From Human Neglect to Planetary Survival: New Approaches to the Appraisal of Environmental Records

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The environment is in crisis. Planetary disasters are everywhere on the increase, the result of human negligence or gross miscalculation. In nearly all such cases, human beings — individually or collectively — bear the deepest responsibility for abusing the earth's environment. For example, the crises at Three Mile Island and Chernobyl that shocked the world are evidence that the manipulation of nuclear processes can backfire. The threat to the ozone layer comes directly from too many exhaust fumes, too many polychlorinate biphenyls (PCBs), and too greedy a destruction of the world's forests. How have humans come to control, manipulate and fragment nature to this extent?

Of late, the crisis in the environment is forcing us to rethink our corporate values as a human race. Was there a time when things were better? If so, how can we reclaim the organic world we have lost and reintegrate those lost values to ensure the sheer basic survival of the planet? And, what are the implications of the environmental imperative for archives? What is the lesson for archivists who appraise environmental records?

This article, divided into three main sections, first seeks to explain how our longstanding neglect of the consideration of the whole, or context, has led to the present deplorable state of the environment — and of archives. In particular, archival appraisal decisions have often been piecemeal and fragmentary, rarely reflecting the context of the entire social construct within which the records were created. Yet, even environmental records — including scientific data about natural phenomena, seemingly pure and strictly observational, as well as reports based on such data leading to policy decisions and much more — have always been created as part of a social construct, reflecting someone's idea that the records should be created or shared or used only in a particular way. Furthermore, there is a clear connection between human views of nature and social organizations. The first part of the article explores the character of this past neglect — of the environment and of archives.

The second section analyses some recent works of philosophers, feminists and historians who recognize the plight of the earth's environment today. They point back to a time when life on earth was more organic, nature was hallowed, and humans lived in harmony with nature: human and planetary life was better integrated. One of their major contributions is the idea that nature is a perception dependent on the perceiver's

world-view; by extending this view for archival purposes, archivists must come to recognize their own need to be fully perceptive of the larger social context of records creation. For example, we should be asking the question, "What historical evidence supports a particular interpretation, and within which context was it created?"

Drawing on the example of the recent appraisal of the paper and electronic records of the Atomic Energy Control Board, the third section suggests how we might consider holistic, "survival" values in the appraisal of environmental records, especially in the Information Age. Such new "values" may lead to the proper protection of these records, and thus ensure the well-being of the planet. The need to sharpen appraisal skills for environmental records, given the planetary crisis, has never been greater.

Neglect

Our collective neglect, building up over several centuries, has led to the present nearly irreparable state of the environment. We have assumed that the earth would always be there, replenishing itself for our collective future. Now, however, with our recent loss of control over the earth's environment — precisely through excessive attempts to control it — the environment itself ironically is forcing us to rethink our corporate values as a species. As calls for attention to the earth's current disease[1] reach a crescendo, the environment continues to waste away.

How did the environment get to such a sorry state? Although scientific reductionism did not arise fully from René Descartes, he significantly moved this idea forward. In 1637, in his *Discourse on Method*, Descartes wrote that we, as human beings, "by ... knowing the nature and behavior of fire, water, air, stars, the heavens . . . can . . . make ourselves masters and possessors of nature."[2] Descartes's influence contributed to the breakdown of an integrated, holistic concept of the universe and nature, in order to study their parts, and to concentrate on an empirical, mechanistic approach to a nature previously perceived as organic. It did not take long for Descartes's influence to spill over into other areas of study and life in general.

Many of the roots of an objective and mechanistic approach to science and archives, and of our current environmental dilemma and its connection to science and technology, can be found in the world-view arising out of the seventeenth-century Scientific Revolution, of which Descartes has become the leading symbol.[3] In its starkest sense, the Scientific Revolution changed the direction of western civilization away from a universe uniting spirit and nature, into one fragmented into mechanistic parts. What followed was great attention to detail, to parts, in scientific endeavours and in life generally. The requisite rationalism and logical, linear, forward-looking mentality of this concept were reinforced by the necessity for definite answers to questions, and then by the clear-cut findings which supported the approach; it was a self-perpetuating philosophy, favouring the physical over the metaphysical questions almost by definition. Because Descartes articulated this reconceptualization of nature as a machine rather than a living organism, the idea of the matter/spirit split has traditionally been referred to as the "Cartesian dichotomy."

Morris Berman has written that our current world-view is the "Cartesian paradigm."[4] Since the seventeenth century, the "driving forces within modern civilization" have been science and technology,[5] and as a result we now have "a detached view of

nature."[6] It is not science or nature *per se* that must be questioned, however, but the idea of nature which has been objectified and valued as objective "truth" by the practice of modern science and technology.[7] The unchecked development of science in the modern age has spiralled us into an age of fear of nuclear destruction and environmental degradation. The impact has been so devastating that authors in various disciplines have entitled their critiques "the machine in the garden," "the death of nature," "the [dis]enchantment of the world," and "the death of the soul."[8]

The danger does not lie in science but in scientism — "a pseudoscience or misinterpreted science . . . [it] is neither science nor philosophy, but that peculiar modern invention and malady—an ideology," according to William Barrett. Modern science has transformed human life because of its "exhibition of the power of the human mind, of its freedom and originality to construct concepts that are not passively found in nature but nevertheless help to organize our experience of nature." Indeed, it is "in itself a powerful evidence of human freedom," yet in the seventeenth century the science of mechanics was quickly followed by a "widespread ideology of mechanism."[9]

This ideology of mastery over nature, based on mechanistic exploitation of her individual parts, undermined the idea of nature as a living organism. Nature was used and abused and not hallowed, and became less and less the "root metaphor binding together the self, society, and the cosmos...." To be sure, the essence of nature did not change, but the dominant image of the earth did change from an organic, vital, living female, to a dead and passive earth, dominated and controlled by humans. Over time, this connection between social change and changing constructions of nature became more and more evident. Human beings and nature became less interdependent and less subordinate "to communal purposes of family, community, state, and vital life permeating the cosmos to the lowliest stone."[10] Things valued were no longer organic and inclusive — we might say contextual — but fragmentary and exclusive.

Archives have often been referred to as an organism. Indeed, archivists have a unique contribution to make in the Information Age, given our ability to recognize the patterns, connections and linkages in records, and to give meaning to the myriad groups of information swelling around us in various types of media today. Hugh Taylor, using the ecological analogy of agriculture and cultivation of the soil, points to the obligation of archivists to "husband . . . with the greatest of care . . . both the records and the information they contain . . . if there is to be a fertile crop of knowledge and wisdom forthcoming." If we do not give proper attention to the tasks before us, we will contribute to the "erosion and destruction of the soil and [its] eventual starvation." Instead, he recommends refocusing on the interconnections of the records with which we work, an emphasis on the whole and not the parts.[11] Given the new challenges in today's archival environment, to which I will turn shortly, archivists must gain, or regain, more than ever before, a rich understanding of evidential or contextual functions and actions behind any group of records, and of the interrelatedness among several groups of common records. In short, they must focus on the contextual framework of records creation in order to appraise soundly.[12]

Why this recent call for archivists to take a more comprehensive, even holistic, approach to records appraisal? The call is made because of the urgency of the task before us, especially given the amassing of information in multiple media, the duplication of information, the challenge of electronic records, the lack of resources, the

problem of missing data and structural bias, the increasing lack of control over the sheer bulk of records, and the growth in the number and size of institutions creating records.[13] While there have been attempts to work a little faster and a little better, the usual result has been increased (misguided) attention to the isolated facts and stray bits of information around us and in our records. Meanwhile, valuable records have been lost forever because of inattention to the broader contextual framework needed to appraise properly the records of society. If we continue to wallow in the morass of endless information, our uninformed, haphazard appraisal choices will not leave an archival legacy which would help to form a well-rounded "true image"[14] of society.

In archives, how and why have we neglected the preservation of environmental records? We have assumed that detailed information about natural resources and scientific processes was less important to the collective memory of Canadians, and their *right* to have it preserved, than records of a social or — for government records, at least — administrative nature. Perhaps we have assumed, too, that the "archives of the earth" would always take care of themselves just as we assumed that the earth would always be there, in constant renewal every spring. We have been less comfortable making irrevocable archival decisions about records we often do not understand, coming as we do to the archival profession with training primarily in the humanities. We have been intimidated by the process of science; yet this process is one of the features represented in scientific records which makes them unique. In addition, creating institutions and individual scientists, for example, who have painstakingly created and manipulated records of an environmental nature, often see themselves as proprietors of the records and not the archives; in cases where archivists are aware of such records, they have often been only too happy to have the creators made responsible for their long-term preservation, even though such retention may not be for "archival" reasons or uses.

But the time has come, the environment itself tells us, to ensure the archival preservation of these previously neglected scientific records — both those created for institutional, national and global reasons (such as long-term observational data), and those created by individual scientists. Scientific records preservation is all the more crucial today for the survival of the planet and the humans on it: in order to develop solutions to current environmental crises, there must first be some level of understanding — derived from the historical record and its context of creation — as to how the planet attained its present state. As for individual scientist's papers, they may provide clues as to what lines of research to pursue, or not to pursue, for our future survival. Essentially, we need a long-term understanding of the environment — which can only come from looking at the historical record of science — in order to be able to work towards long-term, visionary solutions for environmental crises.

Of late, there has been an increased emphasis on context in the archival appraisal of all records. Recent articles by Hugh Taylor, Helen Samuels, David Bearman and Terry Cook, among others, list several reasons for this contextual need. One major reason which propels us all, but especially government records archivists, is the sheer vast amount of information discovered in the records which we appraise; volume and content seem to overwhelm us. Environmental records, too, are voluminous and contain great amounts of information impossible to digest even if we had the resources and time. Unlike social records series, with which they may share such features, environmental records are often most valuable when cumulative in nature and viewed

longitudinally; transactions are less important than patterns over time. Environmental records have forced us to reconsider taking a more contextual approach for another major reason: even if we were able to assimilate all the vast amounts of information contained in environmental records, we would not likely be able to understand it in any meaningful way. Environmental records are distinguished by their seeming incomprehensibility to those not educated in the sciences; many of these records are packed with more data than any other type of record, and the contents are often technical, especially if the records are electronic. Thus, even more so than with social records, for example, we need to know the contextual creation (the scientific process) of the records in order to determine their archival value. In order to preserve environmental records of the highest archival value, we need to look for patterns in the context of records creation; an understanding of the use of the record by the creators (within the department and outside of it) is especially important for environmental records.

Furthermore, we need to move beyond the search for the obvious "human" element in records to a search for records of value to humans *and* to the planet as a whole. Perhaps we have been too "human-centred" in our approach to appraisal; in documenting human activities and institutions, the earth itself has been relegated to second place. We have neglected the earth, what Hugh Taylor calls "planetary evidence," and by doing so we have done a disservice to humanity, to ourselves.

Integration

Perhaps something has been missing from our collective world-view — something that a reconsideration of our interrelationship with the environment and all living things would help to reinstate. Many writers — feminists, philosophers and environmental historians — are currently asking us to rethink our relationship with nature, to view it more holistically. There have been others before them. Back in 1926, one of the last nineteenth-century public commentators, South African idealist J.C. Smuts, tried to show how mechanism and the attention paid to reducing nature into parts in the previous centuries could not be isolated from the "process of creative synthesis . . . in the wider setting of holism." He saw how the intense, creative interaction of the whole was much more than simply the sum of its parts.[15] Parts could not be studied separately from their wholes in nature, because that went against the very integral unity of each living thing and its part in the cycle of all of nature.

Madonna Kolbenschlag writes that "life perseveres and flourishes in a delicate balance.... [Indeed, the] model for life is embedded in our body and in the planet earth."[16] "A living structure is one in which the parts communicate and cooperate." Each part is a vital, interdependent and equally important part of the living organism. All things in the equilibrium "flourish and nourish each other."[17] Inclusivity is crucial to recapture what we have lost to fragmentation and mechanization. One philosopher has written that "for a long time now the labor of a good part of our culture has been reductive," which has resulted in the fragmentation of individual human beings and of their interdependence with others and with nature.[18] Another author has written "that an inspiriting vision of a humane community has been reduced to a token of individual survival.... the old symbol of reconciliation is obsolete."[19] The symbol of reconciliation can be revived by viewing the earth as reproductive and replenishing and therefore constructive, not reductive. By "reconceptualizing reality as a . . . living organism," we

can help to reverse the trend of "the transition from the organism to the machine" which began several hundred years ago.[20]

"The world we have lost was organic," according to Carolyn Merchant.[21] Although there have been both dominating and nurturing metaphors in most systems of thought throughout time, the predominant image of the earth as a beneficent, nurturing female who provided for the basic needs of humankind gradually disappeared as the Scientific Revolution of the seventeenth century called for the mechanization and rationalization of nature: nature could also be disorderly, as could a woman, and the taming of nature or power over nature's expressions was necessary. Various writers have described this slow shift in world-view over time, which continues to have its impact today, but what is important to note is that the images of the earth as female — whether nurturing or uncontrollable — were "projections of human perceptions onto the external world."

> The change in controlling imagery was directly related to changes in human attitudes and behavior toward the earth. Whereas the nurturing earth image can be viewed as a cultural constraint restricting the types of socially and morally sanctioned human actions allowable with respect to the earth, the new images of mastery and domination functioned as cultural sanctions for the denudations of nature.[22]

Sixteenth-century descriptions and imagery of the earth as a nurturing mother were used as normative constraints against abuse of the earth's resources, only to be replaced later with descriptions of the earth as useful for exploitation and necessary to be tamed — just as a woman might be — in order to sanction new commercial activities such as mining. Again, although the essential characteristics of the earth and women did not change, the *perceptions* of nature were important controlling images which could either constrain or sanction mining, for example, which in turn and over time sanctioned the widespread rape or commercial exploitation of the earth. Others have studied this theme in depth as it relates to various natural resources, but one passage from the poet John Donne demonstrates the popular identification of mining with human lust:

> License my roaving hands, and let them go,
> Before, behind, between, above, below.
> O my America! my new-found-land,
> My kingdome, safelist when with one man man'd
> My Myne of precious stones, My Emperie,
> How blest am I in this discovering thee![23]

Whereas before the prevailing "organic framework" encouraged the image of Mother Earth as a moral restraint against overextended mining, a new image of the earth as greedy, avaricious and lustful — and therefore inviting exploration — supported the necessary heightened mining activity during and following the Scientific Revolution. As the mechanization of nature proceeded, it was accompanied by changes in attitudes to, and imagery of the earth from nurturing to an inanimate, dead, physical system.[24] As in the example of mining, so too with forestry, agriculture, water usage and other natural resource developments did the new exploitative values of the Scientific, and related Commercial Revolution replace the older organic paradigm.

There are a few examples of European communities that lived in communion with nature, that revered women as they revered the earth, and both because of their life-

giving powers. There is also the North American example of American aboriginal communities that lived in harmony with nature and respected all living things.[25] Whereas the dominant European mind-set of the eighteenth and nineteenth centuries "saw nature through a positivist ideology," the relationship of many aboriginal peoples to nature was holistic. For them, nature merited reverence. Their perception of the environment was religious: both animals and plants were "spirit people" in the world of aboriginal peoples. All trees were considered sacred and respected as teachers; people learned from them about important things such as the weather, animals and the Great Spirit. Examples abound of how nothing from nature was ever wasted: J.D. Hughes notes how many aboriginal peoples practised "traditional agriculture" by not destroying the soil or encouraging severe erosion; they used fish as fertilizer and burned fields in the autumn to replenish elements needed by the plants in the ground; and every part of a slaughtered animal filled a specific need. They displayed reverence for the abundance of life-sustaining produce compared to life-bearing woman: "The ripe maize was treated with the greatest respect, called 'mother' and closely associated with Mother Earth." There existed a "sense of reciprocity with life, of spiritual resonance with the natural environment." Nature had "intrinsic values," not merely instrumental ones, and the world was seen as a whole being or organism.[26]

No one would disagree that the traditional relationship of aboriginal peoples with the environment ended with the European discovery of America. Concerning natural resources, the technology of generating energy from minerals, and razing forests to the ground, have triumphed over the aboriginal "concept that land and living things are sacred."[27] Not only that, but also the community and extended-family living arrangements, and the sharing of familial and work responsibilities, were disrupted and reorganized to fit the prevailing Euro-American pattern. In the end, the practical outcome of the seventeenth- and eighteenth-century European idea that nature must be tamed and brought under control had a devastating effect on the ecological ideals and practices of the North American Indian. Studying the changing experience of aboriginal peoples gives an indication of how present-day western society has been rooted in the historical "development of human relationships with and attitudes toward the natural environment down to the present day."[28]

Practitioners of the "new environmental history," which already is "more than a fad,"[29] are increasingly concerned with how humans interrelate with their environment. Moreover, unlike some scientists and archivists, they are particularly wary of the notion that there is an objective viewpoint from which to judge history. Instead, historians should let "human 'nature' and intuition be [their] guide in evaluating our relationship with nature ...."[30] In increasing numbers, they recognize that the theories and so-called discoveries of science have aesthetic and mythical proportions, and that they are the product of personal and group bias and beliefs. Even more than this, environmental history seeks to rediscover that "seamless unity of humankind and the rest of nature" through the "nurturing side of science," to show that "we are interdependent with all of nature and that our sense of community must take in the whole of creation," according to one of the leading environmental historians in the United States, Donald Worster.[31]

In these ways, environmental historians in general are seeking to make the history of all humankind more inclusive.[32] They are telling us that we must pay attention to an holistic, inclusive view. Until we do so, we will continue to perceive — and to have

collected in archives as our collective memory, sad to say — a fragmented and incomplete human history.

What is to be gained from re-examining our past and present relationship with nature and the environment? By taking an "earth's-eye view," "factors having an impact on the earth's resources can be analysed and a new and different interpretation of historical change developed, based on the assumption that the natural and human environments together form an interrelated system."[33] In this way, the earth and its resources are again respected for their capacity for sustaining life, for ensuring survival, and for replenishing nature, season after season. And humans are recognized as intimately connected to the life-giving forces in nature. What are the beneficial implications of this holistic model for archival appraisal?

Survival

Although the late twentieth-century Canadian archival scene seems rather far removed from the seventeenth-century Scientific Revolution, the roots of the current issues facing archives go back at least as far as that. They involve a different consideration of nature, of the earth's environment and of ourselves. What have we lost due to the subsequent emphasis on a mechanistic or fragmented view of nature? By focusing mainly on rationalism, empiricism, logic and the scientific method, the modern age has moved away from what one author called an "ecosystem model," which "presents an earth's-eye view of history."[34] "As the economy became modernized and the Scientific Revolution proceeded, the dominion metaphor" — which had previously existed in Greek philosophy and Christian religion — "spread beyond the religious sphere and assumed ascendancy in the social and political spheres as well."[35] Put another way, we have lost one half of the Cartesian dichotomy. As suggested above, this has had a deep — and heretofore unexplored — impact on archives. Archivists, like scientists, have concentrated on parts, and the further dissection of parts, instead of on wholes. The objectivist ideology of science, and of archival appraisal, has precluded the consideration of subjectivity because of its assumed "pure approach."[36] In archives, as in history and other disciplines, there has been less focus on context and records creation and on the "survival" value of the records, than on the potential research value of isolated bodies of records — especially electronic records. Concerning the environment, here too is a lack of consideration of the interconnectedness of all living things in the larger organism, the earth.

By reclaiming the lost half of the Cartesian dichotomy, we would develop a greater collective understanding of the cyclical process of nature, the interconnectedness of all living things, and the interdependence in nature today. While such attitudes would result in a healthier environment for future generations, more to the point for archival appraisal, such an appreciation of how the whole of the environment functions would also offer some ideas for a more integrated, contextual approach to the appraisal of environmental records. As stated above, the archives of a particular function are like an organism where no element of the

> interlocking cycle can be removed without the collapse of the cycle. Each particular part is defined by and dependent on the total context.... It cannot isolate the parts into simplified systems that can be studied in a laboratory, because such isolation distorts the whole.[37]

What does this mean for archivists doing appraisal? We must appraise records for their evidential value and not merely for their research potential or for their unique characteristics, and we must consider the "total environment" of their creation, including the personal and collective values of their creators. Thus, our appraisal research must be more thorough and comprehensive if we are finally to choose those few records representative of the central functions and most important activities in society.[38] If not, we shall be doing a disservice to future researchers because they will not have the total picture or context behind the details contained in the records.[39]

Environmental records are those records which reveal the age-old human desire to monitor, control and forecast (sometimes) unpredictable nature, including the actual data marshalled to support these aims. They have also been created as part of a particular function or scientific process. An understanding of the actual and potential "survival" use of the environmental record, derived from an analysis of its context of creation, helps archivists to undertake the appraisal of environmental records — with which we have had less experience than, say, with the records of social institutions. In this sense, the definition of "environmental records" is more comprehensive than specific. The current focus on the environment as all-pervasive serves to obscure and enlarge the definition of "environmental records": what may not have been considered an environmental issue or environmental record yesterday may be one today.[40] Both the general and the specific are included in the definition. One can talk of a specific environmental accident and its effect on a particular community, for example, as well as talk of a more global, environmental approach to — or condition of — the physical well-being of the planet, which would affect the human community on earth as a whole. In terms of environmental records, we would include the rather straightforward figures of burnt acres in a western forest reserve at the turn of the century, the laboratory experiments from silviculture research, and the analyses and interpretation of that research in policy as it might affect a community living in a pesticide-sprayed forest zone; as well as broader raw data on soil conditions, rainfall and air pollution, that affect the growth of forests in the first place.[41] Here we can see that a general definition of environmental records would incorporate records (such as policy records) that do not necessarily concern the environment *per se*; a reconsideration of the appraisal of environmental records will have an impact on the appraisal of such kinds of records.[42]

More specifically, the scientific process as captured in scientific records — such as the great number of specialized and different scientific projects carried out in one particular organizational unit — helps to make these types of records individualized.[43] An example is the research done at Agriculture Canada's myriad experimental farms and research stations across the country. Bottom-level scientific research carried out at these stations reflects a "top-down" policy initiative, and any appraisal of bottom-level scientific records must start at the macro-level in order to understand their total context. But, unlike social records, scientific research records are individualized because they concern a specific type of research done in a certain region; scientific research at Agriculture Canada and many other scientific government departments, although carried out according to larger departmental mandates and policies, nevertheless is particular to a specific region or research station, or reflects research into unique phenomena at a particular research station. While not completely dissimilar from the mountains of like records which reflect a top-down policy decision about how a certain social programme is to be implemented equally across the regions, scientific records at

Agriculture Canada "at the bottom" nevertheless also reflect research in a variety of independent agricultural or natural phenomena, the results of which may go up the hierarchy to make a serious impact on policy across the country. Social, economic and military records concern research into administration and the application of laws, whereas scientific records concern research into unique phenomena. Moreover, the process of how the scientific research is carried out over time is also different from social records; scientific records are cumulative and, sometimes, reflect patterns over centuries, whereas social records more often than not concern quick transactions.

As noted, scientific research records are different from social records (and from each other) because of their diversity, complexity, longevity, cumulative nature and lack of uniformity throughout the regions. Such diversity is demonstrated by the records of a research station analysing Marquis wheat in Saskatchewan; to a dairy research station in Quebec; and a honey inspection station in British Columbia. The use to which the scientific record is put — both inside and often outside the government agency sponsoring its creation, as well as this type of record serving different purposes over time —is also significant: sometimes the same data is used to produce completely different interpretations and conclusions, as in the recent case of contaminated breast milk outlined in two differing interpretations of their own data by the International Joint Commission, and in the case of the Atomic Energy Control Board (AECB) and Toronto-based Energy Probe disputing the acceptable level of nuclear radiation in the environment surrounding nuclear generating stations.[44] We might elaborate here by making a distinction between older, more traditional environmental records — those that often were, and continue to be, used as support for environmental research and the "good" of the planet, such as the statistics mentioned above on the number of burnt acres of forest reserve—and those environmental records which document more recent scientific discoveries and monitor situations such as the manifestations of the manipulation of nature — an example being the changing levels of uranium content in the bodies of workers at nuclear generating stations. The distinction lies in the conscious act of creation; in years past, except for a few cases such as the systematic collection of weather data, documents were kept to record the "exploitation" of nature, and the monitoring of nature was only incidental; today, scientific records are purposely collected to monitor, and thereby control as far as possible, the environment. The latter types of record, if properly analysed for their archival value, could prove to be immensely valuable to the future survival of humans and the planet.

While it is true that environmental records are different from records created by social agencies, it is important to note that environmental records themselves are a product of social change. The Canadian government scientist, J.W. Spinks, links the creativity of scientists to the social changes resulting from scientists' discoveries and exchanges of information. Important links in the chain include many players such as institutions that grant funding and facilities, scientific societies, research councils at the national and provincial level, private industry and the universities, and the Science Council of Canada.[45] And so it is argued that science in the Canadian context has been an agent of government;[46] to what extent is this reflected in the records of the individual scientist, or in the collective records of the section or agency in which she or he is employed? In addition, not only do scientists and environmentalists exchange information and results of experiments among the industrial, academic and governmental sectors in their own country, but they also exchange information across political

boundaries and between states and nations. The very information they seek, record and value as important is quite different from the human statistical information collected by governmental social and cultural agencies; an example is the longitudinal, cumulative character of observational scientific data which, when compared and contrasted with other similar data, can show patterns of change in the earth's environment over time. In a way, the environment by definition is much less limited than a single human life. As well, to a certain extent today and even more so in the future, environmental issues will not respect political boundaries; this is a factor which affects the appraisal choices we make (and, further, whether we shall be the ones making them).

It is just as important for archivists to be aware of their own personal values and the mainstream values of society. Decisions made today determine what will remain as the representation of contemporary society. As was shown above in the changing attitudes toward the earth and women some centuries ago, these perceptions of nature were reflected in the social and political constructs of the day. The concepts of nature, like those of women, were and continue to be historical and social contructs; archivists must be sensitized to these concepts in the appraisal of all records, and especially in the appraisal of environmental records, which we often assume to have been created in a "pure" or "neutral" methodology devised to monitor nature impartially. Archivists may not like to hear it, but they know better than anyone else how they leave a legacy each time they make an appraisal or selection decision. Like scientists, commonly revered for their supposed objective, value-free decisions, archivists also make decisions which are subjective and not impartial, even when applying clearly defined appraisal guidelines.

Records at the federal Department of the Environment and other environment-related institutions include scientific records, created by scientists who, like all humans, have certain values and bias in spite of their claimed "objective" and "value-free" profession. Archivists must be aware of such bias in their own appraisal choices. Yet, it is this aspect of science that is the most frustrating to locate in the documentation, and at the same time it is this aspect of science that maintains its "aura of depersonalized authority" and objectivity: "The basic assumptions about the practice of science are never questioned." Scientific writing, according to one scientist, "implicitly denies the relevance of time, place, social context, authorship, and personal responsibility." She continues with some words that should cause archivists to wonder whether they have made the proper appraisal choices in the past:

> There is no historical and political analysis of our hierarchically structured, exploitative society, in which scientists work not so much because they believe that the knowledge they produce is relevant to human needs or values but often in order to generate publications, jobs, research funds, and prizes.

Scientists are compared to a priesthood and its supposed immunity from ideological and political influences, because their "scientific methodology" is supposed to neutralize ordinary human experiences and commitments.[47]

The archival profession not only must try to capture the nuances of science and the values of the creators of environmental records, but it should also be concerned with the mindset, training and values of archivists — those who are making the appraisal choices — in at least three ways. Archivists typically obtain an education in the humanities,

which predisposes them to be indifferent to, or unsure of, the needs of environmental documentation. This has only served to magnify the existing problem of inadequate documentation of government environmental activities in the twentieth century.[48] Archivists have been taught that science is "complete and set," yet "science provides a sense of our own ignorance — a wilderness of mystery." What is needed are "minds [to attack] this ignorance from many directions,"[49] ultimately to help to reveal the subjective aspects of science. Moreover, the archival profession, given its emphasis on "archival science" and the classification of individual records, has often approached archival work in an atomistic, piecemeal, "scientific" way. Archivists have paid great attention to details, so as not to contribute to the loss to historical research of any bit of knowledge.[50] By concentrating on measuring and recording bits of information, archivists are merging into the questionable aspects of our present culture, the Information Age. As Hugh Taylor says, "It is this very act of classification, essential as it has been, which in a sense diminishes knowledge...."[51] Furthermore, archivists, like scientists, tend to take an empirical approach to appraisal by applying the pre-set formula of "archival values" — evidential or informational — to groups of records. In this way, the traditional tacit assumption that our appraisal decisions are "objective" is undergirded. Yet, as we all know, our appraisal choices are anything but objective.[52]

Having recognized some of the roots of the prevailing western world-view, we now understand more clearly how "we view and interpret the world through cultural categories and frameworks of belief.... Scientists are not disembodied minds uncontaminated by ideology and unaffected by wider social interests,"[53] nor are archivists. We must be sensitive to the idea that the story told by the records we decide to keep might be a distorted one, reflecting our attitudes and cultural bias more than those even of the records creators and their environment. Moreover, we must be sensitive to the creation of environmental records — especially those in the electronic medium — and the influence of human factors in the supposed "pure" recording of "natural phenomena." Here too, "human factors" and "natural factors" are interrelated. Even the computer is part of a social construct, as is the acquisition and manipulation of electronic records.

Given what we now know about the "facts" of nature and how and why they could be recorded, how might we be more holistic in the appraisal of environmental records in the Information Age? An example at the National Archives of Canada concerns some 820 metres of textual records and eighteen electronic systems of the Government of Canada's nuclear regulatory body, the Atomic Energy Control Board (AECB). The mandate of the AECB has remained much the same since its inception in 1946, that is, to be the federal government's watchdog over the development and use of atomic energy in Canada, and to assist Canada's participation internationally in the realm of measures to control atomic energy. More specifically, the AECB oversees uranium prospecting in Canada, including its extraction, production, refinement, transportation, radioactive waste management and import and export. In addition, from monitoring nuclear fuel that might be exported to Third World countries all the way to approving the amount of radiation that goes into making a digital watch, the AECB also operates several nuclear plants and research centres in Canada. These nuclear power stations are heavily monitored, as are the AECB employees who work in them. The medical dossiers of these employees are filed with the AECB, and these case files became part of the appraisal package. Among a myriad of other, more traditional, operational

records of a government institution, there are also electronic records which document such scientific information as unusual or significant "events" involving the nuclear power reactors, which are then analysed to produce summary assessment reports.

These records are unlike any other in Canada, for they show a late twentieth-century phenomenon in the history of the planet, that is, the human manipulation of mined uranium and the impact of nuclear radiation. They also clearly show Canada's increased involvement in world affairs after the Second World War, most particularly in the export of nuclear reactors.[54] As such, these records possess archival value for traditional appraisal reasons (they possess obvious evidential and informational values). Yet they go beyond that, because they also possess great archival value for what may be called environmental or "survival" reasons in two broad aspects — the survival of humans who inhabit the planet, and the survival of the planet itself. As such, their value is much more "potential" and "futuristic" than informational or actual. Whereas we would consider keeping those significant, often "fat" case files of individuals receiving welfare cheques or family allowance because they may have been precedent-setting or otherwise unusual, in the case of the AECB we decided to keep almost all records documenting the health of individuals and the events and changes in the processing and transportation of mined uranium. We respected AECB solicitors' concerns about administrative and legal repercussions by honouring their request to retain the records for at least seventy-five years, but our own reasons for keeping the files went far beyond that: we were concerned for the future collective health of the country and the planet, not to mention the future offspring of AECB employees.

Why did we decide to keep even those uneventful files which tracked an employee's seemingly perfect record of health for, say, a mere two-year sojourn with the AECB? We did so for the simple reason that these files contain possible "survival" value: AECB scientists themselves admit that the full effects of nuclear radiation on humans and the planet are not yet known. Who knows whether a baby born some generations later might bear some effect of nuclear radiation from an ancestor's two-year employment in a nuclear power station during the 1980s? Although the AECB was rightly and understandably concerned about the possible legal ramifications in the extended lifetime of an employee, and wanted the records retained for this primary purpose, as archivists sensitive to "survival values" in environmental records we kept the records for the future descendants of that employee, the planet and the human race as a whole. This time, the unknown factor —not based on the possibilities for future historical research but on the potential for saving the lives of human beings and their environment — was too great. Thus we decided to keep the records for the reasons which AECB scientists and legal advisers noted, but also for other reasons which, perhaps, might even reflect negatively on these scientists and lawyers by using "their" records in a different way from what they had originally intended. At the same time, the AECB records also show the intention behind their creation and, by extension, they reflect the Canadian Government's or the AECB's "perception of nature" and "perception of humans in nature" since 1946.

Although the above is only one example from a single government agency, it demonstrates how we might consider survival values in the appraisal of environmental records. In addition, in order to make the potential for survival of the corporate human race and the planet as great as possible, archivists should not stop after documenting the

mandates and functions, and preserving the scientific and related human data of such government agencies as the AECB. As Hugh Taylor and especially Helen Samuels suggest, the scientific record will not be complete unless we document the activities and findings of alternative, protest groups — such as anti-nuclear groups — as well as all concerned parties: local, provincial, national and international.[55]

Archivists must pay increasing attention "to those documentary evidences which relate to the wider scene as well as to our bailiwick. This is particularly true of environmental evidence,"[56] given its history of origin in complex bureaucracies that are continually being realigned, its tendency to be part of a long-term, seemingly "pure," monitoring function, and its apparent immunity to political borders and the context of creation alike. In addition, archivists must become aware of their cultural baggage as individuals and as a profession; our decisions are not completely objective. Appraisal of environmental records must be "environmental," or contextual. To take a holistic, inclusive approach to records appraisal means to take an "integrated" look at the records in question. By taking an integrated approach, one may hope to reach some "integral" or "holistic" representation of a function, event, change in society or idea —with the prospect of thereby contributing to the survival of the planet.[57] The choice to take an inclusive, "survival-oriented" approach to the appraisal of environmental records is not a difficult one, and more "natural" to us than might at first glance appear: "Finding a way through may be a matter of finding our way back . . . to the nature of our humanity, who we are and what we are about...."[58]

Notes

* An earlier version of this paper was presented at the Annual Conference of the Association of Canadian Archivists, Banff, Alberta, on 23 May 1991. I am grateful to Terry Cook, Tom Nesmith, Helen Samuels and Hugh Taylor, for their insights and editorial suggestions since the paper was first written.

1 Since the scientist James Lovelock renamed the earth Gaia a few years ago—meaning Mother, one who reproduces—references to our planet have been increasingly personalized in books, articles, and the media. Thus, Gaia can have a "disease." Indeed, as will be implied later, the new approach to the environment is also holistic in that no severe distinctions are made between living things; humans, animals, and plants are given equal importance by Gaia. And in the new paradigm, Gaia can be "healed."

2 As found in Morris Berman, *The Reenchantment of the World* (New York, 1981). Descartes' influence led to increased attention to the "scientific method" which encouraged an "objective" approach to philosophy and all of life—with the old emphasis on "why" questions being replaced by an emphasis on "how" and "what" questions, for which it was easier to get "yes" and "no" answers. Since I submitted this manuscript for publication, I have come across a similar analysis of the Scientific Revolution. See Richard Tarnas, *The Passion of the Western Mind: Understanding the Ideas That Have Shaped Our World View* (New York, 1991).

3 Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution* (San Francisco, 1980), p. xvii. Morris Berman would go even further: ". . .because disenchantment is intrinsic to the scientific world view, the modern epoch contained, from its inception, an inherent instability that severely limited its ability to sustain itself for more than a few centuries. For more than ninety-nine percent of human history, the world was enchanted and man saw himself as an integral part of it. The complete reversal of this perception in a mere four hundred years or so has destroyed the continuity of the human experience and the integrity of the human psyche. It has very nearly wrecked the planet as well." See *The Reenchantment of the World*, p. 23.

4 Berman, p. 23.

5 William Barrett, *Death of the Soul: From Descartes to the Computer* (New York, 1987), p. xiv.

6 Paul Fayter, "Senses of the Natural World: Recent Works in the Philosophy and History of Science," *Forest and Conservation History* 34, no. 2 (April 1990), p. 88. What the authors of the seventeenth-century Scientific Revolution called the Book of Nature ". . .was a world deprived of life, a mechanized world. The human mind, feelings, values, experiences, hopes, and meaning were all subtracted from scientific reality" (p. 88). Fayter's article is one the most sensitively written review essays I have ever read.

7 Fayter, p. 88. See also endnote (2) above, as well as Carolyn Merchant, in "The Theoretical Structure of Ecological Revolutions," *Environmental Review* 11 (Winter 1987), who looks at science and history as

social constructs: "Viewed as a social construction, 'nature' . . . is not some ultimate truth that was gradually discovered through the scientific processes of observation, experimentation, and mathematics. Rather it was a relative, changing structure of human representations of 'reality'" (p. 273).

8 Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal of America* (New York, 1964); Merchant; Berman; and Barrett (all three *op. cit.*). Another probing hook which links the loss of our individual and collective spirituality with a loss of "connectedness" to the life-giving force of the earth or Gaia is Madonna Kolbenschlag, *Lost in the Land of Oz: The Search for Identity and Community in American Life* (San Francisco, 1988).

9 William Barrett, p. xv, *passim*.

10 Carolyn Merchant, *The Death of Nature*, Introduction and pp. 1-2.

11 Hugh A. Taylor, "Information Ecology and the Archives of the 1980s," *Archivaria* 18 (Summer 1984), p. 36.

12 Hugh A. Taylor, "Transformation in the Archives: Technological Adjustment or Paradigm Shift," *Archivaria* 25 (Winter 1987-88), p. 24.

13 A few of these points are discussed in detail in F. Gerald Ham, "Archival Choices: Managing the Historical Record in an Age of Abundance," in Nancy E. Peace, ed., *Archival Choices: Managing the Historical Record in an Age of Abundance* (Massachusetts, 1984), pp. 113-147. See also George T. Mazuzan, "The Challenge of Nuclear Power Development Records," *The American Archivist* 44, no. 3 (Summer 1981), pp. 229-35. Mazuzan remarks on the bulk of records covering the Three Mile Island nuclear disaster and stresses that archivists, who "are the ones intimately acquainted with parts of the whole," have a "professional obligation to obtain the larger view of technology in order to see where the particular collections fit in" (pp. 234-35). The implication in both articles is that there is too much information to account for; the archival profession must take a macro approach to appraisal if there is any hope of obtaining the best records to reflect the reality of society.

14 Terry Cook, *The Archival Appraisal of Records Containing Personal Information: A RAMP Study with Guidelines* (Unesco, 1992).

15 J.C. Smuts, *Holism and Evolution* (New York, 1926), pp. 86-87, as noted in Merchant, *The Death of Nature*, pp. 292-93.

16 Kolbenschlag, pp. 118-19.

17 Ibid., pp. 119, 163.

18 Barrett, p. 157.

19 Leo Marx, pp. 364-65.

20 Merchant, *The Death of Nature*, pp. xvii, xviii.

21 Ibid., p. 1.

22 Ibid., p. 2.

23 John Donne, Elegie XIX, "Going to Bed," as found in Ibid, pp. 40-41.

24 Merchant, *The Death of Nature*, pp. 22-23.

25 J. Donald Hughes notes that the word "ecology" comes from the Greek *oikos* which means "house" or "home." "Ecology ... tries to see that everything is connected to everything else" (*Ecology in Ancient Civilizations* (Albuquerque, 1975)), p. 3.

26 J. Donald Hughes, *American Indian Ecology* (El Paso, 1983), pp. vii, 67, 140-41. See also Merchant, *The Death of Nature*, pp. 28-29, 131-32. The 1991 "Earth Spirit Festival" at Harbourfront in Toronto, as explained in the brochure for the event, was seeking to recapture this relationship that aboriginal peoples had with their environment. This year's celebration is entitled "A Whole Earth is a Whole People." I am thankful to Mary Jane Commanda of the National Archives of Canada, who gave me a copy of the brochure and gave advice on the terminology in these few paragraphs on aboriginal peoples.

27 Hughes, *American Indian Ecology*, pp. 129, 134.

28 Hughes, *Ecology in Ancient Civilizations*, p. 2.

29 Richard White, "American Environmental History: The Development of a New Historical Field," *Pacific Historical Review* LIV, no. 3 (August 1985), p. 335; White, along with Worster and others, calls for more interdisciplinary research which is demanded by a "compromised and complex situation—the reciprocal influences of a changing nature and a changing society. . ." (p. 335). See also Roderick Nash, who highlighted "interrelatedness" in a chart as crucial to environmental history back in 1972: "American Environmental History: A New Teaching Frontier," *Pacific Historical Review* XLI, no. 3 (August 1972), pp. 362-72.

30 Thomas Soderqvist and Morris Berman, papers given at University of Ottawa colloquium on "The History of the Environment," 9 March 1990.

31 Donald Worster, "The Vulnerable Earth: Toward a Planetary History," in Donald Worster, ed., *The Ends of the Earth: Perspectives on Environmental History* (New York, 1988), p. 20. Others, like Carolyn Merchant ("Gender and Environmental History," *Journal of American History* 76, no. 4 (March 1990), pp. 1117-21), have sought to make Worster's conceptual framework for environmental history more complete by suggesting the usefulness of reproduction as a category of analysis in environmental history. See also Barbara Leibhardt, "Interpretation and Causal Analysis: Theories in Environmental History," *Environmental Review* 12 (Spring 1988), pp. 23-36, who notes that "the environmental historian's craft ... is to discern the threads that weave people and their environments together in particular patterns" (p. 23). J.

Donald Hughes, in his relatively short, ground-breaking, and oft-quoted study, *Ecology in Ancient Civilizations* (Albuquerque, 1975), reiterates how "history ... provide[s] us with many examples of ancient peoples who failed to adapt themselves to live in harmony with ecosystems within which they found themselves, who depleted their environment, exhausted their resources, and exist today only as ruins within eroded and dessicated landscapes." Without placing the blame on the Scientific Revolution, Hughes continues, "That fate might also await our own civilization, but this time on a global scale. Ancient history is a warning and a challenge to our attitudes, our ability to understand, our technological competence, and our willingness to make far-reaching decisions. The challenge will not go away, and the response we will make is not yet clear" (p.156). For a discussion of the roots of the ecological movement in Europe see Anna Bramwell, *Ecology in the 20th Century: A History* (New Haven, 1989). While it has been argued that "environmentalism" is a variant of "ecologism," and differences exist between the "Ecology" and "Deep Ecology" movements, these semantics are not the concern of this paper.

32 A Canadian example helps to show how unearthing records in archives can help to correct long-held impressions: James P. Hull, in "Canadian Technology in the North American Economy: Pulp and Paper 1913-1939," unpublished paper given at the Canadian Historical Association conference (March 1989), notes that "traditional historiography" of industrial technology in Canada "is a story of unrelieved gloom. ... [Yet] Canadians made important, internationally significant contributions to the technical development of the [pulp and paper] industry" leading to the necessity of a "broader concept of the nature of technology" (pp. 1-2). Even where we may think that a chapter in environmental history has been completed, some important elements or players may have been left out — often because of the values of the more powerful players at the time, the accepted values of the society at the time and today, or the values of the archivists and historians collecting and interpreting the records of the historical event. See, as an example of this, Carolyn Merchant, "Women of the Progressive Conservation Movement: 1900-1916," *Environmental Review* 8 (Spring 1984), pp. 57-85, who contrasts her findings with those recorded in Samuel P. Hays' recognized, "definitive" history, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement 1890-1920* (New York, 1959): "... women's self-conscious role as protectors of the environment ... during the progressive conservation crusade [in the United States] of the early twentieth century ... has been rendered all but invisible by conservation historians" even though they "transformed the crusade from an elite male enterprise into a widely based movement" (p. 57).

33 Merchant, *The Death of Nature*, p. 52.

34 Ibid., p. 42. In another chapter, Merchant explains that "the Scientific Revolution of the sixteenth and seventeenth centuries has been treated by most historians as a period of intellectual enlightenment in which a new science of mechanics and a mechanical world view laid the foundation for modern scientific, technological, and social progress. But, in the face of the current crisis over the depletion of natural resources, Western society is once more beginning to appreciate the environmental values of the premechanical 'world we have lost.' Today the ecological consequences of exploitative attitudes toward the four elements—earth, air, water, and fire—the ancient sources of life and energy, are beginning to be fully recognized" (p. 99). Paul Fayter, in reviewing Hans Peter Duerr's *Dreamtime: Concerning the Boundary Between Wilderness and Civilization* (New York, 1985), notes that "most histories of science concentrate on what has been gained. Duerr invites the reader to consider what we may have lost." Fayter says that Neil Everden's *The Natural Alien: Humankind and Environment* (Toronto, 1985), supports joining together (again) "what modern science has often torn asunder: value and nature, humanity and environment" (p. 87).

35 *Merchant, The Death of Nature*, p. 3.

36 Evelyn Fox Keller describes "objectivist ideology [as] prematurely proclaiming anonymity, disinterest, and impersonality and radically excluding the subject"—it is almost innocently protected and protective, "a veil not so much of secrecy as of tautology [in which] the effort to universality closes in on itself. . ." (*Reflections on Gender and Science* (New Haven, 1985), p. 12).

37 Merchant, *The Death of Nature*, p. 293. See also T.R. Schellenberg, *The Management of Archives* (New York, 1965), p. 67.

38 Hugh A. Taylor, "Transformation in the Archives," pp. 17, 25-26.

39 Terry Cook, "Mind Over Matter: Towards a New Theory of Archival Appraisal" (draft), p. 5; see also the complete first third of this paper, which is excellent. The "Documentation Strategy" model by Helen Samuels proposes a universal approach to appraisal instead of making appraisal decisions "collection by collection."

40 See A.J.W. Catchpole and D.W. Moodie for non-traditional evidences of climatological change over time, in "Archives and the Environmental Scientist," *Archivaria* 6 (Summer 1978), p. 114.

41 Environmental historians have also struggled with a definition of what they research and write about. Is it purely the non-human environment, such as analysing climatological changes over time? Is it the interactions of humans with their environments over time? Does, or should, environmental history have a moralistic slant? And so on. Our collective perception of nature has changed over time as we have come to view ourselves differently. Thus, many philosophers and environmental historians would say that even "immutable nature" is a "social construct" by definition.

42 Catchpole and Moodie, especially pp. 136-37.

43 See Joan K. Haas, Helen Willa Samuels, and Barbara Trippel Simmons, *Appraising the Records of Modern Science and Technology: A Guide* (Cambridge, 1985), distributed by the Society of American Archivists.
44 Stephen Strauss, "Mind and Matter: How Some Politically Compromised Scientists Soured Scientific Truth," *Globe and Mail* (21 September 1991) and "Mind and Matter: IJC Has Made Up Its Mind and Not Even the Facts, It Seems, Will Budge It," *Globe and Mail* (5 October 1991); "Conflicting Studies Issued After Report on Child Deaths," *Globe and Mail* (9 September 1991).
45 This is one of Helen Samuels's central points.
46 Suzanne Zeller, *Inventing Canada: Early Victorian Science and the Idea of a Transcontinental Nation* (Toronto, 1987).
47 Hubbard, *The Politics of Women's Biology* (New Brunswick, 1990), pp. 10-13, 209.
48 Clark A. Elliot, ed., *Understanding Process as Progress: Documentation of the History of Post-War Science and Technology in the United States*, Final Report of the Joint Committee on Archives of Science and Technology (Chicago, 1983), p. 15.
49 Lewis Thomas, President of the Memorial Sloan-Kettering Cancer Centre in New York, as quoted in Richard Cox and Helen Samuels, "A Research Agenda for the Archival Profession," *The American Archivist* 51, 1 and 2 (1988), p. 41. See also pp. 35-36.
50 Terry Cook, "Mind Over Matter."
51 Taylor, "Transformation in the Archives," p. 14.
52 Again, Hugh A. Taylor challenges us "to examine these and other assumptions of our profession to see whether they still hold up in our mythopaeic 'information age'." ("Transformation in the Archives," p. 26).
53 Fayter, pp. 86, 90. See also Hubbard, pp. 51, 209-11. In a fascinating account, Hubbard relates how the double-helical model of DNA "came into being" as an "example of how personal and societal agendas, often thought to lie outside the realm of objective science, are part of the process of scientific discovery" (p. 48). See also, again, Keller, p. 12.
54 On the topic of governmental involvement in nuclear development since the Second World War in the United States, see Mazuzan, "The Challenge of Nuclear Power Development Records."
55 Helen W. Samuels has made significant advances for archivists with her work on documentation strategy—"an analytic, planned approach to solving problems posed by the complexity and volume of modern documentation." See especially "Documenting Modern Chemistry: The Historical Task of the Archivist," paper given to the author by Samuels. The suggestion from Hugh A. Taylor came in a personal letter to the author, dated 21 June 1991.
56 Taylor, "Transformation in the Archives," p. 15. See also by Taylor "'The Totemic Universe': Appraising the Documentary Future" and "Chip Monks at the Gate: The Impact of Technology on Archives, Libraries and the User," the latter published elsewhere in this issue of *Archivaria*.
57 On this point see Catchpole and Moodie's conclusion, p. 136.
58 Taylor, "Transformation in the Archives," p. 13.