is in this larger world of the 'pure' that 'pure science' should be located. Given this trajectory of the pure, the word 'applied' in 'applied science' may have pejorative connotations. Applied is somewhat 'impure'—the taint or the contamination comes from the mixing of human interests in what is pure knowledge. The value to the applied is the value of materiality and not the value of disinterested inquiry. This also means that pure in the pure sciences does an important job for science—it keeps pure science out of the concern of ethics. Pure science is seen to be above ethical challenges. It is not that the claims of pure sciences are ethically sound or unsound; it is that they are not answerable to ethics first of all. If ethics is applicable to science at all then it must be in the domain of applied science—this is the commonly voiced claim about science in the context of ethics. This argument is so pervasive that scientists commonly use this for ethical questions on a whole range of issues ranging from uses of knife to nuclear energy/bomb.

It is striking that even in an essay published as recently as 2006 (and republished in an edited book in 2007) a scientist, Mario Bunge, rehashes the same argument. For example, the first section in this essay is titled 'Do not blame scientists: Frisk technologists'. Here Bunge continues the problematic distinction between

basic and applied sciences and notes that ‘basic science, which is the attempt to understand the world, was mistakenly attributed the power to change it’ (p. 29).² He continues to echo the most prevalent cliché about science and ethics in saying that ‘technology can be used by industry or government for either good or evil...nuclear engineering, which is based on nuclear physics, can be used either to design nuclear plants or nuclear bombs’. He goes on to title the next section as ‘The ethics of basic science’ where he reiterates the convenient distinction by noting that ‘basic scientists’ (who work on basic science) need have ‘no such scruples’ (ethical ones which might afflict the technologist) because ‘his work is unlikely to have practical uses’ (ibid., p. 30). He also notes that basic science is characterized by a particular ethos. Following Merton, he lists the elements of this ethos as consisting of ‘intellectual honesty, integrity, epistemic communism, organized scepticism, disinterestedness, impersonality, and universality’ (ibid.). All these are virtues which underlie basic or pure science. The interchangeability of ‘basic’ and ‘pure’ is explicitly expressed by him when he notes that ‘basic science is pure, but individual scientists may get corrupted’ (ibid., p. 33). These scientists get corrupted ‘when given the opportunity to double as either technologists or policy consultants’! He further goes on to add that ‘[B]asic research is the search for truth, not for wealth, justice, salvation, or beauty’ (ibid.).

Bunge is not alone in his beliefs about basic/pure science and its ethos. Countless scientists place enormous emphasis on these beliefs although it seems obvious that there is little that is pure about pure science. The reward of doing pure science is also material—witness the

human drama around claims of originality, authorship, politicking for getting prizes and so on. None of these motivations are disinterested! But the reason why this distinction continues to be so important today is that there is an underlying ideology in insisting on this distinction as well as celebrating the ethos of the pure. I believe that this distinction and the invocation of the pure is primarily the most effective way of deflecting ethical concerns addressable to science. Scientists take this position so that they can escape from the ethical imperative and in doing so are exhibiting their political agenda of safeguarding their work against pressures of the larger society. The fact that they have managed to escape from answering to the ethical challenge so far illustrates the effectiveness of this ideology.

In this paper, I will consider one essential catalyst for this distinction. While disinterestedness and other such characteristics are markers of pure science, they are all based on a human capacity, the capacity for curiosity. Many influential narratives on science by scientists describing why they do science identify the nature of curiosity as a primal characteristic of the scientific attitude. Curiosity is a special faculty of the mind. Curiosity is not reason; rather, it needs reason to sustain it. Curiosity is what is common to the child and to the scientist, leading psychologists and philosophers to find parallels between a scientist and being a child.³ This is a position that finds strong resonance among practising scientists and contributes to the distance between ethics and science, for children can be excused from ethical excesses. Science uses the notion of curiosity to build a wall against ethical criticisms. Therefore, I believe that a proper ethical foundation for science can

be developed only if we first understand the ethics of curiosity....

Science and Curiosity

Why does one do science? Why do scientists say they do science? What attracts them to that activity as compared to other activities? In popular discourses on science, particularly by scientists, there is much emphasis placed on the excitement of doing science at the individual level. The description of this excitement is often in terms of notions such as awe, the pleasure of discovering something new, satiating curiosity, engaging with something beautiful and so on. Many of these characteristics are derivative to a primary characteristic of the human mind, one which is very influential in the original drive towards doing science. And this characteristic is that of human curiosity. One begins to do science merely because one is curious, where curiosity is seen to be a very important element of being human. However, although ubiquitous, it is not easy to understand the nature of curiosity.

Curiosity is seen to be the catalyst that creates knowledge. Because we are curious, we think. Because we are dissatisfied with the answers we get, we come up with new ways of thinking. Because we are curious, we discover methods. We discover science. We can distinguish—loosely—different types of curiosity. We may be curious about what something is—for example, I see an object I have not seen before and I am curious to know ‘what’ the object is. We are curious to know why something is the case—why is the sky blue? Why is the neighbour’s door locked all the time? We are curious about how something works. Experimental science is

based so much on the character of curiosity—our first engagement with tools and technological objects is often one of curiosity. For example, an experiment was conducted in Delhi which involved keeping a computer in a hole in the wall in a locality where slum children lived (see <http://www.hole-in-the-wall.com/>). Rather than teaching them computers formally, these children were exposed to the computer to do what they wanted. Remarkably, the children learnt many aspects of the computer and they did so because they were driven by curiosity.

Curiosity is so pervasive but there is often a suspicion attached to excessive curiosity. The phrase ‘curiosity killed the cat’ is widely used. Often we caution children not to be ‘over-curious’. Children exhibit a stronger sense of curiosity which seems to diminish as we grow older. This trend often fails in the case of good scientists. The image of the ideal scientist is one who is eternally curious—this should remind us of the pervasive view that scientists are ‘childlike’.

The beliefs about science and curiosity are many and deeply ingrained in the scientific community. Some of these well-entrenched beliefs are: science begins from curiosity, curiosity is the catalyst for pure science, scientists even when they are old should not lose their curiosity, questioning attitude comes through retaining the spirit of curiosity, science is where ‘curiosity is institutionalized’ and so on. Einstein echoes what countless scientists say:

The important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvellous structure of

reality. It is enough if one tries merely to comprehend a little of this mystery every day. Never lose a holy curiosity.⁴

Curiosity is often seen as being synonymous with the questioning attitude. Here it is worthwhile to distinguish between curiosity and doubt. Doubt is an epistemological term—it is derivative to something more basic such as perception.⁵ I see an object which looks like a man but because it is some distance away I am not sure whether it is a tree or whether it could be a tall man. This creates doubt in me and I have a question concerning that doubt. Doubt also can be classified into types of doubt—like curiosity, we have doubt about what something is, why something is the case, how something works and so on. But doubt is not a human trait that is basic in the way curiosity is seen to be. It is not because we doubt that we ask these questions—doubt is based on some judgements we make about our perception and inference. But doubt, like curiosity, is what leads us to questions and also to knowledge. However, curiosity is a psychological act and not an epistemological one. That is, curiosity is ‘biological’—the fact that some people are more curious than others is like saying some people have better eyesight than others. But all have eyesight and all of us have the capacity for curiosity. Doubt is a higher order term in this sense.

But interestingly, curiosity was not always held in high esteem. Phrases such as ‘nosy parker’, ‘morbid curiosity’, ‘curiosity kills the cat’ captured the potential problems inherent in curiosity. Being curious is also to be too nosy, interfering in matters where one is not supposed to, not minding one’s business, being too inquisitive and

so on. Stories in different cultures often are unsympathetic to characters who are too curious. In Western thought, the impact of the myth of Pandora’s Box and what it says about curiosity are well known. The influential *The Golden Ass* by Apuleius illustrates the danger of being overly inquisitive which leads to disastrous consequences. Apuleius is, according to Walsh,⁶ responsible for the popular use of the word ‘curiositas’. The main character in the novel is punished not only for being curious but also for insisting on satisfying his curiosity. A similar parallel occurs in the narrative of the folk tale of Psyche and Cupid. Psyche pays an enduring price for her ‘rash’ curiosity but eventually is saved by Cupid who says that ‘Once again, poor girl, that same curiosity was your undoing’ (ibid., p. 77). In this case, curiosity as a means to knowledge becomes problematical when a person not eligible for a particular knowledge tries to attain it through his or her curiosity. (It is interesting that Indian stories do not seem to emphasize the negative aspects of curiosity as the Western traditions do. There are a few stories such as Kunti’s curiosity which leads her to becoming an unwed mother but on the whole there is definitely a cultural difference in the way this idea has been used in these cultures.)

Walsh discusses various senses of the idea of curiosity starting from Plutarch, who discusses undue curiosity in individuals. Plutarch was worried about the effect of curiosity on social habits such as prying into the affairs of neighbours, ‘their debts, and their private conversations’ (ibid., p. 73). Plutarch then goes on to distinguish two ways of responding to the impulse of inquisitiveness. One is to avoid temptation to be inquisitive when it comes to social behaviour. The other is to direct our curiosity

towards nature—heaven, earth and sea. Plutarch's solution to the problem of curiosity is to distinguish 'vulgar' curiosity and the more lofty 'intellectual' curiosity. Thus, development of 'intellectual' curiosity, which later on becomes so important in the activity of science, should be cultivated against the tendency towards vulgar curiosity.

The emphasis on intellectual curiosity was also of great interest to Augustine. Seneca believed that curiosity about nature was a positive virtue and it is interesting to see why—for Seneca this kind of curiosity is justified because such curiosity towards the world adds to our understanding of the value of human life and therefore can be seen as a 'moral pursuit'. Curiosity of this kind, one which gets valorised in scientific curiosity, had this intrinsic moral character at least in the early Western tradition. (In contrast, such curiosity that characterizes modern science has completely been excluded from the ambit of morality.) As Walsh notes, the Aristotelian tradition supported disinterested inquiry whereas the Stoics argued that such curiosity was justified only if it increases virtue.

By the time of Augustine we can see an established ideological use of 'curiosity'. For the Christian tradition, curiosity was always problematic—even the fall of Adam and Eve is also due to their curiosity. For Augustine, attaining knowledge through means other than (and contrary to) the *Bible* was seen to be the work of 'misplaced' curiosity, 'abominable' curiosity, 'impious' curiosity and the like. Walsh suggests that *The Golden Ass* had a significant influence on Augustine's *Confessions*. A common theme of importance in both is the significance of curiosity. For Augustine, curiosity was part of the

process which led him to follow false trails before 'submitting to Christian baptism' (ibid., p. 82). For Augustine, the curiosity of vision is vulgar whereas that of the mind is disordered. Among the three vices he notes, curiosity is one along with pride and lust. Also, the suspicion towards the dark arts like magic was encoded in these arts being called as 'the curious arts' (p. 268).⁷ Augustine uses the image of lust to describe the acts of curiosity such as curiosity being a 'lust for experimenting and knowing'. He calls curiosity the 'lust of the eyes' but we should note the implications of a 'lust of the mind' which is inherent in this view.

Given Augustine's influence on theology and ethics, it should not be a surprise to discover the impact of his views on curiosity. The medieval theologians continued this distrust of curiosity and along with magic, pagan religions, necromancy, they attacked astrology (which was becoming popular) as an activity which was catalysed by curiosity. Even Aquinas, although accepting the study of nature, retained curiosity in the list of vices. The condemnation of curiosity was widespread, from the Renaissance and Reformation to the age of Puritanism in late 16th and 17th centuries in England. As Harrison points out, these views on curiosity were 'not restricted to moralists and divines, and allusions to this intellectual vice abound in the works of 17th-century poets, prose writers, and dramatists' (ibid., p. 271). Similar to earlier views on curiosity, the strongest vice associated with curiosity was pride, the 'deadly sin'. Harrison notes how Downname (17th century) claimed that pride and curiosity were in a cyclic relation. Pride was the mother of curiosity and at the same time, curiosity led to vain knowledge which increased (or 'puffed-up', a term that begins to get

used widely around this time) one's pride. By the 17th century, methods of inquiry were subjected to ethical analysis and thus each method of analysis came to be associated with virtues or vices as the case may be. If certain methods of knowing and inquiry were associated with vices such as curiosity, vanity and so on, then it also meant that knowledge acquired through such inquiry was contaminated by these vices.

Not only were astrology and alchemy seen to be the 'dubious fruits of curiosity' but so were subjects like mathematics and the mechanical arts in the Renaissance 'associated with the proscribed practices of witchcraft and magic' (ibid., p. 277). There is a common structure that can be discerned in this suspicion towards curiosity. Dominant is the recognition that there is a dual aspect to curiosity—the moral status of the inquirer and the nature of the proposed knowledge' (ibid., p. 278). This explicit invocation of the moral status of the inquirer and also the nature of knowledge derived from curiosity are important elements of any ethical response to curiosity.

This suspicion towards vain/pure curiosity and knowledge about the world, one can imagine, must have constituted a grave challenge to the birth of modern science where both these characteristics are essential. Francis Bacon is often referred to as a very important figure in the establishment of science. In this story of curiosity, he also plays an important role. Bacon begins by distinguishing knowledge about the world and vain curiosity which he relates to magic, alchemy and the like. He then argues for the usefulness of knowledge about the world by relating it to the ethical virtue of charity. Thus, he shifts the association of knowledge with pride, curiosity, etc. to a seminal Christian virtue, namely, charity.

More significantly, he cleverly established the legitimacy of studying nature by two arguments—one, by showing how such effort is consistent with biblical interpretation and the other by denying that knowledge acquisition is not morally wrong if done properly. There is a moral connotation to this proper conduct and thus doing natural philosophy (science for us) necessitated 'certain moral qualifications' (ibid., p. 281). Consider some of these qualifications: purity of the mind with respect to motives, restricting intellectual lust and 'tendency to excess'. In place of 'lust and gluttony' (with respect to the mind) he suggests 'abstinence and chastity' for proper intellectual activity. As Harrison notes, this is an ascetic model of seeking knowledge, elements of which are present in today's narratives about working in science, which includes giving up (or at least have restrained indulgence in) the pleasures of the world, a disciplined and sustained mental perseverance and so on. For Bacon 'it is charity that must motivate the knower, not curiosity' (ibid., p. 282). Therefore, Bacon makes possible the pursuit of science in a way that is acceptable to the larger society by placing knowledge within the sphere of accepted morality as well as erasing negative views on curiosity.

From the 17th century positive values got attached to curiosity. Hobbes characterized curiosity as a 'morally neutral "appetite of knowledge"' (ibid., p. 283). Hobbes also used curiosity to distinguish humans from animals and thus puts curiosity in a constellation of ideas such as rationality which served to make this distinction in Aristotle. For Hobbes and Descartes, curiosity was the origin of the search for knowledge. For Descartes, the problem was in unmethodological curiosity and so he constructed methods which will control 'blind curiosity'.

Over the course of the 17th century, curiosity was established as something natural, something innate which characterizes human thought and action. It is not an accident that this period also saw the invocation of duty towards attaining knowledge. No longer was knowledge to be an idle pastime or even something belonging to the curious and evil arts but was now the beholden duty of the intellectual to pursue. But even when curiosity is accepted as a natural part of being human, it was also felt that its purpose was to ‘seek out moral regularities in nature’ (ibid., p. 287).

Harrison also briefly discusses how curiosity is legitimized by relating it to the Divine. Robert Boyle, among others, looked at nature as embodying various curious features. Curiosity is thus removed from being a particular human proclivity to being something which characterizes features in the world, features which excite our curiosity perhaps. (Something similar happens with various other subjective concepts such as beauty, which over time gets removed from a particular psychological response to a ‘property’ inherent in beautiful objects.) If curiosity now characterizes the world (so that we can talk about ‘curious creatures’, ‘curious objects’, ‘curious features in an insect’ and so on) and if the world is created by God then the negative value associated with curiosity is negated—this argument of Harrison (ibid., p. 287) has some force.

By the 18th century, curiosity was completely ‘rehabilitated’. David Hume’s definition of curiosity as ‘love of truth’ was part of this process where curiosity, like in the case of Descartes, was the genesis of knowledge. Moreover, Hume also claimed that not being curious leads to ignorance and ‘barbarism’. So not only

is curiosity a positive virtue, it is also one that is necessary for certain positive ends. As Harrison notes, ‘...if for Aristotle wonder was the beginning of knowledge, for Hume and his contemporaries that honour now fell to curiosity’ (ibid., p. 287). Harrison concludes by suggesting that the trajectory of the idea of curiosity also indicates a shift in the way the relation between the knower and the known was understood—earlier the moral character of the knower was important but this role of the knower loses its significance as the notion of curiosity achieves its positive status. In other words, the morality of the knower becomes less important as curiosity becomes more important to the extent that in modern science the morality of the scientist is completely erased in evaluating scientific knowledge. Thus, an impersonal method replaces the subjective knower—a trend which Harrison discovers not just in Descartes but also in Bacon and others. And over time and with increasing distance between Christianity and science, the idea of method dominates the view of science.

The creation of modern science was also the creation of new meanings for curiosity. The rehabilitation of curiosity as a positive term was essential to the development of modern science. Peters⁸ points out how the changing meaning of curiosity was part of the discourse on exploration and discovery leading up to Columbus. Legitimizing travel to distant places, as well as exploration of the world—including exploration for commercial purposes such as mining—was necessary because travel and exploration were not always seen as positive acts. The recreation of the meaning of curiosity was used to validate such explorations and discovery of the secrets of the world. Part of this programme of legitimization was

related to the Church's attempt to take Christianity to the rest of the world.

Scientists were consciously aware of the changing discourse on curiosity and in fact worked towards promoting new meanings of curiosity. Perhaps the best illustration of this is in the way the Royal Society used curiosity in the 18th century.⁹ For science, the validation of wanting to learn about new and strange phenomena rested on the idea of curiosity. The Royal Society in the first half of the 18th century contributed to the value of curiosity through various institutional means. In the communications presented to the Society, not only medical events but also astronomical ones were often described as being curious. As Costa notes, even the 'certificates of election presented to the Society also illustrate this "language of curiosity"' (ibid., p. 148). For example, a certificate presented to Henry Stevens 'described him as "gentleman of extensive curiosity"'. Costa argues that 'being curious' was promoted as an important trait of being a scientist and the 'pursuit of curiosities' as being a valuable act. The Society took it upon itself to promote this practice of curiosity—so there were 'regular exhibitions of natural and artificial curiosities at the meetings', members were encouraged to have their own collection of curiosities and it became a tradition for the Fellows to donate curiosities (Newton donated a 'small bird brought from Pennsylvania' [ibid., p. 159]).

Curiosities played an important role not only in the activities of the Society but also in framing definitions of knowledge and science in the 18th century. Costa concludes by noting that the 'place of curiosities of nature at The Royal Society therefore shows the variety and intricacy of elements involved in the making and diffu-

sion of natural knowledge in the period' (ibid., p. 160). In the latter 18th century the preoccupation on curiosities decreased but by then curiosity had been completely rehabilitated. In fact, one can already see this influence of scientific curiosity in literature. The most notable example is that of detective fiction. The detective story is often modelled on the scientific and has various instincts of the scientific in it. Edgar Allan Poe is often credited as being the author of the first modern detective novel (*Murders in the Rue Morgue*)—this novel 'presents itself as scientific'.¹⁰ Positive virtues of curiosity—including a passion for it as well as something which is a disinterested enquiry—have marked the history of the modern detective. The 'jargon of scientific enquiry' was a primary influence on fictional detectives (ibid., p. 54) and the rehabilitation of curiosity had an important role to play in this.

The discourse on pure and applied was also significantly changed in the changing history of curiosity. Justification of knowledge in the early phase was based on its moral and religious usefulness. But later the justification is in terms of practical use—a move which, Harrison argues, also establishes the distance between the morality of the knower and the known. Thus, the shifting notion of usefulness in the context of scientific knowledge meant that the moral status of the scientist is irrelevant to the claims of that knowledge—herein we can see the beginnings of the imposed expulsion of ethics from scientific practice. The very fact that we often use 'science' (as an impersonal discipline, a method) instead of 'scientist' even in contexts where human agency is clear is another indication of the success of this project of erasing the human from nature, the ethical from the scientific.

The trajectory of the development of the narrative about curiosity has important lessons about ethics and science. As Blumenberg¹¹ points out, curiosity for Augustine was a ‘temptation’. Curiosity today has come a long way from this view but in doing so, has also divested any notion of responsibility. Among other positive virtues, it has come to be associated as a characteristic of children and also as a virtue related to innocence. It is this innocence of curiosity that science shares with children and it is this innocence that is often the bulwark against insistent ethical questions towards science. It is this presumed innocence that makes scientists claim that their only duty is to discover ‘truths’, whatever be the consequence of such truths. Blumenberg’s argument is that scientific revolution, as exhibited in the case of observations made by Galileo with his telescope, liberated curiosity from the clutches of a religious morality. This leads to the escape from ‘self-restriction’ which, for Blumenberg, catalysed the enlightenment and the establishment of scientific method leading thereby to modern science. While this picture is perhaps too sweeping, it is nevertheless true that the removal of ‘self-restriction’ was and continues to be extremely important to the practice of science. The belief that there should be no fetters to scientific thinking has its origins in this complex history.¹²...

NOTES

- 1 Ian Hacking, *Representing and Intervening* (New York: Cambridge University Press, 1983).
- 2 Mario Bunge, ‘The Ethics of Science and the Science of Ethics’, *Science and Ethics*, ed. Paul Kurtz (New York: Prometheus Books, 2007).
- 3 Alison Gopnik, ‘The scientist as child’, *Philos. Sci.* 63 (1996): 485–514.
- 4 <http://www.asl-associates.com/einsteinquotes.htm>.
- 5 Sundar Sarukkai, *Indian Philosophy and Philosophy of Science* (Delhi: CSC/ Motilal Banarsidass, 2005).
- 6 P. G. Walsh, ‘The Rights and Wrongs of Curiosity (Plutarch to Augustine)’, *Greece and Rome* 35, no. 1 (1988): 73–85.
- 7 Peter Harrison, ‘Curiosity, Forbidden Knowledge, and the Reformation of Natural Philosophy in Early Modern England’, *Isis* 92 (2001): 265–290.
- 8 Edward Peters, ‘The Desire to Know the Secrets of the World’, *J. Hist. Ideas* 62 (2001): 593–610.
- 9 Fontes da Costa, ‘The Culture of Curiosity at the Royal Society in the First Half of the Eighteenth Century’, *Notes Rec. R. Soc. London* 56 (2002): 147–166.
- 10 Andrea Goulet, ‘Curiosity’s Killer Instinct: Bibliophilia and the Myth of the Rational Detective’, *Yale French Studies*, no. 108 (2005): 48–59.
- 11 Hans Blumenberg, *The Legitimacy of the Modern Age* (Cambridge: MIT Press, 1985).
- 12 Robert John Weston Evans and Alexander Marr, eds., *Curiosity and Wonder from the Renaissance to the Enlightenment* (Burlington: Ashgate, 2005).

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SCIENCE AND ART: NEW PARADIGMS IN EDUCATION AND VOCATIONAL OUTCOMES

LINDY JOUBERT

INTRODUCTION

Contemporary thinking places the arts and sciences in two separate spheres of learning. There are, however, many aspects of the two disciplines that arise from the same source and aspirations. Curiosity is the driving force behind intelligence and the human mind is on a constant quest to find meaning in the physical, intellectual and spiritual world. This has led to great achievements, discoveries and profound expressions of creativity. Art in science reveals itself in many ways, just as science has been a strong inspiration for Western art.

It is important to re-look and re-think current educational models in the light of links between the arts and the sciences. Research in this field indicates that human intelligence reaches its greatest potential when a holistic approach to learning is achieved.

Teaching and learning can no longer rely on contemporary paradigms; entirely different attitudes about how people learn and should be taught are now

evolving. There is no doubt that the age of technology has changed our lives and will affect our futures. Most of today's work will be computerized in the near future, so our students need to be educated to a previously unseen or unheard of level of intellectual, emotional and practical dexterity to earn their living. Employees for the future need to be intuitive, flexible, literate and creative problem-solvers.

Maybe it is the term 'education' that is no longer valid; perhaps the appropriate term is 'character and behaviour'. What we need to consider ourselves as educated people is to become human beings who have multiple skills, flexibility and confidence to face a world that has yet to be imagined. Half of the jobs that will be required this century have yet to be invented; we need to educate a work force that will be prepared to adapt to the burgeoning future.

A holistic, symbiotic education in the sciences and the arts will develop all aspects of human potential. Science explores the means to elucidate natural processes that abide by fundamental laws. Science investigates the laws controlling the behaviour of the world and the universe, and the results are expressed in an abstract, mathematical language. Logical deduction based on practical observation and research is the vehicle for scientific outcomes and discoveries. Art has been the means by which all civilizations have expressed and evaluated their ideas, behaviour and culture through their own respective artistic idioms. Artists generally express their feelings (conscious or subconscious)—not only recording their observations. These expressive qualities in art appeal to the sensations and to the higher faculties of mind and

imagination. Scientists like Newton and Einstein, in their time, supported the concept of this paper by proclaiming their dependence on the vivid imagery that comes from visually creative experiences to achieve scientific outcomes.

Current educational models need to be challenged, horizons broadened and new thinking stimulated in order to provide links in learning that are generally absent in contemporary educational practice. There is a shift from the current worldview in some quarters in favour of linking the sciences and the arts. Numerous examples have been presented where our perceptions of these disciplines have been enhanced in order to see the underlying unity of both fields. Scientists and artists who work collaboratively in a number of fields agree that this partnership results in more productive outcomes. Current educational practice directs students into one field or the other, thereby diminishing the opportunity to develop in the other—the unchosen field.

The purpose of this article is to identify new developments in the sciences in the context of multidisciplinary learning and links between the sciences and the arts. Other related issues are presented in the quest for maximizing human potential. Political, economic, spiritual and social issues are equally important when considering the role of science education for the future. Marginalized groups in society, such as the poor in developing countries, stand at greater risk of being completely left behind in the rush for economic development. Ethical concerns about science education for the future mean that we must ensure a good education for all.

RECOGNITION OF THE FIELD

Current evidence in the fields of education, the sciences, the arts and the humanities indicates that specialized areas of knowledge are considerably enhanced in a multidisciplinary learning environment when associated with other, previously unrelated, areas of ability. This holistic approach to learning allows human intelligence to reach greater potential. Specialized training focused on one area can, in fact, lead to a diminished ability to cope in this rapidly changing world. This theory is at the cutting edge of new thinking on education, linking disparate disciplines that have previously remained segregated in most curricula across the world.

This article not only examines these issues relating to multi-disciplinary learning and teaching of the sciences and the arts, but is also concerned with the application of these theories. Vocational and research studies follow, highlighting practical outcomes. My research in the United States, Europe and Australia has resulted in a collection of data on the latest developments in the sciences and the arts. Once students complete their educational training, there is a need to draw attention to the limited nature of the areas of their expertise. This applies to the fields of engineering, medicine, science, mathematics etc. The following examples provide viable alternatives to achieving more productive outcomes for the professions, aiming to empower teachers as agents of change and enhance the opportunity to provide outcomes-focused curriculum development.

SUCCESSFUL LINKS IN THE SCIENCES AND THE ARTS

The Arts and Medicine

In some areas of medicine in the United States and throughout Europe, a number of practitioners are realising that collaboration with the arts is capable of bringing about more beneficial results in regard to lessening medication and time spent recovering in hospital. New developments in the medical field need to be implemented at the early stages of education. For example, doctors need increased understanding in the broad spectrum of the arts and their role in healing. These issues have been neglected in traditional medical training and at the earlier stages of upper secondary education, where potential doctors are directed into mathematics and science streams.

Artists working in health-care environments are providers of creativity—a recognized source for improving one's sense of well-being, one's sense of self and self-worth, and the positive effects of these measures in the healing process. Doctors and health-care workers have developed new skills in communication and bedside manner as a result of working with artists. There is a growing movement where hospitals are turning to the arts as an additional aid to healing that provides a visual tool to support health care.¹

The Arts and Hospital Design

Hospital architects are working collaboratively with artists and designers, as well as landscape architects, to build harmonious healing environments with proven outcomes. These revolutionary hospital designs include gardens and spaces for meditation. Architects are working with artists and design professionals to build

new hospitals that create a new ambience with a positive outcome on the healing process. Common sense tells us that a hospital with rooms opening on to gardens and balconies with a view of foliage, one that is full of light and beauty, improves emotional and consequently physical health. Florence Nightingale wrote in 1885:

The effect in sickness of beautiful objects, of variety of objects, and especially of brilliancy of colours is hardly at all appreciated. People say the effect is only on the mind. It is no such thing. The effect is on the body too. Little as we know about the way in which we are affected by form, by colour and light, we do know this, that they have an actual physical effect. Variety of form and brilliancy of colour in the objects presented to patients is an actual means of recovery.

The Arts and Engineering Sciences

Engineers working with natural phenomena, such as turbulence in air, wind and wave flow patterns in a scientific context, agree that many of the outcomes spring from the perceptual sensitivity of the artist. Norman J. Zabusky is famous for his theoretical work on ‘solitons’ using visualization as a heuristic tool to understand nonlinear processes. Visualization of complex phenomena is very difficult and assistance from artists is often required. On the other hand, findings in engineering and physics have stimulated new techniques in the arts.

For many years, Milton Van Dyke of Stanford University has researched the patterns of turbulence in the flow of air and water and published monographs highlighting the creative and aesthetic nature of these patterns. Guido Buresti analyses turbulent flow with

wavelets, which are a mathematical tool allowing for time-frequency analysis, similar to musical notes. He sees a very strong relation to music and is interested in audio-perception. One project is to analyse the psychological impact of the sound of car motors on passengers via wavelets.

Renzo L. Ricca is a highly educated Italian with great knowledge of science and a profound interest in the arts. He conducts research on solar coronal structures and the physics of magnetic knots—these are high-level, interesting knot structures. It would be interesting, he claims, to compare these ‘scientific knots’ to the knots used by the Incas in ancient Peru or to those in other cultures. Professor Werner Jauk is a musician who has researched the subject of ‘perception’. This is of great importance for scientists who present their work as visualizations, as it improves the understanding of their audience. Often, only specialists can understand what the author wants to say, so artists who collaborate with scientists and engineers help enhance communication.²

The Arts and Sciences

There are many scientists who realise the strong correlation of their science with art and design. Frank Oppenheimer, the founder of the Exploratorium Science Museum, was a fine example of how a scientist working with artists makes it possible for people to appreciate the significance of pattern. He saw the search for patterns as fundamental to both art and science. Kepler found pattern in the motion of the planets and this he recognized as the key to their risings and settings, as they moved in ellipses around the sun. There is pattern in the structure of poetry and in the melody of music. Physicists

find pattern and rhythms with colour, and botanists reveal how certain structures of higher plants demonstrate perfect engineering and design solutions. These basic patterns of natural growth have outstanding beauty, harmony and balance. Such findings may be compared to pattern and design in the field of creative art.

The Arts and Architecture

Frank Gehry, Coop Himmelblau, Norman Foster, Renzo Piano, Richard Rogers, Rem Koolhaas and Zaha Hadid are examples of architects who have an interest in the science and art of architecture. Rem Koolhaas believes in social progress and reforges the link between technology and progress. The 'high-tech' vocabulary of Foster Associates shows an uncompromising exploration of technological innovations and forms. Zaha Hadid's continually new forms stun the world and she is widely recognized for her paintings, which are representations of possible constructed forms. She narrates her projects through an array of media—line sketches, paintings, collages, photographs, idea models, computer-generated presentations. The Guggenheim Museum at Bilbao, designed by Frank Gehry, has been described as the 'greatest building of our time' and 'the best building of the century'. Originally designed as a sculpture with a conglomerate of forms and materials, it was to be the museum's first artwork. Frank Gehry has 'pursued notions of freedom and openness rather than architectural precedence and doctrine'. The designer's non-rational, nonlinear forms sharpen the senses and heighten perceptions, giving visitors the confidence of their own intuitions, emotions and senses. It is a great contribution to the art and science of architecture.

The Arts, the Sciences and Museums

Museums supporting the principles of linking art and science provide extensive material supporting the paradigm of a holistic art and science education for schools and the general public. Artists who have been trained in the sciences as well as the arts produce many highly inventive exhibits that capture the imagination and ignite the desire for further knowledge in their audience. Some exhibits connected with the Exploratorium in San Francisco include the 'Wave Organ', a wave-activated acoustic sculpture located on a jetty in San Francisco Bay; the 'Aeolian Landscape'; the 'Chaotic Pendulum'; the 'Confused Sea'; the 'Magnetic Field Stone'—to name only a few. Artists work successfully with scientists to create exhibits, fulfilling founder Frank Oppenheimer's dream that the sciences and the arts working collaboratively will produce a better world.

The work of Jim Tattersall at the Museum of Natural History in New York City combines holography, the computer and scientific information to create cutting-edge exhibits. The visual and educational excitement generated by his techniques is revolutionary. For example, 'The Holographic Woman' explains the anatomy of the female form using state-of-the-art technology. Science and art are totally integrated as harmonious united forces to demonstrate the spirit of invention and new ways of seeing the natural world.

The Art of Pattern, Mathematics and Mandelbrot

An extraordinary range of patterns exist in nature and the composition of their structures can be explained using mathematical, fractal formulas. Benoit B. Mandelbrot, a mathematician at IBM's T.J. Watson

Research Centre, developed a geometry that could analyse and quantify nature's crags, whorls, billows and branchings. He called this new offshoot of mathematics 'fractal geometry'. Since that time, scientists and mathematicians have used fractals to find order in natural structures that previously defied analysis. A rocky coastline is one example of a fractal analysis. Analysis of the fractal geometry of natural forms has led to the creation of fractal forgeries—computer-generated images that resemble the forms of the natural world. At the heart of any computer-generated fractal is a mathematical formula. Using different formulas, computers have generated images that resemble landscapes, clouds and trees. These images powerfully exemplify the beauty and intricacy of art and design in nature.

The Art of the Scientific Artist

Great works of art depicting and explaining the sciences of botany, natural history and anatomy have been achieved by artists throughout history to the present day. Artists from Palaeolithic hunters to twentieth-century man have made an extensive contribution to art and science. Works by both famous and lesser-known artists can be found in all the great collections of the world, including the British Museum, The Smithsonian and the Mellon Collection. These examples highlight the science of depicting nature through art. Some of the artists represented are Leonardo Da Vinci, Albrecht Dürer, Jim Dine and Georgia O'Keefe. There are illustrations of botanical and natural history discoveries: from the time of the Columbus voyages to Charles Darwin in the Galapagos Islands; from the Holy Roman Emperor Rudolf II to the Australian Indigenous peoples; from

Sydney Parkinson, artist on Captain Cook's *Endeavour* voyage; to Walter Hood Fitch, one of the most prolific botanical artists in history.

The Art of Music and the Mind

Evidence of productive outcomes resulting from linking the arts and the sciences in multidisciplinary teaching and learning is made clear by examining the work of musicians and scientists who explore musical experience. The research and techniques of Paul Robertson are providing answers to age-old questions about the musical world. He is leader of the Medici String Quartet and Visiting Professor of Music and Psychiatry at Kingston University, United Kingdom. His research in the field of neurology, together with neuro-psychiatrist Peter Fenwick, has developed a new concept of how the brain and music function, correlate and synthesize. The premise for their research is based on early Greek models, since mathematical philosophers had realised that pitch intervals conformed to mathematical principles.

Neurologist and neuro-biologist Mark Tramo at the Harvard Medical School is investigating how we recognize music at the most elemental level of brain response. Contemporary scientists have carried out research on 'tone colour', location devices, aural paradoxes, the scanning of the musical brain, the significance of sound on our lives and the neurology of musical response.

American researchers hit the headlines claiming that listening to Mozart made you more intelligent. This supports the argument put forward by the theme of this paper—extraordinary as it may seem. Research outcomes present solid evidence that playing or listening to music increases the capacity for students to score higher in IQ

tests, predisposing the neural columns of the brain to creative functioning and providing impressive increased abilities of up to 47% in object assembly tasks (connecting puzzle pieces). These results were achieved by children who had received eight months of keyboard training, compared to a control group who did not have piano lessons.

One may ask why listening or playing music affects intelligence. The answer lies in the auditory system that has the function of inferring and discovering patterns. It quickly interprets patterns in time, which it perceives as rhythm, and relates them to the body's own pulses. This research supports the claim that the study of or listening to music affects the way we think and actively enhances abstract thought. Once again, the study of this form of artistic endeavour in education clearly enhances a student's intellectual capacity.

A HOLISTIC APPROACH TO LEARNING

The concept of holistic education, meaning the inclusion of the arts across the spectrum of the school curriculum, has been lost in the educational reforms of the last century where a streamlined, specialized focus on learning has become the norm. This curriculum is one of learning alone, seated at a desk and trying to make sense of someone else's experience, condensed and abstracted into textbook form. Current secondary educational practice directs students into specialized fields. Cutting-edge research indicates that specialized areas of education are considerably enhanced when the arts are incorporated into the sciences and humanities.

The truth of the matter is that when the arts are incorporated into a traditional science curriculum they

can be the catalyst to overcome predetermined attitudes and achieve much greater retention rates in classes. An arts-related curriculum can increase interest in the subject matter, give students confidence in themselves and provide new ways and means to learn. Above all, by integrating the arts into learning, the subject automatically becomes far more attainable and students feel stimulated to learn.

RESEARCH SUBSTANTIATING A MULTIDISCIPLINARY CURRICULUM

Harvard University's Project Zero, the Association for the Advancement of Arts Education's review in the United States (AAAEE) and the United Kingdom's National Foundation for Educational Research (NFER) have conducted extensive research programmes whose outcomes have the potential to re-map the educational terrain in relation to particular social, political, economic and technological educational environments.

These research programmes put forward sound arguments for reform that could lead to a fundamental re-evaluation of the ways in which schools are organized for teaching and learning. Educators are being challenged to re-examine traditional notions of what should be taught in schools and how it should be taught. This includes an emphasis on a more clearly articulated, rigorous and interdisciplinary curriculum that acknowledges and values the contributions of all aspects of a particular society.

Research in theory-building studies and theory-driven experiments by the Reviewing Education and the Arts Project (REAP), part of Project Zero, find when

academic innovations incorporating the arts are introduced in schools, they provide motivational and engaging entry points into academic study for the many students who do not thrive in the structures and cultures of contemporary schooling.³

This very fact can be applied to students in developing countries, who may have many disadvantages to overcome. Education needs to be relevant to their demands, values and cultural traditions, as well as taking into consideration their social and economic realities at the local level.

REAP at Harvard claims when a subject takes on an artistic inclination, the willingness to stay with the subject is increased. Increased confidence leads to increased motivation and effort, which then result in higher achievement. Common sense tells us that it is possible for all students to benefit from an arts-integrated approach—even high achievers—simply because an arts-integrated approach makes any subject more interesting.

RESEARCH IN SCIENCE/ARTS EDUCATION IN SECONDARY SCHOOLS

A paper published by the United Kingdom's NFER presents a summary of the detailed report on *Arts education in secondary schools: effects and effectiveness*. The report presents the results of a three-year study of the effects and effectiveness of arts education in English and Welsh secondary schools. Launched by the British Royal Society of Arts in 1997, the research was carried out by the NFER.⁴

The main aims of the study were to:

- investigate the range of outcomes attributable to arts education in secondary schools, in particular the hypothesis that engagement in the arts can boost general academic performance;
- analyse the key factors and processes that may bring about the effects, including the identification and portrayal of particularly effective practices.

Findings from the Case Studies Examining the Effects of Arts Education

The effects of arts education fell into nine broad categories. The first six dealt with direct learning outcomes for pupils, while the remaining three covered other types of effect. The outcomes attributable to the arts and relevant to the purpose of this article are shown in the appendix of this text.

In schools with strong reputations in the arts, numerous and wide-ranging effects were reported by pupils who were performing well in at least one art form. Outcomes relating to advancements in the technical skills and knowledge associated with specific art forms were by far the most frequently mentioned type of effect. In addition, vivid testimonies to many other outcomes were recorded. These included:

- a sense of fulfilment in one's own achievements;
- social skills (especially those required for effective teamwork);
- self-confidence;
- expressive skills and creativity.

To understand the benefits of new developments in science teaching incorporating the arts, we need to examine the results of the case studies from the main research programmes discussed here. Issues, for example, of improved self-esteem, and personal and social development are highly pertinent to the task of tackling disaffection and social exclusion amongst young people.

CONCLUSION

Why Incorporate the Arts Into a Science Curriculum?

The arts incorporated into primary and secondary school science education facilitate learning and provide general enjoyment of education through creative experiences. This enables students to understand the meaning of humanity—to experience what human beings do uniquely, which is giving life-experience form through an array of aesthetic and scientific symbols and understandings. Researchers have been able to clarify the claim that a prominent role for the arts in a secondary school curriculum actually improves academic achievement. There is apparent value in the search to link the arts with the science curriculum to improve academic achievement, compared to a science curriculum that does not have such a link. Researchers will continue to investigate how the arts can be vehicles of transfer, providing educators with the chance to put an arts and science curriculum into practice.

Outcomes from three research programmes—Harvard University’s Project Zero, the AAAE review from the United States, and NFER’s report from the United Kingdom—come to very similar conclusions that education should depend on two principles:

1. the arts, integrated into a science and humanities curriculum facilitate a solid foundation for learning;
2. to develop and live by a value structure that will improve the quality of life.

In the future memory will no longer be necessary to recall vast amounts of information. Computer technology has changed the world of learning by providing all the information we require. What we need is the ability to think clearly and intelligently, which is very different from knowing vast amounts of information. This is possible only if students are taught to think holistically, in a well-rounded, multidimensional fashion and all the disciplines are to be taught simultaneously—the sciences, the arts, history and literature. In order to learn well, students do not need to approach education in the way traditional schooling has dictated for so long. Leading research programmes come to the same conclusions: Students can learn in many different ways when combining the arts with history, literature and the sciences. This method of learning is far more likely to remain with the student forever and give them a chance to achieve their full potential.

The value of a science/arts integrated curriculum at the primary and secondary education levels, and its capacity to realise the full intellectual potential of the student, can be seen by examples of vocational outcomes. A science/arts based programme, as demonstrated in research findings, also develops the opportunity for acquiring responsible behaviour and enhancing values in an ethical and social context.

In order to understand the concept of ethical concerns and acquiring responsible behaviour, it is important

to focus on the important values of social responsibility and being a concerned, humane person. Academic work is important, but it needs to be of high quality and responsible.

Such responsible education cannot be completed in the early years of schooling, but reaches its greatest impact during the years of secondary education. Adult years are too late. Parents and teachers must embody a responsibility in their own lives and seek to nurture a sense of responsibility in all young people. Also, knowledge in the field of the health sciences is essential for developing responsible behaviour for life-skills programmes, for combating the growing problems of drugs and HIV/AIDS.

The developed world is living in an age that favours scientifically-based explanations. Ensuring a responsible, wise and enlightened pathway to the future will depend on combining the best of science, the best of the arts with the finest ethical values.

APPENDIX. OUTCOMES ATTRIBUTABLE TO ARTS EDUCATION

Effects On Pupils

1. A heightened sense of enjoyment, excitement, fulfilment and therapeutic release of tensions.
2. An increase in the knowledge and skills associated with particular art forms.
3. Enhanced knowledge of social and cultural issues.

The Development of Creativity and Thinking Skills

4. The enrichment of communication and expressive skills.
5. Advances in personal and social development.
6. Effects that transfer to other contexts, such as learning in other subjects, the world of work and cultural activities outside and beyond the school.

Other Effects

7. Institutional effects on the culture of the school.
8. Effects on the local community (including parents and governors).
9. Art itself as an outcome.

NOTES

- 1 John Graham-Pole, MD, MRCP, Professor of Paediatrics, is a leading figure in the Arts and Healthcare in the United States and Director of the Centre for Arts and Health Research and Education, University of Florida (CAHRE): www.arts.ufl.edu/main/cahre/homepage.html. The European Forum on the Arts in Hospitals and Healthcare was held in Strasbourg, France, in February 2001, attracting artists, doctors, health-care workers, architects and people from across Europe involved in promoting the arts in health.
- 2 This work was presented at the third International Conference on Flow Interaction of Science and Art (SCART) in Zurich, 2000. The idea is to promote dialogue between an international group of scientists, most of them fluid-dynamicists, and artists.
- 3 REAP at Harvard University's Project Zero is looking at what can be learned from the massive number of studies about the effects of arts instruction (multi-arts, visual arts, music, drama and dance) on cognition and learning in nonarts domains.
- 4 The full report of this study for the NFER, entitled 'Arts education in secondary schools: effects and effectiveness', is available from the Publications Unit, The Library, NFER The Mere, Upton Park, Slough, Berkshire SL1 2DQ, United Kingdom. Research enquiries to John Harland, e-mail: jbh3@york.ac.uk.

BIBLIOGRAPHY

- Davis, Jessica. 'The history of the arts at Harvard Project Zero'. Paper prepared for the Annual Meeting of the American Psychological Association, Division 10, Washington, DC, 1992. [Available from Harvard Project Zero.]
- Gardner, Howard. 'Problem-Solving in the Arts and Sciences'. *Journal of aesthetic education* (Champaign, IL) 5 (1971): 93–113.
- Goleman, Daniel. *Emotional Intelligence*. New York: Bantam Books, 1995.
- Kornhaber, Mindy L. and Howard Gardner. 'Critical Thinking across Multiple Intelligences'. Paper presented at the CERI Conference, 'The Curriculum Redefined (Learning to Think, Thinking to Learn)', OECD, Paris, France, 1989.
- Krechevsky, Mara and Steve Seidel. 'Minds at Work: Applying Multiple Intelligences in the Classroom'. In *Intelligence, Instruction, and assessment*, edited by Robert J. Sternberg and Wendy M. Williams. Mahwah, NJ: Lawrence Erlbaum Associates, 1998.
- Perkins, David. *Smart Schools: From Training Memories to Educating Minds*. New York: The Free Press, 1992.

(2006)

RECENT CRAFTS

ABRAHAM CRUZVILLEGAS

BETWEEN THE SUMMERS of 1995 and 1997, I visited various indigenous communities in the state of Michoacán with the goal of executing a series of sculptures using different handcrafting techniques. I had received funding for doing this, having established a precedent already through the *Nuevas Manías* exhibit at the Fundación para el Arte Contemporáneo [Foundation for Contemporary Art] in 1993. There, I developed a visual irony around artistic idioms and their contemporary conventions, translated into an installation that included three distinct levels of technical resources: electronic, mechanical, and handcrafted.

Parallel to my research into the trades of the Purépecha region (the ethnicity to which my paternal ancestors belong) and the making of the pieces, I replaced traditional iconography with a three-dimensional representation that also functions as a metaphor: physical therapy and the devices used therein.¹ I made exercise equipment, balls, dumbbells, massage tables,

orthopedic instruments, a neck brace, and splints out of wood, textiles, rubber, stone, iron, clay, and copper, as well as objects that obey purity neither of technique nor of topic. Perhaps these are more interesting, as they are the unplanned children, or rather, hybrids of the original project: they are autonomous. These works result from the clash between my everyday experience in the city and the intermittent schizophrenia of the rural-tourist, indigenist-exploitative-family life that I experienced in the region where they were developed.²

With traditional binaries as a point of departure, such as the individual confronting the masses (identity), or the manual with the industrial (relief printing and the readymade), and, perhaps in the end, art versus craft (the Western world above the margins), this project took paths that have led it to reflections quite different from those articulations and from its premises.

1. As the Colombian anthropologist Andrés Ortiz argues, a social appreciation of crafts' value must be based on their everyday use, on their normal, so to speak, use. Because our society consumes crafts in a purely contemplative manner, the craft has no function, and therefore no life. This conspicuous and contemplative consumption of the craft evidently denaturalizes it, because the craft among its producers would have a direct and practical use. What is needed is a permanent cultural promotion campaign that not only reclaims the craft's esthetic-cultural dimension but also the possibility of its direct everyday use. In other words, this means promoting the end of the craft.

2. On the other hand, it is evident that, from a strictly economic point of view, handcrafting cannot compete with industrial production. In this sense, the possibility of indigenous craftsmanship's survival rests precisely in an increase of its qualities, aesthetic as well as material, of the raw materials it uses, and in being able to assume the characteristic, which it already holds in some countries, of its intrinsic value being tied to its unique expressiveness. This tendency is accentuated in certain capitalist countries: for example, in Italy with Murano crystal; Spanish and French ceramic; or, on the other hand, the cut crystal glass from the former Czechoslovakia.
3. The craft's economic structure and its context (bartering and flea markets) imply, from the perspective and logic of capitalist development, not only a retreat, but also the exclusion of entire social groups from the benefits implicit in social mobility and accumulation of goods and capital, novel aspirations in numerous underdeveloped ethnic groups (it is worth remembering the Yanomami of Brazil and Venezuela, an aboriginal group almost ten thousand years old, whose handiwork is limited to bows, arrows, nets, and huts, and who only consume what they produce based on endogamy and home economics, only to satisfy their most basic needs, which naturally do not include electricity, telephones, or clothing). But these pieces always turn out somewhat picturesque and exportable as a rosy image of misery.

4. A vast sector of society has strongly identified with rescuing endangered species along with green spaces, with defending human rights, ethnic minorities, and street children, flying a flag whose most readily evident sign is a profound sense of guilt. The series of contradictions accompanying the rescue of the indigenous and its well-trodden nostalgia for national values has been erected atop an everyday racism, an insoluble classism, and an increasingly more touristic look into the mirror by the so-called progressive sectors of the intelligentsia and cultural institutions. In and of itself, as a well-meaning attitude, the promotion of handcrafted indigenous products entails the industrialization of its processes, along with the rapid loss of the (predominantly manual) original techniques and the primary purpose of these objects: their use.

On the other hand, the shift towards a prevalence of indigenous groups' customs and primeval practices implies, in turn, distinguishing these group both juridically (Huicholes can transport and consume peyote) as well as economically.³ Therefore, enacting a different law becomes necessary (for example, the Rights of the Indigenous Peoples under the Mexican Constitution's Article Two, first paragraph, only written into law in 1992, when the Mexican nation's status as a plural culture was accepted by decree).⁴ In the end, one concludes that the craft as a concept must disappear in order to allow for the original use of ethnic minorities' products and tools in their proper context. The Flowery Wars, invented by the Purépecha of Michoacán, were characterized by the ingestion of some internal organ belonging

to the opponent, as long as he held the same military or social class or rank.⁵ For this, they used a gleaming crystal tool of polished obsidian, God's earthly material representation itself.

Currently, works are analyzed not only for their formal and conceptual features but also for the ties that each spectator constructs in approaching them, enunciating, according to Lucy Lippard, a likely dematerialization of the work of art, which in the installation's case implies a discursive opening that the author can rarely account for.

In the case of the craft, criteria of this type are impossible to apply, because, by contrast, the craft has been historically viewed in a homogenous, if not flat, fashion. A polychromatic leather Balinese piece, whose original function is to represent the demon during a shadow play, holds the same value in our eyes as a lacquered Olinalá box: their use becomes ornamental, it dies. Categorizing it as art is, in principle, a waste of time, as the term, like democracy, is a Western invention.

When does a craft live? When it is used.

A handmade fitted shoe does not aspire to be anything more than that. It is not exhibited in museums, nor is the risk of the trade disappearing debated. No theory addresses it, and it does not matter whether the model changes someday or whether it remains coherent with a national identity or not; that is, of course, unless we involve ourselves with a genealogy of the *huarache* and the *babucha* [babouche].⁶

For the Purépecha, the word "craft" does not exist; however, they have made the idea of merchandise their own. In their homes, *corundas* and *putzuti atole* are served in plastic containers without the slightest tingle of

discomfort.⁷ For some time now, they have traveled from their communities to urban centers (such as Uruapan, Morelia, Tijuana, or Laredo) commercializing what was formerly exchanged in the plazas of Erongarícuaro and Pátzcuaro for white fish, brooms, or wheat.⁸

As a metaphor, the rehabilitation of handcrafting techniques—without even discussing original use—can be considered by means of applying these to new or different uses, uses that are not merely ornamental, free from the narrative this presupposes. As a result, iconography can be disqualified insofar as its sign value can deflect, due to its unreality (today iconography is as counterfeit as the *Danza de los Viejitos* [Dance of the old folk]), our paramount interest: the reactivation of an accumulated knowledge, regardless of its (natural or social) scientificity or its cultural purity.⁹ Evidently, indigenism is not what animates a probable rehabilitation of trades passed down (who knows to what extent) from Vasco de Quiroga to the state of Michoacán's indigenous communities.¹⁰ Rather, it attempts to open up a juncture amid the contemporary visual and discursive chaos, a juncture oriented towards yielding questions rather than answers or claims of any sort.

Is it possible to value such techniques and trades without kitschiness or blackmail? It is possible, moving even beyond the ideas of integration or acclimation commonly brought to these cases in particular.

Agustín Jacinto Zavala, a Purépecha researcher, considers that “it is quite possible that the language dressing up modern technology is only partly indispensable for its transfer to other human groups, just as it appears that the assimilation of modern techniques by indigenous groups only becomes feasible upon

surpassing technology (as Heidegger puts it), that is, when technology is humanized.”¹¹

Inverting this relationship, our assimilation of indigenous technology will occur as a function of a total change in our behavior and our ties to nature, stemming always from an experience that finds its support not in collective identity, but rather in a shared individuality.

NOTES

- 1 The Purépecha highlands in Michoacán, one of the early centers of Mesoamerican culture, date back about five thousand years and are the homeland of the Purépecha people.
- 2 *Indigenismo*, a term celebrating indigenous culture and history as the source of national identity in Latin America, gained prominence in Mexico after the Mexican Revolution (1910–1920). Although often criticized as an undifferentiated term invented by the nonindigenous elite, it nevertheless proved very powerful throughout the Americas.
- 3 The Huichol, an indigenous people in west-central Mexico, are practitioners of shamanism and animism and traditionally use the peyote cactus in religious rituals.
- 4 The Mexican Constitution's Article Two describes the nation as multicultural and based on an indigenous heritage, giving equal protection under the law for indigenous people.
- 5 The Guerras Floridas, a series of wars fought between the Aztec Triple Alliance and their enemies from the mid-1450s until the Spaniards arrived in 1519, are documented in the letters of Hernán Cortés and the Durán Codex.
- 6 *Huaraches* are a Mexican sandal, pre-Columbian in origin. *Babuchas* are Arabian-style sandals popular in Mexico, open in the back with a pointed toe.
- 7 *Corunda* is a Mexican steamed dish, similar to tamales, common in the state of Michoacán. *Putzuti atole* is a Michoacán variation of *atole*, a corn-based drink.
- 8 Erongaricuaro is a small fishing village populated by Tarasco communities. Pátzcuaro, a large town in Michoacán founded in the 1320s on the shores of Lake Pátzcuaro, was the capital and ceremonial center of the Purépecha state.
- 9 The *Danza de los Viejitos*, a humorous dance from Michoacán in which the dancers wear masks of old people, has largely lost its original meaning and become little more than a tourist show.
- 10 Vasco de Quiroga (1470/78–1565), the first bishop of Michoacán and a judge during the second Audiencia of New Spain (1531–1535), is still venerated as a saint in some Michoacán communities because of his reputation as a protector of the Indians.
- 11 Agustín Jacinto Zavala, professor of philosophy at El Colegio de Michoacán, specializes in the reception of Martin Heidegger in Japanese philosophy.

(2011)

WHY MEDIATE ART?

MARIA LIND

VERMITTLUNG—“MEDIATION” IN German—signifies a transfer from one party to another, the pragmatic transmission of a message. It also stands for attempts at reconciling parties who disagree on something: nations, for instance, or people in conflict. Although there is an abundance, even an overproduction, of traditionally didactic activities within art institutions today, I believe that now is the time to think more and harder about the mediation of contemporary art. About whom we as artists and curators want to communicate with, and the associated questions of how art actually functions in contemporary culture. It is a seeming paradox: an excess of didacticism and simultaneously a renewed need for mediation.

The two different conditions to account for here, before the dance with the question of mediation can begin, occupy different positions in discussions about art and curating. The first is generally considered more annoying than useful by the professional community. The second is by contrast little-discussed, even below the

radar of most practitioners. I am referring to the educational and pedagogical approaches that are in place at most art institutions. On the one hand, they can be overbearing, and they may even obscure the art. On the other hand, there is the increasing bifurcation between experimental, cutting-edge art and curating, and the ambition of institutions to spread art beyond social and economic boundaries. An effect of the latter condition is a growing sense of isolation between spheres of interests and activities in the arts, not to mention an almost total lack of mediation beyond relatively closed circles in the more experimental arenas.

The one institution that has played a greater role than any other in setting the standard for mainstream museum education is the Museum of Modern Art in New York. The model that its founding director Alfred Barr instigated in the 1930s did not add pedagogy at the end of the exhibition-making process, as icing on the cake, but rather integrated it into every exhibition. In the brilliant book *Spaces of Experience: Art Gallery Interiors from 1800 to 2000*, the art historian Charlotte Klonk demonstrates that exhibitions at MoMA have always been consciously didactic, promoting Barr’s formalist view of art. His main purpose was to refine the aesthetic sensibility of visitors and to mold a mode of spectatorship based on what she calls “the educated consumer,” in contrast to the 19th-century ideal of the spectator as a “responsible citizen.” Despite Barr’s famous charts of stylistic developments and well-written, accessible catalogue texts, the educational approach in his exhibitions tended to be more visual and spatial than discursive. The paintings were hung low on the white walls, and numerous partitions created more [organized the?] wall space. The

selection of works and the display strategies themselves were of utmost importance. “Points” were made in the exhibitions: for example, in the 1936 exhibition *Cubism and Abstract Art*, the identification of historical and non-Western visual sources for 20th-century Western geometric abstraction.

The fact that MoMA from the outset quite literally situated itself as a mediator between industrial producers and distributors (a powerful interest group with a strong presence on the board of trustees) and a “buying” audience cannot be underestimated. MoMA openly borrowed display techniques from department stores and other commercial settings. And visitors were considered not just consumers, who in conjunction with certain exhibitions could even buy the displayed design objects in the museum shop, but tastemakers who were expected to become responsible members of the emerging society of consumption. Thus market strategies and business interests merged and shaped new ideals of spectatorship. Given MoMA’s influential status, its approach was taken up at innumerable other art institutions in all different parts of the world. The idea of “winning people over,” of persuading them, was central to MoMA’s didactics from the outset, just as it was in the contemporaneous advertising industry, which was itself coming of age and transforming for the new modern era. Within this largely commercial scheme, unconventional and “innovative” art was accepted as long as the innovations remained on a formal level and did not allude to, let alone provoke, any practical overlap between the sphere of art and the sphere of social and political action.

This should ring more than one bell for those familiar with contemporary art museums and curating. Another

familiar phenomenon is the concept of the education or pedagogical department. Despite the fact that its particular brand of curating was based primarily on integrated didacticism, in 1937 a separate education department was started at MoMA. Under the leadership of Victor E. D’Amico, it deviated from Barr’s ideas about a more or less detached spectator and promoted visitor participation. Instead of emphasizing enjoyment or judgment of the art on the wall, it encouraged visitors to explore their own creativity. John Dewey’s pragmatist philosophy and theories about art as an emancipatory activity with great potential to stimulate political participation in democratic societies played a certain role. Nevertheless, in the cases of both Barr’s educated consumer and D’Amico’s participant, a heightened sense of individuality was promoted. This was markedly different from the collectivist approaches to spectatorship, influenced by Constructivism, that around the same time and even before were promoted by artists such as El Lissitzky and curators such as Alexander Dorner, both in Europe. Collective spectatorship was inspired by the Russian Revolution and by Einstein’s theory of relativity. It encouraged a varied and active experience through dynamic exhibition design, where things looked different from different angles, while simultaneously emphasizing the totality of the installation. It also promoted ideas of shared, collective encounters with art.

Today, Barr’s didactic model of “educated consumer spectatorship” can easily be identified in the operations of most major museums and other exhibiting institutions, from MoMA in New York to Tate Modern in London to Moderna Museet in Stockholm. The idea of “Constructivist spectatorship” has been largely left behind, although

it has hibernated and survived in the work of Group Material; the group around Shedhalle in Zurich in the late 1990s; and artists such as Dominique Gonzalez-Foerster, Philippe Parreno, and Liam Gillick. At the same time museum practice in the United States has, since the early 20th century, promoted itself as reaching out to a wider audience. European welfare states have done some of the same in the postwar period and in the name of equality they have supported both broader access to high culture and reformulations of what constitutes high culture. Educational concerns are important, maybe even essential in democratic societies. But this attitude often clashes with high-modernist ideas about art not imposing itself on its viewers—that it is, or at least should be, strong enough to stand on its own feet and speak for itself, removed from “external” contexts. Which leads to decontextualized “What do you see and what do you feel” pedagogy.

Again the art in question does not typically challenge the status quo; it is about enjoyment and judging. We can call this method “the establishment of the canon,” relying mostly on developments internal to art and certainly echoing Barr’s ideas. This method aims at producing a genealogy of artists, and to a certain degree also a sequence of accepted themes, whose work can be included in a master narrative of the history of art. Importantly, however, this maneuver happens at the expense of more investigative approaches where a stated ambition is to contextualize artistic practice and to study and question current phenomena and inherited norms and procedures. In other words, to decode and recode artifacts and activities that pertain to contemporary life, guided more by what is interesting and relevant than by what is “pleasurable,”

“good,” and “lasting.” Nowadays this model can itself be contextualized within the widespread call for canons of culture, blueprints of “eternal quality” to be implemented in school and university curricula.

So what does this have to do with mediation? All of the above count as forms of mediation, employed more or less consciously: integrated didacticism supplementary participatory education and pedagogy, and finally narrative information deployed both inside and outside the institution. This last was historically generated by educational and pedagogical departments but nowadays it comes more and more from PR and marketing people. Whereas the added participatory education is based on an assumption that there is a deficiency among the visitors—a gap to be bridged, a hole to be filled, or even a conflict to be solved—the other two are concerned more with a perceived lack of contact between parties, a “misunderstanding,” or a conflict to be straightened out. The idea that a sort of “dating service” is needed to put the right people and “things” in touch with each other. At the same time, mediation can be much more than this: It is essentially about creating contact surfaces between works of art, curated projects, and people, about various forms and intensities of communicating about and around art. As a term, mediation seems to be open enough to allow for a wider variety of modes of approaching exchanges among art, institutions, and the outside world. In short, mediation appears to provide room for less didacticism, less schooling and persuasion, and more active engagement that does not have to be self-expressive or compensatory.

Let us return for a moment to the current abundance of didacticism. It is an excess that pertains in equal

measures to what is typically considered the very nucleus of the craft of curating (for example, Barr’s model of selecting, installing, and in other ways contextualizing work) and what is tagged onto a curated project (gallery tours and workshops, wall texts, labels, audio guides, et cetera). Whereas the latter is frequently deemed overdidactic, the former is not commonly thought of as “didactic” at all but rather as common practice, the normal thing to do. It is almost not visible, like curating before Harald Szeemann—invisible hands selecting and arranging. In addition to the type of curating described above (the didactic establishment of the canon, with narrative information added on), among the most common modes of interpellation in art education within exhibiting institutions today remains the participatory format promoted by D’Amico. Experience-based guided tours and workshops where visitors are asked to share what they see and what they think and feel about what they see, to discover “the creator” in themselves, are part and parcel of this.

The division of labor in larger art institutions involves the educational and pedagogical departments taking responsibility for educating the audience, in essence for “fixing” what ought to be the responsibility of other social institutions such as schools, colleges, and universities. The collections and temporary exhibitions departments take care of the more persuasive, integrated, and therefore probably more efficient didactics. An interesting feature of D’Amico-style formats within this scheme is that they are easy to avoid—we don’t have to join in unless we really want to—as opposed to Barr’s model, which is baked into the institution or exhibition. This is also the case with the many overly simplified and

often promotional wall texts, brochures, and other presumably generous narrative techniques, which tend to render art at the same time simpler and more spectacular. The pure promotion has reached almost obscene levels, particularly in press releases. Marketing and PR departments have gradually taken over responsibilities that used to be shared between curators and educators. In many art institutions, marketing and PR take the lead on any added narrative, and they can for example decide *not* to provide written information about a specific project, even though it is up and running, because it detracts attention from the blockbusters. It is not unknown for marketing and PR people to interfere with the program itself, even.

But do we really need more mediation? Maybe what we should call for is different types of mediation, and in other contexts. As well as a heightened awareness of the specific forms of mediation that are already employed in institutions, not least the persuasive mediation embedded within the traditional craft of curating. We as professionals would certainly benefit from methods that help us reflect upon what we do and how we do it, as a form of consciousness-raising. Furthermore, most of the methods of mediation in use today have been modeled upon modern art, which functioned in radically different ways than contemporary practice. Formats derived from one paradigm are being applied to art from a different paradigm.

But most importantly, it is time to consider and take seriously the fact that the art and curated projects at the forefront of experimentation, which formulate new questions and create new stories, are growing increasingly remote from the mainstream. These sidestreams,

many of which test various forms of “Constructivist spectatorship,” trickle further and further away from the situations where most people encounter art and curated projects (large institutions in big cities), and here mediation, whatever type it may be, is marginal. This kind of strategic separatism is in many ways a survival strategy in order to guarantee other proportions of self-determination; the mainstream is not particularly welcoming to the sidestreams and the sidestreams prefer to stick to themselves. And yet the inevitable result is self-marginalization, where only the already-converted are reached.

Another reason for asking what is the good of mediation: More and more over the last decade, I have observed in emerging curators and students of curating a relatively limited interest in communicating about art beyond professional circles. This pattern stands in stark contrast to the developments in mainstream institutions discussed above, which suffer from too much (and too much one-sided) didacticism. Together with a number of colleagues I am partly to blame for this development, having supported ideas around all kinds of experimentation, both artistically and curatorially, advocating the necessity to try out the unknown without having to constantly glance at the reception. We have been motivated by the need to create other ways of thinking and acting—a direct reaction to a perceived stasis among mainstream institutions, including their overly didactic modes of address. The experimentation has more or less only been possible in the sidestreams. And I will continue to pursue it, but while trying to keep more of an eye on how what we are doing might be communicated beyond the confirmed believers. On how mediation can create space for exchange with something “other.”

This limited interest in communication beyond the select audience of one’s peers manifests itself in two tendencies among younger curators and students. One foregrounds smart curatorial concepts and another privileges collaboration and new production. The first one, let’s call it the “curatorial pirouettes,” focuses on the ideas of the curator. Here art tends to be included based on illustrative or representational grounds and the outcome is usually a thematic group exhibition. In this category we can also include some of the more self-reflexive curatorial models, which tend to focus on reworking structures and formats. The second one, which we can term the “over-collaboration,” involves close collaboration between the curator/student and an artist with the purpose of creating new work. Although the rhetoric involves “avoiding traditional notions of authorship” and “escaping individuality,” this intense interaction between the two players often ends up being close to a symbiosis. Others are kept outside, and the result is a “super-artistic” subject who has two bodies instead of one and is surprisingly self-expressive.

In both situations, a third term—a wedge to trigger a dialectical dynamism—is missing. Instead there is little exteriority, almost no outside and very few “others.” Again, this is the opposite of the theoretical open-arms strategy of mainstream art institutions. The curator/student creates a separate universe for her/himself and her/his ideas or artist buddy. Of course any show involves detailed work that needs to take place behind closed doors, but I believe that the moment has come to insist on experimentation while simultaneously attempting to develop new forms of mediation—to consider earnestly the question of what art does in culture, what its function

can be in society, and to be more generous with the material at hand. And to shift the terms of the existing forms of mediation in mainstream institutions in order to make room for other types of exchanges, and possibly also to let art use more of its potential.

Given that consumption is one of the most widely known and accepted forms of engagement with the surrounding reality, we should ask whether dismissing MoMA's model of the "educated consumer" is necessarily a good thing. Is it actually the fastest and most efficient means by which to reach new audiences, or rather, to develop a different "exteriority"? Most likely this model can be used in other ways, for different purposes. At the same time I wonder if we have not already seen the emergence of yet another model, that of "the entertained consumer," where visitors arrive at the museum with the expectation that they must be constantly amused and entertained. And yet the collectivist spectatorship advocated by the Constructivists continues to have an allure. The theoretician Irit Rogoff has argued for a related version of spectatorship, or rather "terms of engagement," in which the physical participation that is part of the 200-year-old art *habitus* carries the nucleus of a qualitatively better form of democracy than the separation offered by representative democracy. If we take Rogoff seriously, "reaching new audiences" is less relevant than changing the terms in which we talk about how we together produce a public or semi-public space thanks to, with, and around art, curated projects, institutions, and beyond.

(1998)

INTERVIEW WITH EDUARDO VIVEIROS DE CASTRO

REVISTA SEXTA-FEIRA

Interviewed for Sexta-feira magazine by Renato Sztutman, Silvana Nascimento, and Stélio Marras on December 21, 1998, in Rio de Janeiro.

What was your anthropology ideal when you started studying indigenous societies?

I wanted to make a “classic” ethnographic study of an indigenous group. My theoretical problem was to understand those societies in their own terms, that is to say (and it could only be that way) in relation to their own relationships: the relationships that form them and which they form, which obviously includes their relationships with social, ethnic, and cosmological otherness...I think there are two major paradigms governing Brazilian ethnography. On the one hand, there is the anthropological image of a “primitive society,” and on the other there’s the tradition deriving from a “Theory of Brazil,” which is perhaps best exemplified by the work of Darcy Ribeiro. The title of a book by Roberto Cardoso de

Oliveira, *Sociologia do Brasil indígena*,¹ conveys this second approach: the focus is Brazil, the Indians are interesting *in relation to* Brazil, in that they are part of Brazil. There’s nothing wrong with that, this sociology of indigenous Brazil is a highly respectable undertaking and has resulted in extremely important work. But that wasn’t my approach. Mine was the poorly named “primitive society”; my focus was indigenous societies, not Brazil: I was interested in *indigenous sociologies*. My approach was that of Lévi-Strauss, Pierre Clastres, the anthropology of Malinowski, Evans-Pritchard...

What was the state of study into indigenous peoples in the Amazon at the time of your earliest ethnological investigations?

We shouldn’t forget that a large part of the Amazon that would be studied in the 1970s didn’t exist in geopolitical terms, and it was incorporated into national society after the developmentalist boom which began in that decade. The focus was on Central Brazil rather than on the Amazon, thanks to the work of Curt Nimuendaju in the 1930s and ’40s, which had been discussed by Robert Lowie and Claude Lévi-Strauss. At the heyday of structuralism in the 1960s and ’70s, Levi-Strauss put Central Brazil on the agenda of anthropology theory. The largest number people working in a coordinated way in the same area in South America were the group linked to David Maybury-Lewis studying Central Brazil; an area that was also exclusively Brazilian. When I was a student in the 1970s, the general impression was that the only interesting thing left in indigenous ethnology was Central Brazil. I wasn’t even really sure that the Amazon existed as a possibility for work. Partly because I was

intensely involved in reading the theses and books by my lecturers and their associates, which were all about groups like the Jê, Bororo, and so on. All my later work was strongly marked by a “writing against” central Brazilian ethnology—not “against” in the controversial or critical sense, but against as in *starting from*, like a figure drawn against a background: against the landscape where my training had taken place.

What was the most impressive thing about working in the field with the Alto Xingu Yawalapiti, your first research experience in an indigenous society?

The first thing that caught my attention in the Xingu was that the social system was different from those in Central Brazil. One thing that has concerned me ever since has been how to describe a social form whose institutional structure has no kind of dualistic pattern whatsoever, considering that my basic image of indigenous society was a society with two halves etc. That was at a time when binary contrasts were considered the major key into any indigenous system of thought and action. It became clear to me that what was happening with the Xingu couldn't be reduced to the contrast between the physical and the moral, the natural and the cultural, the organic and the sociological. Instead, there was a kind of interaction between those dimensions that was much more complex than our dualisms. What caught my attention was the Alto Xingu complex of puberty reclusion, in which the youngsters have a literally fabricated body, imagined through the use of medicines, infusions, and techniques such as scarification. In short, it was clear that there was no distinction between the corporeal and the social: the corporeal was social, and the social

was corporeal. So it was something different from the contrast between nature and culture, center and periphery, inner and outer, self and adversary. My research with the Yawalapiti was a kind of investigation into those issues, although what I was doing was much more of a kind of ethnological warming up than research.

How did the theme of the body arise as a fundamental theoretical issue in your early studies?

When I arrived at the Xingu, I was coming from a tradition (reinforced by my Jesuit education) which taught that the body was something *insignificant*, in every sense of the word. With the Xingu, most of the things that we think of as mental and abstract were written physically on the body. The first anthropologist to effectively address the theme of corporality in South America was Lévi-Strauss, in *Mythologiques*, a monumental work on the “logic of sensory qualities,” qualities sensed in the body or by the body: smells, colors, sensory and sensitive properties. This work showed how it was possible for thought to articulate complex ideas about reality based on categories very close to concrete experience.

In 1981 you met the Araweté in the state of Pará, with whom you carried out the longest field research. What was it that most attracted you to doing research with this contemporary Tupi-Guarani group that is (distantly) related to the Tupinambá, who were famous for their cannibalism?

When I began to study anthropology, the Tupi were seen almost as peoples from the past, extinct or “acculturated”; it was as if there were no more to be done with them in terms of ethnological research, apart from

historical reconstruction or “ethnic transfiguration” sociology. Except that when the Transamazon highway was built in the 1970s, some isolated Tupi-Guarani groups in the state of Pará were “contacted”: the Assurini, Araweté, Parakanã... Obviously the thing that most caught the attention in the classical Tupi-Guarani material was the famous Tupinambá warrior cannibalism, but I had no idea that something similar would be found with the Araweté. I thought of the Araweté because I wanted a small group that hadn’t been studied. By chance, that group was Tupi. Research among the Araweté was complicated because they’d had five years of “contact,” and five years is very little. The group was still disoriented, still in the process of a social and cosmological revolution—and, moreover, demographic disaster—brought on by contact with the outside world. These people were really “savages,” dramatic and enigmatic, polite and brusque, subtle and exuberant at the same time; they were different from the Alto Xingu peoples who had impressed me with their etiquette, refinement, and almost solemn composure.

So what was your first experience of contact with the Araweté like?

They were developing their experience with us, testing all possible approaches. They weren’t yet really sure what they were going to do with white people. I was one of their first guinea pigs. They tried various approaches of managing otherness with me, one might say. So the research was psychologically complex, but I got along very well with them.

They didn’t try to drown you like the Tupinambá did with the Portuguese in the 16th century?

No, they didn’t drown me, at least not like that—because I think you’re referring to something else, to Lévi-Strauss’s story about the Spaniards and the Indians in the Antilles. Despite the fact that I was always a kind of enigma to them, an impression that was in fact reciprocal. The whole study was marked by their investigation of me. Of course they had already encountered white people many years before the official contact. The Araweté are one of those societies that must have had various encounters with white people in recent centuries, and might even be descendants of Tupi groups who had direct contact with Christian missions or something like that. They had forgotten a lot, but not everything. You can feel that they know much more about us than they let on.

The research interested them because, since I had no great theoretical question to follow from the outset, I followed the dialogic interests of the Araweté. I had no particular topic, so I had to follow what was of interest to them and what I managed to understand, I mean, I completely followed the flow of our interaction.

How did your experience with the Araweté inspire the development of the notion of “Amerindian perspectivism”?

My book on the Araweté is full of references to a perspectivism, to a process of putting oneself in the place of the other, which initially came to me in the context of the vision that humans have of the Maï, the heavenly spirits, and reciprocally. I subsequently suggested that Tupi-Guarani cannibalism could be interpreted as a process in

which one assumes the role of the enemy. But that was a perspectivism of my own, the concept was basically mine and not the Indians'. It's there, but it's formulated by me: cannibalism has to do with commutation of perspectives etc. Some years later, one of my (then) supervisees and (always) friends, Tânia Stolze Lima, was writing her thesis about the Juruna, which ended with a discussion about the Juruna relativism, and that brought me back to the issue of perspectivism. It's a wonderful piece of work, one of the field's most original ethnographic studies of indigenous thought so far. Tânia and I engaged on a systematic discussion about the material she was analyzing, and that was when we began to define the conceptual complex of perspectivism, the indigenous concept according to which the world is populated by other beings or people, in addition to humans, and who see reality differently from human beings.

How did you manage to move from the particular manifestations recorded by these recent ethnographic studies to the construction of a generic model—“Amerindian perspectivism”?

That irresponsible generalization is entirely my own. It's no fault of Tânia's. I wanted to identify elements in different indigenous cultures that would allow me to construct a model, to some extent ideal, in which the contrast with the characteristic naturalism of European modernity became clearer. Obviously this model is more or less remote from all the ethnographic realities that inspired it. (For example, as far as I know, the Araweté don't have that particular idea that certain *animal species* see the world differently from us.) But the phenomenon that Tânia discovered with the Juruna was very common

in the Amazon, although the vast majority of ethnographers did not attribute great importance to it. I was under the impression that one could make out a vast landscape, not just in the Amazon but Pan-American, in which shamanism and perspectivism were connected. One could also see that the mythological theme of separation of humans and nonhumans, that is to say, culture and nature, didn't mean the same thing as it did in our evolutionist mythology. The proposition of myths is that animals had once been humans and weren't any more, the humanity is the common background of humanity and animality. In our mythology, it is the opposite: we, humans, were animals and are not anymore with the emergence of culture, etc. The generic condition for us is animality: “everyone” is animal, except some are more animal than others, and we are less so. In indigenous mythologies, everyone is human, except some are less human than others. Various animals are much more distant from humans, but they are all, or almost all, originally human, which leads to the idea of animism, that the universal basis of reality is the spirit.

Could you give an example of how this perspectivist thinking works in the everyday life of indigenous groups?

Here's an example that shows the relevance and significance of the perspectivist theme. About three years ago, the son of Raoni (the leader of the Kayapó Txukarramãe) died, at the Kamayurá settlement, I think, where he was being treated by the shamans. The family had sent him there for shaman treatment. According to the white doctors, the boy died from an epileptic fit. Well, he had killed two Indians (I don't recall if it was in his own settlement, where he'd gone to spend some time in

between the various phases of the shaman treatment, or whether it was in the Kamayurá settlement itself), and some time afterwards he died. The death of this boy among the Kamayurá made the news in the *Folha de S. Paulo* newspaper, which published an article about the state of tension that subsequently ensued between the groups, with the Kayapó accusing the Kamayurá of witchcraft. It seems that war between the two groups was even mentioned. Then the paranoia began, and the *Folha* learnt about it (who knows how?) and sent a reporter to write an article. Some weeks later, Megaron, a Txukarramãe who is director of the Xingu Park (and Raoni's nephew), decided to write a letter to the *Folha* saying that the article was incorrect and that the Kamayurá were really sorcerers...I think it's fascinating that these accusations of witchcraft among indigenous Xingu groups were being aired in letters to the editor at *Folha*. I think this business of modernization, then postmodernization, globalization doesn't mean that the Indians are becoming white and that there are no discontinuities between the indigenous worlds and the "global world" (which it might perhaps be better to refer to as the world of the "United States"). The differences have not ended, but they've now become commensurable, occupying the same space, and actually increasing their potential for differentiation. So you can read in the same newspaper the political-literary platitudes of Sarney, a businessman talking about the miraculous properties of privatization, an astrophysicist talking about the big bang—and a Kayapó accusing the Kamayurá of witchcraft! All on the same level, on the same newspaper. Bruno Latour attributes great significance to this phenomenon in his *We Have Never Been Modern* (1991).

Well, anyway, Megaron's letter said, "This young man died because he had been bewitched by the Kamayurá. It's true that he killed two people before he died, but that was because he thought he was killing animals, because the Kamayurá shamans gave him a cigarette and he thought he was killing beasts. When he came to, he saw that they were human and was deeply shocked." This is an explanation that appeals to the perspectivist argument, this notion of seeing people as animals. When a person sees other humans as animals, it is because he is no longer human himself: this means that he is very sick and needs shaman treatment. But Megaron says that the Kamayurá shamans bewitched the young man and de-humanized him to make him see humans as animals, that's to say, making him behave like a wild beast himself. One of the theses of perspectivism is that animals don't see us as humans but rather as animals (on the other hand, they don't see themselves as animals, but instead as we see ourselves, that is as people).

That's why perspectivism is not just thriving but can also become part of stimulating political arguments.

To what extent can this perspectivist model be extended to all Amerindian groups, despite the profound differences between them? How can one talk about perspectivism among Jê peoples who have no current shamanistic practices, for example?

Well, we've just seen a member of the Jê group using such an argument. But in any case, even if the Jê don't say that animals are humans today, or that each animal sees things in a particular way, etc., their mythology, like that of all Amerindians, says that, at the beginning of

times, animals and humans were one and the same thing, that animals are ex-humans, and not that humans are ex-animals. This previous humanity of animals is never completely discarded, it is there as potential—just as for us, our “past” animality continues to pulsate under layers of civilizing varnish. Moreover, you don’t need shamans to be able to live in a shamanistic cosmology. (The Txukarramãe were using the Kamayurá shamans, for example.)

The idea that animals are people, which is common to many indigenous cosmologies (but not to all, in such simplified terms), doesn’t mean that the Indians are stating that animals are people like ourselves. Everyone in their right mind, and the Indians’ mind is at least as right as our own, “knows” that an animal is an animal and people are people, etc. But from certain points of view, and at particular moments, it makes perfect sense for the Indians to follow the notion that some animals are people. What does that mean? When an ethnographic study says something along the lines of “the so-and-sos say that jaguars are people,” it needs to be clear that the proposition “the jaguars are people” is not identical to a proposition as trivial as “piranhas are fish” (meaning “‘piranha’ is the name of a type of fish”). Jaguars are people, but they are also jaguars, while piranhas are not fish “but also” piranhas (since they are fish because they are piranhas). Jaguars are jaguars, but they have a hidden side that is human. But when you say, “piranhas are fish,” you’re not saying that piranhas have a hidden side that is fish. When the Indians say that “jaguars are people,” it tells us something about the concept of jaguar and also about the concept of people. Jaguars are people—humanity or “personitude” is a capacity that

jaguars have—because jaguariness is also a potential of people, and particularly of human people.

And, indeed, we should not find an idea like “animals are people” strange. After all, several important contexts in our culture see the opposite proposition “people are animals” as something that is perfectly clear. Isn’t that what we say when we’re talking from the biological point of view, or in zoology, etc.? And yet, thinking of humans as animals doesn’t necessarily lead one to treat one’s neighbor or colleague in the same way one would treat a cow, a fish, or a vulture. Similarly, thinking that jaguars are people doesn’t necessarily mean that if an Indian finds a jaguar in the forest he will treat it like his human brother-in-law. It all depends on how the jaguar treats him...

What do you mean exactly when you say that perspectivism is not relativism?

That question arose during a discussion with Tânia, whether perspectivism had anything to do with Western relativism, whether it was a kind of relativism. I thought that it wasn’t relativism but something else. Perspectivism isn’t a form of relativism. It would be relativism if the Indians said that, for pigs, all other species are basically pigs, although they look like humans, jaguars, crocodiles, etc. That is not what Indians are saying. They say that pigs actually are humans; the pigs don’t think humans are actually pigs. When I say that the human viewpoint is always the reference viewpoint, I mean that every animal, every species, every person occupying the reference viewpoint will see itself as human—*ourselves included*.

As a good structuralist, what do you think about the directions of anthropology post-Lévi-Strauss?

I'm a structuralist like every good anthropologist; but I don't know whether I'm a good structuralist...My impression is that structuralism was anthropology's last great effort, like many other earlier currents, to find some mediation between the universal and the particular, the structural and the historical. Nowadays you can see an increasing divergence between these two perspectives; they are almost becoming incommunicable. It's as if the legacy of classical anthropology had been divided up: the universals have been incorporated by psychology; the particulars, by history. It's as if anthropology were now just a contingent part of psychology and history, as if it didn't have its own subject matter. But I think this means that it loses the dimension of the reality of the object of anthropology: a collective reality, that is, relational, with a propensity for transcontextual stability. It seems to me that that's something which needs to be recovered. I think that anthropology needs to escape from this division to find "the middle world," the world of social relationships.

Bearing in mind that specific nature, how do you see the difference between anthropology and sociology?

Anthropology is the study of social relations from a viewpoint that isn't deliberately dominated by Western experience and doctrines of social relations. It aims to consider social life without being exclusively supported on this cultural legacy. Anthropology is different, if you like, in that it *pays attention* to what other societies have to say about social relations, not based simply on what ours has to say, and tries to see how that operates there.

It attempts *genuine* dialogue, treating other cultures not as the object of our own theory of social relations but as possible *interlocutors* of a more general theory of social relations. If there's a difference between anthropology and sociology, that would be the one for me: the object of anthropological discourse tends to be on the same epistemological plane as the subject of that discourse.

How can anthropology escape the hegemonic objectivism of Western thought, this domesticated thought?

We all know, anyone who's read Kant knows, that the act of knowing is a constitutive part of the object of knowledge. Nonetheless, our ideal of Science is guided precisely by the value of objectivity: one needs to be able to specify the subjective part that comes into play in viewing the object and not confuse it with the object itself. Knowing, for us, is to *de-subjectivize* as much as possible. You know something well when you can see it from the outside, as an object. That includes the subject: psychoanalysis is a kind of borderline-case of this Western ideal of objectivization, applied to subjectivity itself. Our basic ideology is that Science will one day be able to describe all reality in completely objective language. In other words, a *good interpretation* of the real for us is one that can reduce the intentionality of the object to zero. We know that the social sciences are, in official ideology, temporary, fragile, and second-class sciences. All science should mirror physics...What does that mean? It means being guided by the assumption that the *less* intentionality is attributed to the object, the *more* knowledge one has of it. The more one is able to interpret human behavior in terms of the energy states of a cellular network, let's say, and not in terms of beliefs, desires and intentions, the

more one *knows* of behavior. In other words, the more I *de-animate* the world, the more I know it. Knowing is de-animating, removing subjectivity from the world and ideally even from oneself. Indeed, we are still animists in terms of the official scientific materialism, because we believe that human beings have a soul. But we're not as animist as the Indians, who believe that animals also have souls. But if we continue progressing, we should be able to reach a world in which this hypothesis will no longer be needed, even for humans. Everything will be describable in the language of physical attitude, and no longer of intentional attitude. That's the current ideology in the universities and CNPq,² which is in the old distinction between the human sciences and the natural sciences, and which governs the differential distribution of funding and prestige...I'm not saying that that's the only current model in our society. Of course it isn't, but that is the dominant model.

In contrast to the Western pattern, what is it that drives indigenous epistemologies?

I'd say that the driving force behind the thoughts of the shamans, who are their scientists, is the opposite. To know something well is to be able to attribute the maximum intentionality to what is known. The more I am able to ascribe intentionality to an object, the more I know it. Good knowledge is that which is able to interpret all the *events* in the world as if they were *actions*, as if they were the result of some kind of intentionality. Explanation for us is to reduce the intentionality of what is known. Explanation for them is to deepen the intentionality of what is known, that's to say, to determine the object of knowledge as subject.

That's even the dominant model in our common sense...
Precisely. "Let's be objective." Let's be objective? No! A shaman would say let's be subjective, or we won't understand anything. The epistemological fault there is lack of subjectivity. Well, these respective ideals or models involve gains and losses, each to its own side. There are gains in being subjective, just as there are losses. Those are basic cultural choices.

Where are the places in our society for less objective and more intentional knowledge?

There are a series of alternative ideals, of course, but they are subordinate, secondary cases, or restricted to certain dimensions of a reality that is ontologically dualized: no one accepts, or at least no one takes very seriously anyone who accepts that *Verstehen*, intersubjective understanding, should include plants, stones, molecules, or quarks... That wouldn't be Science. That *ideal of subjectivity* that I consider to be a constitutive part of shamanism as indigenous epistemology finds itself in our civilization confined to what Lévi-Strauss called the natural park or ecological reserve within domesticated thought: art. The savage mind was officially confined to the realm of art; outside that realm, it would be underground or "alternative." No matter how valued art experience is, it has nothing to do with scientific experiment: art is inferior to science as a producer of knowledge. It may be superior emotionally, but it is not superior epistemologically. That is a distinction that makes no sense at all within what I am calling shamanistic epistemology, which seems to proceed much more according to our model of art than of science. Shamanism, like art, proceeds according to the principle of subjectivization of the object. A sculpture

may be the more evident material metaphor of this process of subjectivization of the object. It's a bit like what the shaman does: he sculpts subjects in the stones, sticks, and animals, he *conceptually* sculpts a human form.

What do you think of current urban anthropology studies?

I don't like the term "urban anthropology." I've nothing against studying in cities, obviously. But I don't like the term urban anthropology any more than I like suburban, rural, jungle, mountain, coastal, or underwater anthropology. But I don't think you're thinking of urban anthropology in the sense of studies of the social context of major human agglomerations, which is anthropology like any other. I imagine you're talking about the so-called "anthropology of complex societies," about the research into national societies in the European (or Eurasian) cultural tradition. Much of what has been done in the anthropology of complex societies is confined to projecting the concepts and characteristic object types of classical anthropology onto the urban context. This didn't get very far, because, in order to make a true projection, it would have to take place in the geometric sense of the word: it's the relations that have to be preserved, not the terms. Therefore, the "equivalent" of Amerindian shamanism isn't Californian neo-shamanism, or even Bahian candomblé. The functional equivalent of indigenous shamanism is science. It's the scientist, it's the high-energy physics laboratory, it's the particle accelerator. The shaman's rattle is their particle accelerator. That doesn't mean that we shouldn't study candomblé or neo-shamanism, since we clearly should. I'm simply saying that a genuine translation of the

anthropology of non-Western societies to the anthropology of Western societies should retain certain internal functional relations and not just, or even principally, certain thematic and historical continuities. Let me stress that I'm *not* saying we shouldn't study kinship, candomblé, urban shamanism, small groups, or face-to-face interactions...What I am saying is that an urban anthropology that "does the same thing" as indigenous ethnology (supposing this to be desirable, which is not clear) would be studying physics laboratories, multinational drug companies, new reproductive technologies, the major currents of thought at universities, the production of legal and political discourse, and so on.

So what kind of work would qualify as worthy of the title "anthropology of complex societies"?

To stick just with foreigners, I'd mention authors as different as Louis Dumont, Michel Foucault, Bruno Latour, or Marilyn Strathern. I'd see Foucault's work as more representative of a genuine anthropology of complex societies than Raymond Firth's study of kinship in London, for example. Anthropology has just recently discovered a whole new field of "anthropologicity" of complex societies that have hitherto been the preserve of epistemologists, sociologists, political scientists, and historians of ideas. We contented ourselves with the marginal, the nonofficial, the private, the familiar, the domestic, the alternative. There has been anthropology of candomblé but not of Catholicism. Does the anthropology of the religion of complex societies mean only studying African-Brazilian worship? Why not the National Confederation of Brazilian Bishops? Of course it's easier—and it was absolutely necessary—at first, to

transport what we had learned in our studies of African religions into studies of candomblé. But we weren't keeping the relations in this case, just the terms. The second step is to realize that there is more to do than transport terms. You can transport relations, and, in so doing, you are creating concepts, which is something that the anthropology of complex societies took some time to do. Anthropology was until quite recently marked by the concepts produced in its classic context: reciprocity, witchcraft, *mana*, exchange, totem, and taboo. So the anthropologists of complex societies looked for *mana* here, totemism there...Alright, I think one can go further than that, and we are indeed going further: we are actually beginning to do symmetrical anthropology, which is anthropologically investigating the "center" and not just the "periphery" of our culture. The center of our culture is the constitutional state, it's science, it's Christianity. Being able to study these objects is one of anthropology's recent achievements. The anthropology of complex societies has had the inestimable merit of showing that the "peripheral" and the "marginal" were constitutive parts of the sociocultural reality of the modern-urban world, thus dismantling the self-image of the West as the empire of reason, law, and the market. But the next step is to analyze these more-or-less imaginary realities which we have tried from the outset to delegitimize. It is no longer so necessary to delegitimize those things; it is now necessary to study how they work.

Do you believe that your work can contribute to an anthropology of Brazilian society?

I'm not overly familiar with the anthropology of Brazilian society. I went into ethnology to escape Brazilian society,

that compulsory object of every social scientist in Brazil. As a citizen, I'm Brazilian and I have no objections to that. But as a researcher, I don't think I'm compelled to have as object of study the so-called "Brazilian reality," which is a curious and untranslatable concept. We don't ask the same of mathematicians or physicists. Brazilian physicists are not studying the Brazilian reality. They're just studying reality, unless I'm (or they're) mistaken. Why can't a Brazilian social scientist do the same? Brazil is a circumstance for me, not an object, and I also think that Brazil is a circumstance for the people I study, and not their underlying condition.

And the commitment to the indigenous societies that you study?

That's another story. I think that Brazil, that's to say the State and the dominant classes, has always behaved badly towards its indigenous peoples. I have chosen to study the Indians. But my commitment to these peoples that I study is not a political commitment, but rather a vital commitment. My commitment to the Indians is not the object of my research, and nor is it its justification. It's neither of those things; it's the condition of my work, which I accept and which has never been a burden to me. I have a great mistrust of political justifications for research. I don't think there's anything particularly noble about justifying, generally ostentatiously, the political importance of what one is doing. The dangers of self-delusion and complacency are huge. Finally, I've so often seen this "political commitment" being used as a kind of epistemological tranquilizer...I have to admit I don't have much sympathy with it. I have nothing against things that are soothing, but when it comes to thoughts, I prefer disquieting ones.

NOTES

- 1 Sociology of indigenous Brazil, in free translation.
- 2 National Council for Scientific and Technological Development, in free translation.

BIBLIOGRAPHY

Verne, Jules. "The Romance of the Moon." In *From the Earth to the Moon*. Translation of the original *De la terre à la lune*. Public domain.

Flusser, Vilém. "The Moon." In *Natural: Mind*. Translated by Rodrigo Maltez Novaes. Reprinted by permission of Miguel Flusser and Univocal. English version © Univocal Publishing, 2013.

Hornbacher, Annette. "Surveying the World." Published as "Die Vermessung der Welt," in *Und nach mir die Sintflut? Natur – Kultur: Kunst*. Bonn, Germany: Humboldt/Goethe-Institut, 2009. Originally published in *Kulturaustausch – Zeitschrift für internationale Perspektiven*, II. Berlin, 2008. Reprinted by permission of the author and the publisher. Translated by Hedy Lorraine Hofmann.

De Maria, Walter. "On the Importance of Natural Disasters" (May 1960). In *An Anthology of Chance Operations*. Edited by Jackson Mac Low and La Monte Young. Bronx, New York: self-published by the editors, 1963, reprinted, New York: Heiner Friederich, 1970. Reprinted by permission of the author.

Latour, Bruno. "Waiting for Gaia. Composing the Common World through Art and Politics." Lecture delivered at the French Institute for the launching of SPEAP in London, November 2011, <http://www.bruno-latour.fr/node/446>, accessed in March 2013. Reprinted by permission of the author.

Kuhn, Thomas. "X: Revolutions as Changes of World View." In *The Structure of Scientific Revolutions*, 50th-anniversary edition, fourth edition, 111–135. Chicago: The University of Chicago Press, 2012. Reprinted by permission of the publisher © 1962, 1970, 1996, 2012 by The University of Chicago.

Kac, Eduardo. "The Satellite and the Work of Art in the Age of Telecommunications." First published as "O satélite e a obra de

arte na era das telecomunicações" and distributed by the author in 1986. Reprinted in Kac, Eduardo. *Luz & Letra. Ensaios de arte, literatura e comunicação*. Rio de Janeiro: Contracapa, 2004. Reprinted by permission of the author. Translated by Nick Rands.

Sarukkai, Sundar. Excerpt from "Science and the Ethics of Curiosity." In *Current Science* 97, no. 6 (September 25, 2009). Reprinted by permission of the author and the publisher.

Joubert, Lindy. "Science and Art: New Paradigms in Education and Vocational Outcomes." *Prospects, International Bureau of Education Journal* (Geneva) 32, no. 4 (December 2002). Reprinted by permission of the editor. © UNESCO 2002

Cruzvillegas, Abraham. "Recent Crafts." In *The Logic of Disorder: The Art and Writings of Abraham Cruzvillegas*. Edited by Robin Adele Greeley and translated by Joaquín Terrones. Cambridge, MA: Department of History of Art and Architecture Harvard University/Benemérita Universidad Autónoma de Puebla, 2013. First published as "Artesanías recientes." In *Round de sombra*, 61–66. Mexico City: Conaculta, 2006. Reprinted by permission of the author and the editor.

Lind, Maria. "Ten Fundamental Questions of Curating. Why Mediate Art?" *Mousse Magazine* (Milan), no. 28 (April, 2011). Reprinted by permission of the author.

Viveiros de Castro, Eduardo. "Interview with Eduardo Viveiros de Castro." Published as "Entrevista com Eduardo Viveiros de Castro." In *A inconstância da alma selvagem – e outros ensaios de antropologia*, 475–492. São Paulo: Cosac Naify, 2011. Originally published in *Sexta-feira n. 4 [corpo]*. São Paulo: Hedra, 1999. Contributions by Carlos Machado Dias Jr., Clarice Cohn, Florencia Ferrari, and Valéria Macedo. Reprinted by permission of Eduardo Viveiros de Castro. Translated by Nick Rands.

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AN ANTHOLOGY FOR TEACHERS,
MEDIATORS, AND AFICIONADOS OF
THE 9TH BIENAL DO MERCOSUL |
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