SHE LOOKS AT HIS SCIENCE: FEMINIST PERSPECTIVES ON SCIENCE, NATURE AND THE SACRED

by

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The feminist critique

In its analysis of the role and the status of women in the society, one of the most important contributions of the feminist critique has been the recognition and the clear statement of the fact that the organization of society has been accomplished exclusively from a masculine perspective. The feminist critique has pointed out that what has been regarded as true, accepted as knowledge, considered rational, moral or important, and what has been decided as social policy has all been determined by males who have historically held positions of power in the society. This empirical fact is a product of as well as a result of the patriarchal assumption, which maintains the superiority of males over females. Within patriarchal cultures, males have dominant positions in the society and females are subordinate. The different status of males and females reflects the different political and social power they have and conversely, the different social positions males and females have result in different experiences. So although every individual has a unique life history, males and females have different experiences and different perspectives because of their gender and because of the ways that the roles and the characteristics of males and females have been understood in the society. The continuing strength of the patriarchal ideology has been due to its invisibility. It has been invisible because the assumptions of patriarchy have been accepted as natural and it has been invisible because of its association with the understanding that truth is objective and universal, whether that truth has been understood to be metaphysical, realized within a hierarchical and authoritarian social order or whether truth has been believed to be that which can be stated by empirical truth claims and which can be discovered and tested through a rational and scientific inquiry.

As long as it is assumed that there can only be a single, objective and impersonal truth and the agreed standards of evaluation are satisfied, it will not be suggested that the perspective on knowledge could influence the content of knowledge. Yet with an increasing understanding of the social construction of reality, and a recognition of the fact that knowledge depends upon the assumptions and the experience of the knowers, questions about the validity and the applicability of what had been regarded as universally true can be raised. The feminist critique has pointed out that since the history and the perspective of the knower influences the knowledge which can be known and since gender is always an important determinant of that perspective, knowledge from the male perspective will be different from knowledge from the female perspective or from the knowledge which includes the female perspective. The fact that claims which we had understood to be objectively true and the concepts and theories which we believed were universally applicable and inclusive are now understood to have been made from a particular historically and culturally specific context raises many new questions.

When the knowledge which is accepted within a social context is held to be universally and objectively true, claims which are made from any other perspective are denied legitimacy and authority. They may be regarded as interesting, but they will not be accorded status as knowledge unless they can be translated into the terms which are accepted by the dominant perspective and tested using their criteria. As a result, other points of view are devalued and excluded, although they may be studied and known about from the perspective of the dominant view. Those individuals, who represent 'the other', may participate in the research if they accept

the meanings, the methods, the values and rules of evidence which have been established[1], but insights from another perspective will not be heard or will not be considered as knowledge.

The insight that women were, as a class, regarded as *the Other* was clearly articulated by Simone de Beauvoir in 1949 in *Le Deuxième Sexe*.

> Humanity is male and man defines woman not in herself but as relative to him; she is not regarded as an autonomous being....She is defined and differentiated with reference to man and not he with reference to her; she is the incidental, the inessential as opposed to the essential. He is the Subject, he is the Absolute - she is the Other. (de Beauvoir, 1974, p. xiv, xv)

The recognition of this fact raised questions about how women's situations reflect this, why women have accepted this status and how women's state of dependency can be overcome. Since then there have been many analyses of this social reality and many attempts to understand the implications of the patriarchal assumption and how it has been perpetuated, as well as many suggestions about what ought to be done about it. However, here I wish to point to the importance of the realization that knowledge which was considered universally applicable was constructed from the perspective of a particular group.

Other cultures have also been examined, studied and judged from the dominant western[2] perspective which is associated with the 'scientific' point of view. As it is legitimated and as it gains authority everywhere, every claim is judged to be true or not in relation to scientific standards of truth and rationality and the accompanying expectations of efficacy. As societies grow more dependent upon technological capability and world trade to support their increasing populations and dwindling resources, the global culture becomes more and more a culture which

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1 This has been the experience of women, of peoples of non-white races, of individuals from lower classes, of peoples from other cultures, and of all groups who are identified and considered 'interesting' from the perspective of the experts who would 'know' about them. In 1932, Freud opened a lecture by raising the question about women and said "Throughout history people have knocked their heads against the riddle of the nature of femininity....Nor will *you* have escaped worrying over this problem--those of you who are men; to those of you who are women this will not apply--you are yourselves the problem" (New introductory lectures, p.100). And he proceeded to explain 'women'.

2 In the global community the distinction between 'The West' and 'The East' is no longer made, because of the increasing technological and economic developments in the east. The euphemisms, 'The First World' and 'The Third World', may be more descriptive, but the derogatory tone is recognized. The terms 'The North' and 'The South' are now used to identify the countries who have technological expertise and competitive trade advantages and those who do not.

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She Looks at His Science: Feminist Perspectives on Science, Nature and the Sacred

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The feminist critique is one of the most important and exciting developments in thought in contemporary western culture and it has led to profound changes in our social relationships and in our institutional practice. This critique is founded upon the realization that we have constructed the social reality in which we live and that we might think and act and live differently than we do. It is founded upon the recognition of our political and moral responsibility and of the possibility that we can make changes in our situation. In its examination of the social reality, the feminist critique has pointed to the need to identify the attitudes and the beliefs which shape our knowledge and which produce the social relations which constitute our lives. It has undertaken a study of the roots of the knowledge which we rely upon and the implications of the ideas which are taken for granted and it has revealed contradictions in our thinking and injustices in our social practices. In doing this, feminist theorists have challenged the assumptions which have been taken for granted, they have inquired into the intellectual and the social foundations of both scientific thought and political action and they have questioned our ideas of truth, knowledge, morality and rationality. The feminist critique thus offers us the opportunity to discover and to develop new ways of relating to ourselves, to others, to the world and to the sacred.

The feminist critique can no longer be excluded from any comprehensive discussion of the human situation for it has produced important changes in the understandings we have of self, of knowledge and of power and in our social relationships and our institutional practices. As the feminist perspective has become a more significant force in the culture, it has become increasingly diversified. Different approaches have been taken by different individuals. Different problems are identified and emphasised, different solutions are proposed. The feminist critique does not represent a single view, but it is a complex and dynamic inquiry of the society in which we live from the perspectives of those who recognize the importance of gender in the social construction of that reality and who point to the need to understand experience from women's standpoint and to include their voices. The fact that the feminist critique now includes such a wide variety of views is a mark of the maturity and the depth of the theory and of the breadth of its applications in practice, as well as of the fact that so many different individuals have understood the requirement of the enterprise. Every discipline and every approach needs to incorporate the insights which the feminist critique has articulated and this results in a great diversity of perspectives within the feminist rubric. The range of views which are included is an indication of the lively and productive exchange which is now possible within feminist thought and which can bring a further development of the understanding of the human situation from this perspective.

relies upon the scientific perspective. As the values, the aims and the methods of science become globally accepted, the scientific perspective becomes 'universal'. Claims which are made from any other world view are then devalued and marginalized. This perspective expresses and produces a particular kind of relationship with the world which is reflected in our social relationships. It is not the only way we might be related to the world and to one another, but unless this is recognized, the variety and the richness of the human relationship to self, others, the world and the sacred is impoverished.

The feminist critique recognizes that since all our knowledge is socially constructed and that since our decisions and our actions are related to the knowledge which we have, all knowledge has social, moral and political implications which need to be evaluated. Therefore, the feminist critique does not only address questions about how we can know more in the ways we have become accustomed to knowing, it also points out that we need to ask what the consequences of accepting particular forms of knowledge are and it points out that we need to examine the implications of the patriarchal perspective in our ways of knowing. One of the most influential forms of knowing is scientific knowledge. Because of its tremendous technological power, scientific knowledge has become the paradigm of knowledge in the modern world. Along with critique more generally, the feminist critique has challenged the belief that scientific knowledge is the only valid form of knowledge. The feminist critique also emphasizes the fact that scientific knowledge is a form of knowledge which has been understood within the patriarchal tradition and therefore shares the limitations of that perspective. It claims that the scientific enterprise needs to be broadened by incorporating the understandings which can be brought from the feminist perspective.

Knowledge and scientific knowledge

The knowledge which we have influences our lives. What we do and who we are, separately and collectively, are linked to the knowledge we have. This knowledge expresses our relationship with the world, with others, with ourselves and with the unknown. And our actions, that is, how we live and what we do, express our knowledge, revealing the relationships we have.[3] Gained through past experience, both culturally and individually, our knowledge structures the future. We see, we think, we act from the knowledge which we have as we respond to present circumstances and we learn as the new experiences and the new impressions which are produced change our knowledge.

The knowledge which we have includes our conceptual and linguistic frameworks, our basic assumptions, our fundamental notions of what is true, what is real and what is worthwhile, our attitudes, our beliefs and our understandings as well as statements and theoretical

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3 'Knowledge' here includes our beliefs, our skills, our notions, and our feelings. In its most general sense 'knowledge' is our relationship with what we see, feel, and experience.

explanations about the world, about others, about ourselves and about events which take place. Human knowledge is a social phenomenon. As we grow up within a cultural and historical setting, we learn the ways of thinking, ways of seeing and ways of knowing which have been accepted in that context as we learn the language and the customs which are shared by the members of the society in which we live.

A cultural reliance on certain ways of knowing, or a belief in the validity of only some forms of knowledge and a denial of the value of others affects the relationships we might have with the world and shapes our social reality. The content of our societal knowledge depends upon the methods which have been used and upon what has been considered important by those who have had positions of authority within the society. What we know as individuals depends both upon the knowledge which has been socially constructed and is accepted within the social context and upon our own position with respect to the social order; it depends upon our own experiences and the ways that we have at our disposal to make sense of those experiences.

Empirical knowledge of the world is that knowledge which can be gained through observation and which can be tested by reference to experience. It is a knowledge which consists of statements of fact and of the laws which are generated or 'discovered' by the theoretical understandings of these facts. It is a knowledge of processes which take place in time and of the laws of causality which govern these processes. Empirical knowledge is judged to be useful or true in relation to its ability to successfully predict events. The ability to predict events is related to a possibility of control, for if the relevant natural laws are known, then insofar as the necessary conditions can be produced, the expected results will follow.

Empirical sciences disclose reality viewed as the result of process in time and as subject to technical control. Theoretical knowledge explains situations which are identified as interesting and it is then applied to achieve our goals in the production of goods and services which can satisfy our needs and desires. It is an expression of our ability to effect change and therefore of our power in the world. Empirical sciences ask "What is the situation?", "Why did this happen?" and "How can we accomplish our aims?" both at very rudimentary levels about ordinary experience and at the most advanced levels and in relation to very abstract concepts. The predominant concern of systematically organized empirical knowledge or scientific knowledge[4] is with the accuracy of information, with the power of theories to explain the situations as they are described and with the efficiency and the effectiveness of techniques which might be used

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4 Empirical knowledge and scientific knowledge became synonymous terms as modern science developed, although the term scientific knowledge is often understood to be the result of rigorous experiment and conceptualization in relation to accepted scientific theory - the knowledge which has been 'proven' by scientists. Remarks which are prefaced by "Science has shown that" often carry authority. Empirical knowledge is understood to include scientific knowledge and the more common sense level of experiential knowledge and understanding of events. A scientistic understanding equates knowledge with scientific or empirical knowledge.

to produce the desired outcomes. It is not concerned with feeling, with beauty, with meaning, or with value although these represent significant aspects of human experience.

Although the term 'the scientific revolution' specifically refers to the changes which took place during the sixteenth and seventeenth centuries in the assumptions, procedures, methods and aims within the sciences, it can also be more widely applied to the fundamental change in the understanding of rationality which followed upon the success of science. The scientific revolution was accompanied and supported by the rationalistic and empiricist philosophies of the Enlightenment, which believed the reasoning mind to be the highest authority. The kinds of evidence which were regarded as acceptable consisted of rational and deductive argument or empirical and inductive demonstration. Scientific methodology, which relies upon a combination of observation and reason, of theory and experiment, of hypothesis and test, of definition and quantifiability was increasingly applied in all areas of research as the dogmatism of ecclesiastical authorities and the rationalism of the scholastics was rejected.

The experimental methodology of modern science was articulated early in the seventeenth century by Francis Bacon who believed that the laws of nature could be discovered through observation and experiment and that as more and more of the laws were discovered, events could more easily be controlled to 'improve' the human situation. "Human knowledge and human power meet in one; for where the cause is not known the effect cannot be produced" (1947, p. 80).

Then, early in the nineteenth century Auguste Comte enthusiastically endorsed the scientific method as the best way to understand social phenomena. He claimed that humanity had passed through the stages of relying upon theological and metaphysical explanations to the final stage of seeking scientific or positive explanations of events in the service of humanity (Comte, 1947). He sought to establish the foundations of "Social physics" or of the "social sciences" in the study of human action and social organization and dismissed any non-scientific approach. He did not believe that there were other questions to be asked besides the ones which science could answer.

Psychology, medicine, history, politics and economics have been greatly influenced by the understandings of science and by the interests, methodology and criteria of science particularly as they had developed in relation to the physical sciences. The satisfaction of humanity's needs and desires in every area of concern depends upon empirical or scientific knowledge. The beliefs that the only kinds of questions which need to be asked are those which are asked about process and that the scientific method, as it has developed, is the only way to discover truth are beliefs which are based upon the assumptions of the possibility and the necessity of the separation of knowledge from interest, from personal perspective and from understandings of value and upon the belief in the universality and objectivity of scientific knowledge.

The understanding that knowledge is that relationship with the world which yields a steady increase of human control over the physical and social environment and the assertion that

only logical or empirical statements can represent truth stem from a belief in science as the paradigm of knowledge. This belief is a dominant characteristic of the modern western world. Modern positivism strengthens science's belief in itself, in "the conviction that we can no longer understand science as one form of possible knowledge, but rather must identify knowledge with science" (Habermas, 1978, p. 4).

The belief in an *exclusive* validity of empirical and analytic knowledge rests upon the assumption that statements describe facts. But statements are always made by someone. They are made from some point of view, with some understanding of the meaning of the terms used and with some intention. They reveal a particular way of seeing and of expressing something about the world. The acceptance of an association of words with things and processes and of statements with facts renders the particular perspective and the conceptual frame of reference, by which the meanings and the validity of the propositions are established, invisible. It masks the ambiguity and the complexity of our relationship with the world. Empirical-analytical methods cannot answer questions about the meaning of terms and concepts, about values, about human purposes, or about the meaning of human life. From a scientistic point of view, answers to these questions are considered to be outside the realm of testability, and therefore the answers are regarded as being dependent on personal opinion or subjective judgment rather than on knowledge. Yet while the success of scientific knowledge cannot be denied, such knowledge is always shaped by goals which have been chosen from a particular point of view and they are understood within the social context. Scientific explanation depends upon the assumption that the meanings of the descriptions of situations and statements of the problems and hypotheses are unproblematic.

To deny the exclusive validity of empirical and analytic knowledge is not to deny that empirical and analytic knowledge has validity as one form of knowledge which operates in conjunction with other forms of knowledge. It is a useful and valuable form of knowledge which can be utilized to serve our needs and to satisfy our desires, but it cannot prioritize our needs or determine which of our desires ought to be satisfied. There are many other questions besides scientific questions which need to be answered and, individually and collectively, we need to know how to respond to those questions. The belief in scientific knowledge as knowledge which can provide objective knowledge of our world which is universally applicable has structured our social reality, and this perspective has left a legacy within our language. Our understandings of rationality, of truth, of objectivity, of knowledge, of masculinity, of femininity, and of what is of value has been shaped within the context of the assumptions of a scientific and rationalistic perspective. The limitations of scientific knowledge can only be assessed by a reflective evaluation of its assumptions, although science is not interested in its own relativity.

The nonsocial subject matter of the physical sciences may appear to eliminate the requirement of a critical reflection upon the way that the attitudes and beliefs which are held shape the knowledge gained through scientific research. However, the history, the sociology and the philosophy of science have shown that the selection of problems, the definition of the terms, the determination of method and of the criteria of evaluation are all accomplished within the

scientific community[5] which reflects and carries the dominant perspective of the larger society. Despite all the talk of objectivity and value-neutrality, our understandings of the world, even in the physical and social sciences, are based upon certain assumptions and value-judgments. Observations, descriptions and explanations are always made by some one, that is, from some perspective. Observation and description are value-laden and depend upon the attitudes which are held. Observation always involves selection from a field of impressions and description depends upon observation, upon the linguistic and conceptual framework, the choice of words and upon the understanding of meanings. Furthermore, the technological applications and the social implications of the use of science are not separable from the scientific knowledge. The same assumptions, beliefs and attitudes which shape the knowledge will influence decisions about how that knowledge will be used.

Split culture

The feminist critique has pointed out the partiality of the dominant perspective and it has questioned the belief that assumes this partial perspective is the view which should be the authoritative one. In this, it has examined some of the implications of the patriarchal, rational and scientific perspective which rules.

The assumptions, the methods, and the language of science as it has been understood are based on the isolation and control of variables, a detachment and a separation of the knower from the subject of study, and an elimination of emotions in the scientist. Within the scientific methodology, the level of the being of the scientist as person is not relevant. As long as a scientist has intelligence and follows the procedures rigorously, the values of the scientist are considered unimportant. But there are other ways of discovering truths about the world. Evelyn Fox Keller writes, for example, of the Nobel prize winner, Barbara McClintock's work as resulting from "a feeling for the organism". Keller documents McClintock's intense passion for the individual, for the unexpected, for difference and the unpredicted. She points out that what we call the scientific method cannot by itself give us real understanding. She claims "It gives us relationships which are useful, valid, and technically marvelous; however, they are not the truth" (Keller, p.201). McClintock is convinced that "without an awareness of the oneness of things, science can give us at most only nature-in-pieces, more often it gives us only pieces of nature" (Keller, p.205).

Susan Griffin speaks of the split culture which is our legacy as we are born into the modern scientific culture and we inherit the habits of mind which are embedded in our language and carried in our social practices. We believe and we act as if thought can be independent of feeling, as if mind and body can be separated, as if fact and value can be identified and

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5 Kuhn's study of the historical development of science shows the role which the scientific community plays in the determination of what is accepted as knowledge.

understood apart from one another,[6] as if nature and culture are distinct, as if public life and private life are two different spheres which can be related to the worlds of production and reproduction and as if males have the ability and ought to take responsibility in one and females have the ability and ought to take responsibility in the other. And we speak as if knowledge and belief are not intimately connected. The consequences of these ideas and of the practices which reflect and maintain them affect every aspect of our lives and influence all of our relationships and yet they are insupportable. They have been accepted without question and it is difficult to see any other way of thinking, speaking and acting. In identifying their social roots, the feminist critique raises questions about these notions and asks how we have come to have the ideas, how they are maintained and how they could be changed.

At the same time, it points out that in our patriarchal society the traits and the activities which have been regarded as masculine have been valued more highly than the traits and the activities which have been regarded as feminine--or is it that the traits and the activities which have been more highly valued have been associated with males and the traits and the activities which have been less valued have been associated with females? In this world divided, where masculine and feminine are regarded as antonyms, each of us has access to less than the whole if we do not overcome the assumptions which structure our social relationships and our lives.

The feminist critique has pointed out the parallel between the relationship between male and female and between man and nature. I intentionally use the gender-specific term 'man' here, because those in positions of power have been male and the significant effects upon nature have been produced by man and he must take responsibility for the situation as it now stands. Although there is much to celebrate in the world, there is also much to protest. It is clear that we need to improve the situation for women and we need to address the urgent environmental problems which have been created as a result of our actions. Man has used and abused both woman and nature. When he knows what he wants and he knows how to get it, he has made use of both woman and nature. But he has not taken sufficient account of the implications of his decisions and he has not listened to what woman and nature have been saying.

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6 Kant had identified the difference between scientific knowledge which has theoretical and non-metaphysical validity, and morality which has metaphysical validity but which cannot be proved true by rational argument or by inductive demonstration, and he examined the limits of rational and theoretical knowledge of experience in order to show its inapplicability in the domain of practical or moral reason (1965, p. 29). Einstein made a similar distinction: "For science can only ascertain what is, but not what should be, and outside of its domain value judgments of all kinds remain necessary" (1954, p. 45). Both Kant and Einstein differentiated between the knowledge of process and the religious or the moral aspiration which might lead to insight into and knowledge about suprapersonal goals and states, "which neither require nor are capable of rational foundation" (Einstein, 1954, p. 45). Both Kant and Einstein acknowledged the importance of each of these modes of human reason, although they saw them as clearly separable.

The belief in the scientific model of knowledge expresses a belief in the possibility of understanding processes in order to predict and control their outcome. It is based upon the aim of having power over nature in order to satisfy human purposes. The relationship of power between man and nature which is paralleled in patriarchal cultures by the social relationship between men and women where males assume a dominant position and females are given a subordinate position is also the same as the relationship between countries which are more developed economically, technologically and industrially and those states which are less developed. In each of these cases the power which is possessed by the dominant group may be used benevolently or coercively. If the power is used benevolently then nature or women or the less developed countries may be cared for or admired; they may be cultivated, protected or developed according to the purposes and the vision of those in power and the consequences of this relationship of power will depend upon the extent of their knowledge and understanding. But those who are in positions of power may also abuse those who have less power. Nature, women or the less powerful countries may be and have often been controlled, used, raped or exploited because in a relationship of power, the possibility of violence is always present. Whether the power is used benevolently or coercively, decisions are made and knowledge is constructed by those in positions of dominance and from their perspective. The response to the environmental crisis which imagines that the solutions can be found by initiating more scientific research is inadequate, for it is a continuation of the practices which have led to the difficulties. We need, rather, to establish other kinds of relationships with the natural world; we need to discover other ways of knowing. The new forms of relationship between males and females can provide models for new forms of relationship between human beings and the world--between human beings and nature.

The feminist critique has identified and documented many situations which reflect the asymmetric relationship of power between men and women. It has analyzed the assumptions of gender which produce and maintain these relationships and it has called for new forms of relationship between men and women. It has shown the partiality of the perspective which has been regarded as universal, it has pointed to the negative consequences when people of one gender assume superiority and have power over those of the other gender and it calls for a new appreciation of the different contribution that women can and do make in every area of human concern.

For example, the feminist critique has also spoken of the absence of women in science. Studies have documented the barriers which women face in getting the appropriate education, in finding jobs or in getting support for their research, and in being heard. The feminist critique has also shown that the direction of the research and the selection of problems have been determined from a male perspective. These facts have been widely acknowledged and they are being addressed through more inclusive policies and affirmative action programs. And we are gradually seeing the difference which is being made. The changes are slow, because it is difficult to change attitudes which are deeply embedded in our language and in our social customs. However, the problems are not only related to the fact that women have been excluded from science. The feminist critique also points out that science has been a man's game and it has imposed a particular perspective which has had destructive consequences. They propose that

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the rules of the game need also to be changed. It is true that as more women become involved in and gain prominence in science, women's ways of working and women's concerns will play a more significant role in scientific decisions, but the feminist critique reminds us that it will still be important to identify and to challenge the assumptions which rule and to consider the way they shape all of our lives.

The kind of knowledge which can be gained through a recognition and an understanding of the connection between individuals and between individuals and the world and which is founded upon and leads to a care for others and for things has been identified as 'women's way of knowing'[7]. Because there is a growing realization that the knowledge which can be gained through analytical thought and empirical study is limited and because the contribution which women can bring is increasingly being valued, women's ways of knowing and other ways of knowing are being taken more seriously. The feminist critique has been influential in all these areas. However, just as scientific knowledge as it is, is not a knowledge which only men can understand and participate in, knowledge gained through an understanding of connection is not a knowledge which only women can understand or participate in. The feminist critique, which has been accomplished largely, although not entirely, by women, emphasizes the importance of the perspective of women and shows how the perspective which has been often a woman's perspective or has been relegated to women and which has been given a lower status can bring a new way of knowing, a new way of relating to one another and to the world. The feminist critique challenges the assumptions of the dominant perspective and, at the same time, brings about the possibility of new ways of seeing and knowing.

The knowledge which is a knowledge of and through connection is a knowledge which others have had. The native American peoples, for example, have understood the unity of every thing and lived in accordance with that understanding, even though they were often regarded as primitive and savage by those who arrived from Europe. In 1854, when Chief Seattle replied to an offer from Washington to allow the Indians to live on reservations in exchange for a large area of land, he said:

> *Whatever befalls the earth befalls the sons of the earth. If people spit on the ground, they spit upon themselves. This we know. The earth does not belong to human beings; human beings belong to the earth. This we know. All things are connected like the blood which unites one family. This we know.*

It is the kind of knowledge that leads to action.

> *The rivers are our brothers, they quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember, and teach*

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7 See Belenky et al and Gilligan.

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your children, that the rivers are our brothers, and yours, and you must henceforth give them the kindness you would give any brother.

However, as the newcomers exerted their power, their perspective became dominant and as this perspective was regarded as the only possible one, all other ways of knowing and ways of seeing were dismissed. The perspective, which regards nature as dead and as separate from human beings, leads to very different kinds of actions than the perspective which views all of nature as alive. But it is this perspective, which separates human beings from nature, from one another and even from our own natural selves and bodies, which has shaped the world we now inhabit. In the extreme this feeling of separation leads to a feeling of isolation and to a lack of connection with others.

The Sacred

Many scientists, the best among them, have spoken of and written of a feeling for the sacred which motivates their scientific inquiry[8] or which they have come to when they recognize the complexity and the beauty of the systems which they study. However, the sacred is not acknowledged in the methods, the language or the processes of science. Science does not honour the relationship to the sacred which exists in human search and research. Those scientists who have a relationship with the sacred find it outside of science, at the beginnings and at the endings; and not all scientists rely upon or discover the feeling for the sacred in their work.

But what is a feeling for the sacred? Einstein has described it as a conviction of the rationality or the intelligibility of the world, and as the feeling which results from an experience of the mysterious and of the intelligence which is manifest in the world. The recognition of the endless mystery of things and the simultaneous recognition of the order which can be discovered is a fundamental motivation for and result of scientific research but it also describes a relationship to the sacred. The recognition of the sacred is always a recognition of a larger scale in relation to which our work and our lives may find meaning and value. The recognition of the sacred does not come from ourselves alone but from the realization that we exist in relation to a larger context than we have created or than we can comprehend. It places us within a universe of mystery and brings a feeling of wonder and an experience of humility. In bringing the universe alive, it brings us to an awareness of our relationship with others and with nature and prevents our feeling of isolation. As Chief Seattle expressed it:

Every part of this earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people. The sap which courses through the trees carries the memories of the red men.

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8 Cf. Einstein.

In seeing ourselves and in seeing others, we may begin to appreciate the responsibility we have for one another and for the earth. The realization that what I do affects you and what you do affects me, and that what we do affects the forests, the oceans, the stars and that what happens in the forests, the oceans, and the stars affects us is the beginning of the recognition of our responsibility. Although we may not know what to do in order to fulfill our responsibilities, the recognition of this responsibility raises questions about the consequences of our decisions for others and for the earth and it raises questions about what right action would be. With the recognition of our existence in the order of things, we may wonder about larger purposes than our own and we may begin to ask what our responsibilities are in this.

Scientific knowledge gives us the power to accomplish our purposes but it does not and is not able to evaluate the purposes which determine our actions. When the purposes are determined by interests of individuals who do not recognize their connection with and their responsibility for others, then the actions can only be self-centred and self-serving, whether that self is an individual or a privileged group. Sacred action is neither self-centred nor self-serving but arises from a recognition of our responsibilities and from a wish to serve the largest purposes and the highest aims. Scientists are among the most highly trained and the most skilled of human beings and they have a great deal of power which is related to the knowledge of process. Scientific knowledge may be used for lower purposes or it may be applied in the service of higher purposes. If scientists know that they have a responsibility for their actions in the world and that they are related to every thing and to every person and if they work to become free of self-interest, then their decisions may be guided by larger concerns. Action which is guided by compassion for others and a wish to serve can become sacred action.

The feminist critique has queried this belief and it raises questions about how patriarchal assumptions have influenced the understanding of science, how they have promoted the marginalization and the exploitation of women and the destruction of nature. In pointing to the value of the connected form of knowing, it has reminded us of the need to see our relationship to ourselves, to others and the world and to take responsibility for how we live in these relationships. In so doing, the feminist critique furthers the search for a connection with and a realization of the sacred.

It is an interesting paradox that while science does not acknowledge the sacred, the practice of science or of any other human activity may lead to a vision of the sacred. In this vision, which allows us to see others and to appreciate our responsibility, we may begin to experience compassion for others and a wish to serve higher purposes, that is, this vision may lead to the transformation of the human being. However, in order for that transformation to take place, the person must be free of those assumptions which rule and which prevent the actualization of a relationship with the sacred. The assumptions of science which are based upon a desire for and an expectation of control and which lead to an increasing isolation from others and from the world need to be challenged. The feminist critique has aided this process. The assumption that scientific knowledge is the only valid form of knowledge has prevented questions of meaning, understandings of feeling and a search for value from being taken

seriously. The feminist critique has queried this belief and it raises questions about how patriarchal assumptions have influenced the understanding of science, how they have promoted the marginalization and the exploitation of women and the destruction of nature. In pointing to the value of the connected form of knowing, it has reminded us of the need to see our relationship to ourselves, to others and the world and to take responsibility for how we live in these relationships. In so doing, the feminist critique furthers the search for a connection with and a realization of the sacred.

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