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MARVIN HARRIS AND THE FOUNDATION OF A SCIENTIFIC THEORY OF CULTURE

A Thesis

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Degree

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ABSTRACT

This thesis is concerned with the historicial and philosophical dimensions of the anthropological endeavor to formulate a scientific framework for the study of the evolution, maintenance and change of socio-cultural systems.

The historical dimension of this topic is concerned with the development of the concept "culture." This development is traced from the initial articulation of the concept by Gustav Klemm in the mid-nineteenth century to the modern definitions formulated by anthropologists and sociologists. It is argued here that the concept, in its modern meaning, was a necessary prerequisite to any scientific understanding of human socio-cultural behavior.

In the philosophical analysis of this topic four issues are examined. First, the nature of culture is explored, and it is argued that culture is an empirical phenomena consisting of both mental and behavioral elements. Second, the relation between culture theory and anthropology is examined. This relationship is shown to be such that culture theory provides the theoretical and conceptual meeting ground of all the sub-disciplines of anthropology. Third, the nature of science and the scientific enterprise is discussed and a minimum set of empiricist criteria is established to demarcate scientific theories and research strategies from non-scientific ones. It is also argued that because of its empirical nature as a phenomenon and its importance to

anthropology as a subject, culture must be studied according to canons of scientific investigation and reasoning. Finally, two anthropological research strategies--the functionalist strategy of Bronislaw Malinowski and the cultural materialist stratey of Marvin Harris--that have been claimed to be scientific research strategies are examined. It is demonstrated that functionalism, despite its scientific aspirations, fails to meet the requirements for a scientific research strategy on both substantive and methodological grounds. It is argued that cultural materialism, however, does meet the requirements for a scientific research strategy and that it is capable of generating adequate and testable theories about the evolution, maintenance and change of socio-cultural systems.

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CHAPTER I

INTRODUCTION

> "Lacking an objective understanding of social life, people imagine themselves in the grip of uncontrolled Satanic forces. But we, ordinary men and women are the sole authors of our discontents. Seeking a better world, step by step, together, we have spun the web that holds us from our dreams. Trembling, we expect the embrace of an inhuman beast, but we are only waiting for ourselves."
>
> -Marvin Harris

> "Yet nothing is more certain than that man ought to see whether the scientific methods which have given such stupendous results in unlocking the secrets of the physical universe might not help them understand themselves and their neighbors in this rapidly shrinking world."
>
> -Clyde Kluckhohn

On the evening of July 1st, 1858 a paper was read before the Linnean Society of London that would alter the course of the biological and human sciences forever, revolutionizing them in the same way Issac Newton's Philosophiae Naturalis Principia Mathematica had revolutionized the physical sciences nearly two hundred years earlier. The paper, a joint work consisting of essays by both Charles Robert Darwin and Alfred Russell Wallace, was entitled "On the Tendency of Species to Form Varieties and on the Perpetuation of Varieties and Species by Natural Means of Selection," and although its basic premises had been known to

a select group of English scientists for many years this was the first airing of these ideas in public. In this and subsequent works (including, most notably, Darwin's Origin of Species) Darwin and Wallace presented the scientific community with the theoretical framework necessary for understanding how biological organisms survive--the theory of natural selection. According to this theory, survival is a function of the positive selection for randomly occurring biological characteristics that confer adaptive advantages upon the individual in relation to its natural environment, allowing it to thrive and reproduce, and the negative selection against non-adaptively advantageous characteristics whereby the genetic material of unfit individuals is removed from the gene pool. The emphasis here is clearly on the alteration of biological structures in an effort to maintain adaptive fitness. Without a doubt, one of the most efficient and successful biological structures ever developed by the human organism is the human brain.

The human brain has proven to be such a remarkably adaptive biological structure not, primarily, because it solves any immediate need, such as the lungs do in bringing in oxygen to be absorbed into the blood stream, or as the kidneys do in filtering impurities from the blood. Rather, the brain is adaptive because of the amazing array of things it allows human beings to do. Of these the most important for human survival has been the development of an elaborate

and non-biological structure called culture. As a mechanism to insure survival culture has permitted human beings to adapt to and flourish in a wider range of environments than any other organism, with the possible exception of certain plants. Historically, human cultures have extended from as far north as as the 70th parallel to as far south as the 60th parallel. And with the advent of twentieth century technologies (themselves the products of culture) even these boundaries have been all but eliminated. Human populations have established footholds, exploited and survived in every geographical zone and under every climatological condition, including the temperate climates of central North America, Europe and Asia; the tropical rainforests of Central and South America, Africa and southeast Asia; the deserts of southwestern North America, northern Africa, the Middle East, Asia and Australia; the mountains of South America, southern Europe and Asia; the island archipelagos of Indonesia, Micronesia and Polynesia; and the tundra of North America, Scandanavia and Siberia. Any terrain or climate that has shown even the remotest possibility of supporting life has been successfully exploited by human beings. Even water poses no real obstacles to the human determination to survive. Witness the Ma'dan, the Marsh Arabs that live in the marshlands formed by the confluence of the Tigris and Euphrates rivers in southern Iraq. Large groups of the Ma'dan live on huge rafts made from giant mardi reeds. Their

houses, elaborate structures also made from mardi reeds, are built on these rafts, as are meeting houses and other structures. Even the water buffaloes they raise live on large rafts that are attached together (Young & Wheeler, 1977).

The survival value of culture is something that, more often than not, we tend to take for granted, when, or if, the thought even occurs to us at all. It is taken for granted especially by those of us in the western world, where modern technology and the relatively high standard of living we enjoy have long ago insulated us from the fact that the natural world is by and large uncaring of human wants and needs, that it is, indeed, for many people and creatures, a world of the survival of the fittest. For, as Colin Turnbull's The Mountain People aptly and horrifyingly illustrates, even culture cannot insure individual, let alone collective, survival when the external pressures acting on a cultural system become too great.

Culture is a way of hedging our bets in an uncaring and uncooperative world. Through the cooperation and sharing it engenders culture allows larger numbers to live in a given area than would otherwise be possible. It also allows societies to support individuals that, left to themselves, would not survive. In other words, the development of culture allowed human beings to concern themselves with the quality of life, rather than the mere fact of survival itself. The degree to which they can be so concerned, however, depends to

a large extent upon the ability of a culture to provide for the needs of its members, and on its level of technological sophistication. In more modern societies, for instance, we would consider it unconscionable and inhuman if handicapped individuals or the elderly were turned out and forced to fend for themselves. Yet, in some cultures, such as that of the Netsilik Eskimo, when the elderly are no longer productive members of the band it is customary for them to commit suicide, or for their relatives to kill them (Balikci, 1970: 166). These actions are deemed necessary, on a cultural (but not necessarily a conscious) level, not because of any inherent dislike of old people, but because the level of subsistence is such that the band cannot afford to support individuals who cannot contribute anything back into the group. In still other cultures, like that of the Yanomamo of Venezuela, many female babies are routinely killed at birth for similar reasons. Unlike male children, female ones do not grow up to be hunters and providers, consequently they can become a cultural liability (Chagnon,1968).

Cultural systems are such powerful mechanisms for insuring human survival precisely because of the vast array of potential and possible behaviors, institutions and ideas they can support. Behaviors, institutions and ideas that are interconnected, and that cover such a wide spectrum because they are adapted for survival in a specific geographical area and under certain climatological conditions, just

as our bodies are. Unlike our bodies, however, which if given sufficient time can acclimatize to drastically different surroundings, cultural systems must adapt to changing conditions in order to insure the continued survival of their members. As long as a cultural system does maintain a high degree of adaptive fitness in relation to its natural environment, i.e., as long as it continues to adapt to changes, it remains a healthy system. When it fails to, or cannot, adapt to changing conditions, however, a cultural system begins the often slow and painful process of decay (a process that has been repeated many times throughout the course of human history). This last statement points to a crucial fact--one that should not be forgotten. Although socio-cultural systems are powerful survival mechanisms (and initially must be so else they would not arise), there is no guarantee that they will always insure the survival of their members. This is so because out of the array of behaviors, institutions and ideas that cultural systems can and do support it is likely that in the long run some will prove potentially destructive. Their potential for destruction depends upon whether the behavior, institution or idea in question affects a crucial aspect of the culture, such as what Karl Marx called the "mode of production," or a relatively unimportant aspect, such as dress codes at religious ceremonies and rituals. Consider, for instance, the concept and practice of celibacy. This is clearly a potentially

dangerous behavior. As a species our days would be numbered if it were widely practiced. Fortunately, it is only expected and required, for the most part, of those individuals entering religious orders. On the other hand, consider what anthropologists call "intensive farming" and "intensive hunting." Without adequate efforts at land and animal conservation these practices can be culturally and ecologically devasting. They are in fact one of the principle reasons postulated for the fall of the Mayan civilization. Their intensive slash-and-burn agriculture depleted the land while it also destroyed the jungle which supported the animal life that was itself already over-hunted. The consequence was mass exoduses from Mayan cities that could not longer support themselves or their citizenry. Yet another cultural behavior that may prove to be destructive--beyond the scope of anything that has preceded it--is the current nuclear arms race. Sometimes there can be a high price to pay for the security, comfort and survival culture offers. This is one of the most important reasons why it behooves us to study the nature of socio-cultural systems--how they develop, are maintained and change over time--before it is too late.

Because socio-cultural systems are essentially adapted to a given environment and climate it should come as no surprise that no two cultures are exactly alike in all their aspects, even when they developed in similar environments.

For example, while the Arabs who live in the deserts of the Middle East have traditionally been nomadic herdsmen, the American Indians who lived in the deserts of the southwestern United States were largely sedentary, living in large adobe complexes like that at Mesa Verde. Similarly, look at the contrast between European culture and classic Chinese culture even though both developed in similar climates and environments; and, again, contrast both of these with the American Indian cultures that developed in comparable environments in North America.

The reason cultural systems can differ so drastically, despite having developed in similar environments, is that there is a range of possible ways to survive under any given set of environmental conditions. And once survival has been more or less assured, cultures are free to develop in a multitude of different ways (subject, of course, to certain constraints), especially as regards those behaviors, institutions or ideas that are not directly concerned with survival. These include such cultural components as religion, art, fashion, poetry, recreational activities, etc.

Thus, we find cultures where women may have more than one husband, while in others men may have more than one wife; cultures where premarital sexual relations are proscribed and others in which they are encouraged; cultures in which beef is eaten and pork is not, while in others pork is eaten but beef is not; cultures in which a man is forbidden

to speak to his mother-in-law and others in which he wishes he did not have to; cultures in which the religious authorities are also the government, while in others the two are strictly separated; cultures in which witches are burned and others in which they are merely an annoyance. The variety of human cultural behaviors is almost endless.

Despite clear, and sometimes vast, differences, however, all human cultures do share certain characteristics. This is why we may speak of culture in the abstract, as opposed to having to talk only about Japanese culture, or !Tung culture, or Kwakiutl culture. These characteristics take the form of cultural categories out of which all socio-cultural systems are organized. Thus, while each culture may define what constitutes murder differently, all cultures forbid the taking of another human life for no reason. Similarly, all socio-cultural systems sanction some form of marriage between men and women for the purposes of procreation and inheritance. Likewise, in all but four known instances cultures unequivocally forbid incest, although what constitutes incest may, and does, vary from culture to culture. These are but a few of the many similarities that we find transcend cultural barriers. As Clyde Kluckhohn notes, the ethnological files of the

> Cross-Cultural Survey at Yale University are organized according to categories such as 'marriage ceremonies,' 'life crisis rites,' 'incest taboos.' At least seventy-five of these categories are

> represented in every single one of the hundreds of cultures analyzed (Kluckhohn, 1949: 20).

It is this fact that makes cross-cultural anthropology possible.

That culture is an effective mechanism for insuring the survival of human beings, both as individuals and as a species, is scarcely open to doubt. Indeed, it is obvious to anyone who makes the effort to step back and reflect on the matter. This, however, is precisely why individuals within a culture are seldom consciously aware of the role that culture plays in their continued survival. To comprehend and appreciate this role one must view culture from the outside, as it were. Yet as individuals we are, most of us, all too much in and of culture for such reflection to come easily or naturally. To paraphrase Aristotle, "Man is a cultural animal." And from the inside the picture a cultural system presents is vastly different than that from the outside.

From the point of view of an individual acting within a socio-cultural system, his or her culture, when it is even thought of in these terms at all, is seen as a complex collection of institutions, behavioral patterns, ideas and artifacts that dominate and regulate their life. In all cultures there are institutions--institutions such as religion, government, marriage, the educational system, the military, men's and women's clubs, health services and subsistence technologies--each of which provides a certain service or

satisfies some need important to day-to-day existence. There are also within each culture patterns of behavior, i.e., culturally sanctioned ways of behaving or acting. From these patterns the members of a culture learn, among other things, how to address their elders, how to ask for someone's hand in marriage, how to put a spell on someone, or, conversely, how to accuse someone of witchcraft, how to prepare and cook food and what foods are appropriate to eat and when, what it is appropriate to say and wear at funerals, to whom it is acceptable to tell off-colored jokes, and how to insure a good harvest. In addition to these institutions and patterns a culture also consists of many ideas and beliefs, such as the belief that eating the flesh and bones of one's ancestors will give you courage and wisdom, or that all men are created equal, or that there are many gods, or that capitalism exploits the working class, or that human beings possess an immortal soul, or that eating insects is disgusting, and so on. Finally, each cultural system possesses what is called a material culture. This consists of all of the material artifacts a culture produces, such as paintings, books, tools, machines, buildings, pottery, funiture and musical instruments.

Although each of the cultural elements just mentioned is concerned with different aspects of an individual's life, it would be a mistake to assume that they exist in isolation without any connection to one another. As components of a

cultural system the institutions, behavioral patterns, beliefs and artifacts that make up that system are interconnected and interdependent. These elements support and reinforce one another in a way that lends a cohesiveness and consistency to the cultural system as a whole, allowing us to talk about "Icelandic culture" or "Mayan culture" and not just about collections of disparate customs and traditions.

Like the idea that culture is a survival mechanism, however, many of the elements that go to make up a cultural system, especially the reasons behind certain behavioral patterns and beliefs, are not explicitly represented in the culture. Thus, most of those who live and act within cultural systems are not consciously aware of much of what they do, nor the reasons why they do it. Such elements are acquired by means of enculturation and acculturation--the processes of growing up within, or adapting to a culture, respectively. But they are no less real or efficacious for not being explicitly articulated like other components.

Culture is an elaborate and complex phenomenon. And despite its human origins it is no less essential to our survival and well-being than our bodies themselves are. The power of culture is not to be underestimated. It is an unfortunate fact, therefore, that the nature of culture--the processes and mechanisms by which it develops and changes--is so inadequately understood. Unlike biological evolution, which Wallace and Darwin provided us with a rich and

powerful theoretical framework for understanding, no such framework exists for understanding cultural evolution. We have as yet no scientific theory of culture to guide our researches and explanations. Since science has consistently proven to be the most powerful tool we have for understanding the nature of the world around us, the absence of such a theory is sorely felt indeed.

Certainly many individuals have attempted to bring their scientific acumen to bear on social and cultural phenomena, beginning as far back as the eighteenth century with Giambattista Vico's The New Science. Although valuable and enlightening, these efforts have nonetheless been unsuccessful in producing a scientific framework for understanding culture. The reasons for these failures are many. Among them is the fact that the very concept "culture" is itself quite recent; the general acknowledgment that it is a phenomenon capable of independent study, more recent still. Just as important in these failures has been the elusive nature of "science" itself. Despite the best efforts of scientists and philosophers of science, "science" has persistently eluded definition. Yet, without the knowledge of what science is, it is difficult to say what is a science. Fortunately, however, this definition has not been necessary in order to study things scientifically and, in general, to do science. Thus, the effort to develop a scientific theory of cultural evolution has continued.

In the chapters that follow it will be my concern to examine more thoroughly the issues and controversies that have surrounded the attempt to formulate a theoretical framework that would allow for a truly scientific understanding of the nature of socio-cultural systems. To this end I shall begin in Chapter II, "Culture," with a brief history of the concept "culture." This will be followed by an examination of culture as an independent, empirical phenomena, and will culminate with a definition of culture. In Chapter III, "Culture and Science," I shall add further details with a discussion of the relationships between anthropology and culture theory. I will then argue that there is a clear and urgent need for a scientific theory of culture. Chapter III ends with a brief foray into the philosophy of science that suggests certain criteria that must be met by any theory that purports to be a <u>scientific</u> theory. Finally, in Chapter IV, "A Scientific Theory of Culture (Part I)," and Chapter V, "A Scientific Theory of Culture (Part II)," I will undertake an examination and critical analysis of two attempts to provide a foundation for a scientific theory of culture--the functionalist research strategy of Bronislaw Malinowski and the cultural materialist research strategy of Marvin Harris. The former strategy represents one of the first attempts to establish a scientific theory of culture (and is still a powerful theoretical force in anthropology and sociology), while the latter programme is one

of the more recent and, I will ultimately argue, the most successful scientific research strategy yet formulated for the study of socio-cultural systems.

CHAPTER II

CULTURE

> "During the last hundred years it has become increasingly clear that culture . . . represents . . . a distinct domain. We have a thing sui generis that demands for its investigation a distinct science."
>
> -Robert Lowie

1. A Brief History of the Concept.

Although the word "culture," in one form or another, has been around for nearly two millenia--deriving originally from the classical Latin adjective cultus which meant tilled or cultivated, or when applied to a person, civilized or refined--it was not until the middle of the nineteenth century that it was used with, and subsequently acquired, the meaning primarily associated with it by contemporary sociologists and anthropologists (Kroeber & Kluckhohn, 1952: 145). The concept was, in fact, first used in its modern sense by the German ethnographer Gustav Klemm for whom it indicated, not the agricultural prerequisite to the raising of crops, nor the property of being educated and well-mannered, but rather "a state or condition . . . in which all human societies share even though their particular cultures may show very great qualitative differences" (Kroeber & Kluckhohn, 1952: 10). Klemm called this state Cultur and its explanation was the principle focus of his ten volume

history, Allgemeine Cultur-geschichte der Menschheit (1843-1852) and the two volume science of culture, Allgemeine Culturwissenschaft (1854-1855) (Kroeber & Kluckhohn, 1952: 10). Despite his voluminous work, however, and though much concerned with investigating the nature of Cultur, Klemm nevertheless failed to provide a systematic or precise formulation of the concept.

It was not until 1871 when Edward B. Tylor introduced the concept to the English-speaking sociological and anthropological communities (having borrowed it from Klemm), that "culture" was given a precise definition (Kroeber & Kluckhohn, 1952: 145). Tylor,

> boldly called his major book Primitive Culture and in its opening sentence gave the first formal, explicit definition of culture. This may be set down as the recordable date of the birth of the scientific concept, though the procreation had been German (Kroeber & Kluckhohn, 1952: 146-147).

According to Tylor's definition, culture, or civilization, "is that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society" (Tylor, 1889: 1). This definition, notwithstanding the fact that it is over one hundred years old, is still widely quoted in anthropology texts and forms the basis of most contemporary definitions of culture.

In the years before this new definition of culture had been described by Klemm and formalized by Tylor, the word "civilization" had most commonly been employed to refer to that state or condition of human societies which Klemm and Tylor had sought to determine the nature of. Unfortunately, like the meanings that had historically been associated with the concept "culture," "civilization" also carried with it connotations of betterment, of greater social and moral (and in some cases, political, technological, religious and even artistic) value. There were men and women who lived in civilizations and there were savages who lived in primitive or aboriginal societies, and the process of evolving from the latter to the former was one of becoming civilized. This use of "civilization" can be seen quite clearly in Lewis Henry Morgan's scheme of social evolution (see Figure 1).

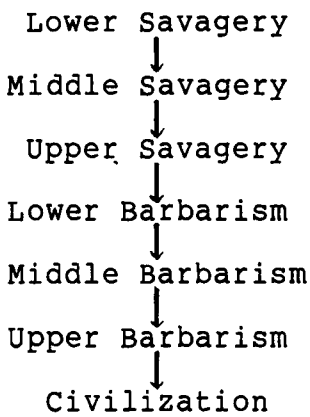


Figure 1. The seven stages in Morgan's scheme of social evolution.

According to Morgan's schema a society had to move through three distinct levels of both savagery and barbarism (with their associated material and subsistence technologies) in order to reach the pinnacle of social evolution--civilization. Civilization, for Morgan, was characterized by a phonetic alphabet and writing (Harris, 1968: 181).

Thus, the meanings associated with both "culture" and "civilization" placed severe limitations on the types of societies they could be used to describe. Indeed, as descriptive terms they were applicable only to a small proportion of the world's human societies. But it was not a concept that would allow them to describe the most advanced type of human societies that Klemm and Tylor were after. It was an entirely new concept that they sought to formulate, a concept that recognized what was common to all human societies despite, as Kroeber and Kluckhohn put it, their very great qualitative differences. Therefore, as Klemm understood "Cultur" and Tylor "culture" it was a universal characteristic of human societies. "Every society has a culture, no matter how simple this culture may be, and every human being is cultured, in the sense of participating in some culture or other" (Linton, 1945: 30). Understood as such, this new meaning of culture was not laden with any sense of social or moral superiority. It was, or aspired to be, a value-free or neutral concept--a scientific concept.

It should not be supposed, however, that this new definition of culture was immediately embraced and universally accepted by the sociological and anthropological communities. Indeed, as Kroeber and Kluckhohn point out, it was not until some fifty years after Tylor introduced it that the new meaning even appeared in any general or unabridged American or British dictionary (Kroeber & Kluckhohn, 1952: 9). Moreover, at the time of their writing the term was still meeting with some resistance on the part of the British and French, though it had been universally accepted outside of these countries (Kroeber & Kluckhohn, 1952: 147).

2. Culture as an Empirical Phenomenon.

What then is "culture"? Is it merely a useful concept, or does it represent an actual and, at least in principle, investigable phenomenon? In order to understand the contemporary anthropological conception of the nature of culture we must consider not only (what might be called) the core or substance of the concept, but also the particular characteristics that different formulations of the concept emphasize as being the most important feature. These may be called the two levels of meaning of the concept.* The first level of meaning is concerned with the general phenomena or

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*Note, however, that the purpose for introducing this distinction here is merely heuristic and no attempt will be made to develop it in any further detail.

situations which the concept seeks to describe. This, of course, is the core of the concept. The second level, on the other hand, is concerned with those particular elements or aspects (such as technological sophistication, moral values, social structure, education, etc.), that are emphasized as being the most essential qualities of cultural systems.

Since Tylor's formalization of the concept in 1871 the general phenomena that anthropologists and sociologists have sought to describe by the term "culture" have remained essentially the same. As Kroeber and Kluckhohn write,

> Various social theorists (Hegel, Weber, Comte, Marx, Huntington, and others) have tried to make particular forms the main dynamic in the historical process: ideas, religious beliefs and practices; forms of social organization; forms of technological control of the environment. One modern group would place forms of intra-family relationships in a central position. There has, of course, been some of this partisanship in anthropology: White and Childe who stress modes of technology; Laura Thompson and others who stress idea systems; British and American social anthropologists who make forms of social organzation central; a few who have recently stressed the role of linguistic morphology. But if there be any single central tendency in attempts to conceptualize culture over eighty years, it has been that of denying in principle a search for "the" factor. In the attempt to avoid simple determinisms, anthropologists have fairly consistently groped for a concept that would avoid commitment to any single dynamism for interpreting sociocultural life and would yet be broad and flexible enough to encompass all of the significant aspects in the

> "superorganic" life of human groups (Kroeber & Kluckhohn, 1952: 180).*

The fundamental concept that has emerged from this long search was, and is,

> . . . that of a set of attributes and products of human societies, and therewith of mankind, which are extrasomatic and transmissible by mechanisms other than biological heredity and are as essentially lacking in sub-human species as they are characteristic of the human species as it is aggregated in its societies" (Kroeber & Kluckhohn, 1952: 145).

It should not be supposed, however, that a cultural system is nothing more than an indiscriminate and unplanned collection of all the different physically possible and functionally effective patterns of action and belief (Kroeber & Kluckhohn, 1952: 171). Rather, every culture must be looked upon as a structure, a system of separate though interrelated and interdependent patterns that are organized in a manner that is felt to be appropriate (Kroeber &

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*The point here is not that anthropologists (and others who have sought to define "culture"), have not stressed certain traits as being more causally determinant than others, or that they have not attempted to discover that one particular trait or characteristic that makes human sociocultural systems what they are, but that the search for these characteristics has historically been secondary to the search for the general or core concept that would be common to all definitions of culture. That is, "The majority emphasis, the steady emphasis has been on working out a generalizing idea . . ." (Kroeber & Kluckhohn, 1952: 180).

Kluckhohn, 1952: 171), and according to certain fundamental structural principles.

As a thought experiment then, if we could, so to speak, dissect a culture we would discover a system composed of (at least) four distinct though interconnected levels. Proceeding from the level of least abstraction, the broadest cut of this anatomization would isolate the physical products and artifacts of the cultural system--the material culture. The next cut would reveal various patterns of behavior, the belief systems and the institutions of the culture in question. In addition to these patterns and institutions, finer cuts still would disclose the structural interrelationships between them, i.e., how they are organized.* Finally, the finest cut would reveal the overarching principles that guide the development, organization and modification of both the individual patterns and the structure as a whole. These principles supply not only developmental and organizational rules, they also underlie man's ability to satisfy his own fundamental or organic needs and those of the race in general (Malinowski, 1944: 37). Such needs, since they are the result of man's nutritional, reproductive and hygenic requirements, represent the minimum set of conditions imposed

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*These first three levels correspond roughly with what anthropologist Leslie White refers to as the technological, sociological and ideological subsystems of culture.

on each and every socio-cultural system (Malinowski, 1944: 37).

There can be no doubt that this kind of analysis is much easier when performed in the abstract than it would be if an actual culture were under the conceptual knife. However, at this point in the discussion at least, the issue is not whether these four levels and the phenomena which comprise them can in fact be discovered within every cultural system, but whether those qualities or characteristics that are common to all definitions of culture can be isolated. Indeed, I am convinced that all contemporary anthropological and sociological formulations of the concept can be analyzed (according to the schema above) to contain explicit references to the phenomena associated with the first three levels, i.e., to the material products of a culture, to its institutions and patterns of behavior and belief, and to its structural organization. Consider, for instance, the following three definitions formulated by anthropologists working from within different and competing paradigms or research traditons--historical particularism, functionalism and evolutionism.

> (i) Culture may be defined as the totality of the mental and physical reactions and activities that characterize the behavior of the individuals composing a social group collectively and individually in relation to their natural environment, to other groups, to members of the group itself and of each

individual himself. It also includes the products of these activities and their role in the life of the groups. The mere enumeration of these various aspects of life, does not constitute culture. It is more, for its elements are not independent, they have a structure (Kroeber & Kluckhohn, 1952: 96, fn. 4).

(ii) It [culture] obviously is the integral whole consisting of implements and consumer's goods, of constitutional charters for the various social groupings, of human ideas and crafts, beliefs and customs. Whether we consider a very simple or primitive culture or an extremely complex and developed one, we are confronted by a vast apparatus, partly material, partly human and partly spiritual, by which man is able to cope with the concrete, specific problems that face him. These problems arise out of the fact that man has a body subject to various organic needs, and that he lives in an environment which is his best friend, in that in provides the raw materials of man's handiwork, and also his dangerous enemy, in that it harbors many hostile forces (Malinowski, 1944: 36).

(iii) Culture is the name of the means, the equipment, employed by man and by man alone in this struggle. Concretely and specifically, culture is made up of tools, utensils, traditional habits, customs, sentiments, and ideas. The cultural behavior of man is distinguished from the non-cultural behavior of lower animals and of man himself considered as an animal as distinguished from man as a human being--by the use of symbols . . . . Culture is a traditional organization of objects (tools, and things made of tools), ideas (knowledge, lore, belief), sentiments (attitude toward milk, homicide, mothers-in-law, etc.) and use of

> symbols. The function of culture is to regulate the adjustment of man as an animal species to his natural habitat (Kroeber & Kluckhohn, 1952: 96-97).

These definitions are from The Mind of Primitive Man by Franz Boas, A Scientific Theory of Culture and Other Essays by Bronislaw Malinowski, and "Evolutionism and Anti-Evolutionism in American Anthropology" by Leslie White, respectively. As definitions of culture they are remarkably similar despite having been formulated within radically different schools of anthropological thought. In each of the defintions, as was suggested, we find reference not only to the material aspects of culture (crafts, tools, utensils, etc.), but also to patterns of behavior, systems of beliefs and institutions, and, finally, to how these patterns, systems and institutions are organized. In addition, each of the definitions cited point out yet another crucial aspect of culture--that it is a uniquely human phenomenon, i.e., "employed by man and by man alone." Although this belief cannot, properly speaking, be considered as element of any of the levels of phenomena set forth above, it is nevertheless common to all concepts of culture.

So far we have discussed only the first three levels outlined in the schema above, what of the fourth? Identifying references to the fourth level in defintions of culture is somewhat more problematic, since the fundamental principles that underlie a cultural system's evolution,

organization and modification are not, technically, a part of the culture itself. Rather, they are the foundation upon which the very existence of culture depends. Moreover, because they are fundamental laws, these principles are (almost) never formally articulated within the culture. Consequently, the individual participants within any given cultural system have little or no conscious awareness of the basic principles that underlie the workings of their system (cf. Malinowski, 1961: 83; and Kaplan & Manners, 1972: 22, 186). Be that as it may, there can be no doubt as to the importance of such principles. Furthermore, no effort to understand socio-cultural systems can hope to succeed without recognizing (1) their existence and (2) the necessity of discovering them. Examples of these fundamental principles are to be found in Karl Marx's principle of the determinancy of modes of production, in Marvin Harris's principle of techno-environmental determinism and in Malinowski's principles of intergration. We shall have more to say about these principles and their importance later.

Now, while it may be true that the general phenomena that anthropologists and sociologists have sought to describe by the term "culture" have remained essentially the same, the particular aspects that have been emphasized as the primary or dominant characteristics have changed frequently. According to Malinowski, for instance, the fundamental units of investigation in studying socio-cultural

systems are institutions and the functions they serve. Leslie White, on the other hand, stresses the importance of techno-economic factors and man's ability to use symbols. These are only two examples of concepts that are concerned with the same general phenomena and yet stress different characteristics as being the most important to a complete account and understanding of socio-cultural systems. In Culture: A Critical Review of Concepts and Definitions, Alfred Kroeber and Clyde Kluckhohn divide the 165 definitions they record into six primary categories--descriptive, normative, genetic, historical, psychological and structural defintions. Within these six categories they further identify thirteen areas of emphasis, depending upon the particular quality or characteristic of culture that is stressed. Figure 2 presents a breakdown of the primary categories and their sub-divisions that Kroeber and Kluckhohn employ in the classification of definitions of culture.*

The taxonomy presented in Figure 2 is not intended to be, nor should it be considered as, the final word on the classification of definitions of culture--Kroeber and Kluckhohn, themselves, did not even intend it for that purpose. I introduce it here for one reason only, because it

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*For a more detailed explication of this schema and the definitions it classifies I refer the reader to Kroeber and Kluckhohn's book. Although written in 1952 (second edition, 1963) it remains one of the most comprehensive and authoritative examinations of the subject available.

1. Descriptive definition
   a. with an emphasis on the enumeration of content.

2. Historical definitions
   a. with an emphasis on tradition or social heritage.

3. Normative definitions
   a. with an emphasis on rule or way.
   b. with an emphasis on ideals or values, plus behavior.

4. Psychological definitions
   a. with an emphasis on adjustment, on culture as problem solving device.
   b. with an emphasis on learning.
   c. with an emphasis on habit.
   d. with an emphasis on purely psychological characteristics.

5. Structural definitions
   a. with an emphasis on the patterning or organization of culture.

6. Genetic definitions
   a. with an emphasis on culture as a product or artifact.
   b. with an emphasis on ideas.
   c. with an emphasis on symbols.
   d. residual category definitions

Figure 2. A schematic breakdown of the categories and subdivisions employed by Kroeber and Kluckhohn in the classification of definitions of culture.

illustrates in an easily accessible manner the variety of emphases we find in definitions of culture. This accessibility is necessary, moreover, if we intend to acquire anything approximating a complete understanding of the phenomena "culture" purports to encompass.

A close examination of Kroeber and Kluckhohn's taxonomy will reveal, I think, that the properties of these phenomena fall roughly into two categories. There are, on the one hand, external properties such as artifacts, institutions, traditions, behavioral patterns, social organization, charters, laws, and symbols. On the other hand, there are, what we might call internal properties. Examples of these are ideas, beliefs and attitudes, values, learning and habits. Although these are, properly speaking, part of the shared psychological make-up of the individual participants within a culture, they are no less essential and determinant features of cultural systems. After all, it is within human beings, both individually and collectively, that culture resides and finds its dynamic, living expression.

In order to fully understand a particular sociocultural system, then, the anthropologist must essay to discover through empirical observation and enquiry not only the external properties of that culture, but the internal properties as well. That these attributes are in fact discoverable, despite their psychological nature, is not gainsaid by contemporary anthropologists. If anything at all is

questioned about these properties it concerns their relative importance in a description or account of the nature and workings of a cultural system, but not their existence or amenability to empirical investigation. Consider, for example, the culture and personality school of anthropology whose proponents included Clyde Kluckhohn, Ruth Benedict and Margaret Mead. This school stressed not only the importance of discovering ideas and other mental phenomena, but also their significance in influencing and guiding cultural development. On the other hand, the functionalists and materialists, while they also recognized the importance and discoverability of the more psychological aspects of socio-cultural systems, nonetheless denied their causal efficacy as regards cultural evolution.

3. A Definition of Culture.

As a phenomenon subject to investigation and description then culture can be approached in a variety of different ways. We can approach it through any one of the many characteristics it possesses, or by means of its structure, or by concentrating upon the fundamental principles that underlie all socio-cultural systems. In this thesis I shall not attempt to add to the existing proliferation of definitions by offering yet another definition of culture. One hundred sixty-five plus definitions seem adequate to capturing the spirit, if not the letter, of any concept.

Instead I would like to paraphrase at some length the characterization of culture that Kroeber and Kluckhohn set forth in the conclusion to Culture. This extended definition, in itself, is inclusive enough to satisfy even the most dogmatic enclave of anthropological theorists. Indeed, as Kroeber and Kluckhohn write, it attempts to avoid commitment to any particular " dynamism for interpreting socio-cultural life and . . . yet be broad and flexible enough to encompass all of the significant aspects in the 'superorganic' life of human groups" (Kroeber & Kluckhohn, 1952: 180).

Culture is created and sustained by human beings, individually and operating as groups. It is an intervening variable between human beings and the natural environment. But, since it is also internalized within individuals, by means of other individuals and cultural products, it becomes part of their immediate environment. Culture is comprised of patterns, both explicit and implicit, of and for behavior and belief. These patterns, acquired and transmitted by symbols, constitute the unique and distinctive achievement of human groups and are embodied in the artifacts these groups manufacture. As well as containing patterns, culture also consists of traditional, i.e., historically derived and selected, ideas and customs, and the values associated with them. Such values determine, in large part, the ends towards which human action within a culture is directed (Kroeber & Kluckhohn, 1952: 181, 186).

Socio-cultural systems may, on the one hand, be considered as the products of action; actions which take place (1) in time between persons and (2) in space in an environment partly made up of other individuals. Since actions do take place in a temporal framework, the past continues to influence the present. As part of this influence the history of a cultural system shapes individuals' perceptions of events, other persons, and their environment in ways not entirely determined by biology and environmental pressures. In addition to being products of actions, socio-cultural systems may also be looked upon as conditioning elements of further action. That is, they consist in standards of behavior and in ideologies that justify, rationalize and, if necessary, allow for the modification of these selected ways of behavior (Kroeber & Kluckhohn, 1952: 181, 186, 189).

As Boas cautioned us, however, the mere enumeration of a cultural system's characteristics does not suffice to constitute a description of that culture. A culture is more than just a collection of characteristics; it is also a complex of relations, a multiverse of ordered and interrelated parts (Kroeber & Kluckhohn, 1952: 63). And this structure or order is no less important (in fact some have argued that it is more so) to understanding a culture than are its constituent parts.

Finally, every socio-cultural system includes (in the sense that discovering them is essential to a complete

understanding of such systems) certain broad general principles of selectivity and ordering, in terms of which all the internal, as well as external, workings of that culture are to be understood. That is, these principles (which have previously been called "fundamental principles") underlie not only the material artifacts and goods a culture produces, but also its patterns of and for behavior and belief, its organizations and institutions, the rules according to which all these aspects are organized and the ends towards which individual and social behavior are directed--in short, the evolution, maintenance and modification of the cultural system as a whole.

In the discussions that follow, then, when I speak of culture or cultural systems it is the phenomenon, or, more precisely, the assemblage of phenomena characterized above to which I will be referring. Even so, I must caution the reader once again that this characterization is not intended as, nor will it be upheld as, the final, authoritative definition of culture.

CHAPTER III

CULTURE AND SCIENCE

> "The research which has been done on native races by men of academic training has proved beyond doubt and cavil that scientific, methodic inquiry can give us results far more abundant and of better quality than those of even the best amateur's work. Most, though not all, of the modern scientific accounts have opened up quite new and unexpected aspects of tribal life."
>
> -Bronislaw Malinowski

1. Anthropology and Culture Theory.

Culture theory, as I shall define it here, is the systematic attempt to discover and describe cultural laws or regularities. That is, it is the attempt to isolate those processes, structures, or mechanisms that underlie cultural evolution and change, and which account for the similarities and, especially, the differences between socio-cultural systems. A descriptive account of these laws or regularities and how they operate is, then, a theory of culture.

As a field of study culture theory is by no means the sole concern or subject matter of anthropology. Anthropology, at least as it is taught in the United States, consists of four separate (though interrelated) subdisciplines: archaeology, biological anthropology, linguistic anthropology and cultural anthropology. Properly speaking, culture theory is the province of the last of these subdisciplines--

cultural anthropology. However, unlike other areas of interest anthropologists may pursue, culture theory does hold a special position in anthropology. For, as Malinowski points out in the essay "A Scientific Theory of Culture," it is precisely the study of culture (for Malinowski the "scientific" study of culture), that establishes the meeting-ground of the different branches of anthropology (Malinowski, 1944: 4). Thus, though properly within the domain of cultural anthropology, it is the general concern with socio-cultural systems that brings together these seemingly disparate disciplines under the collective title anthropology. Similarly, David Kaplan and Robert Manners write that anthropology's central problems "are the explanation of cultural similarities and differences, of cultural maintenance as well as cultural change over time" (Kaplan & Manners, 1972: 3). More precisely, Kaplan and Manners argue that since the emergence of anthropology as a systematic field of inquiry it has been its concern with two broad and interconnected questions ((1) How do different cultural systems work? and (2) How have these cultural systems, in their considerable diversity, come to be as they are?), that has united the different branches of anthropology into a single discipline (Kaplan & Manners, 1972: 2). The importance of an adequate theory of culture, then, both as an explanation of cultural evolution and diversity and as the field of

study that provides the foundation for all other anthropological endeavors, should not be underestimated.

In this thesis I shall be concerned almost exclusively with questions pertaining to the scientific status of culture theory, i.e., with whether or not there is, or can be formulated/constructed, a scientific (as opposed to a non- or anti-scientific) theory of culture that will provide adequate, testable answers to the questions posed by Kaplan and Manners, and what such a theory would entail. In particular, I will consider this question in regards to a recent candidate for the status of scientific theory of culture--the theory generated by the cultural materialist research programme of Marvin Harris.

As was remarked, the type of theory being sought here--a scientific theory--is to be distinguished from non- or anti-scientific theories of culture. In order to appreciate the difference between these two fundamentally opposed approaches to culture theory it will help to look upon anthropology as an essentially historical discipline, i.e., as a discipline concerned with the historical development of various entities, in this case the evolution of sociocultural systems. These two approaches to culture theory then translate, on the one hand, into an attempt to formulate nomothetic explanations of the history of cultural development and change and, on the other hand, into the attempt to formulate explanations that do not invoke, and

perhaps even deny the existence of, universal laws governing cultural evolution. Examples of these latter, non-scientific kinds of explanations are the religious dominated supernaturalism of Wilhelm Schmidt and the historical particularism of Franz Boas.

Trained originally in physics, mathematics and geography, Boas brought with him to anthropology the conviction that through the painstaking collection of historical facts and the use of the comparative method we could indeed discover cultural laws. The discovery of such laws, in fact, was the "greatest aim" of ethnology (Boas, 1948: 637). This at least was Boas' belief in 1888. By around 1910, however, Boas had given up hope that significant developmental uniformities involving whole collections of institutions would, or could, be found. Still, he continued

> to stress the probability that the occurrence of similar institutions throughout the world reflected something inherent in the human mind. But it was now his opinion that the expression of this common denominator did not require a uniform cultural matrix (Harris, 1968: 278).

Boas' doubts did not stop here, however. In his later theoretical writings on historical particularism it was Boas' considered opinion that the search for cultural laws was a chimera, that the goals of anthropology should not even include the search for them, and that no amount of additional

research would alter the futility of such a search (Harris, 1968: 280).

> In my opinion a system of social anthropology and "laws" of cultural development as rigid as those of physics are supposed to be are unattainable in the present stage of our knowledge, and more important than this: on account of the uniqueness of cultural phenomena and their complexity nothing will ever be found that deserves the name of a law excepting those psychological, biological determined characteristics which are common to all cultures and appear in a multitude of forms according to the particular culture in which they manifest themselves (Boas, 1948: 311).

For Boas then the possibility of a theory of cultural evolution grounded in a detailed explication of the universal cultural laws that governed such evolution, no longer existed. Those cultural regularities and similarities that did exist and were discoverable were, in Boas' opinion, attributable entirely to the existence of certain mental laws. It was this belief in the primacy of the mind in the shaping of socio-cultural systems, moreover, that dominated Boas' approach to the study of cultures. According to the historical particularist strategy any ethnography that purports to be accurate must attempt to describe the culture in question from the natives' point of view. It is the anthropologist and ethnographer's task to get inside the natives' heads and, in effect, to become like a native.

Schmidt, like Boas, also denied the existence of scientific laws governing cultural development and change. However, unlike Boas, Schmidt, a Catholic priest and proponent of the German Kulturkreis school of anthropology, denied the existence of not only nomothetic explanations of cultural evolution, but the existence of naturalistic explanations as well. Schmidt's programme, in his attempt to reconstruct cultural evolution, was dominated by his religious beliefs; beliefs which necessitated reconciling all anthropological findings with scriptural precedent (Harris, 1968: 391). In his major work, the twelve volume Der Ursprung der Gottesidee, e.g., Schmidt was almost exclusively concerned with proving that those cultural systems which most nearly approximate the condition of primitive hunting and gathering communities possess a purer understanding of the nature of God. Consequently, as culture evolved, as its science and technology became more sophisticated, there was a corresponding degeneration of the religious sphere. Thus, according to Schmidt, the very first human beings were not simply in a "natural state but were possessed [in a way we are not] of the supernatural gift of divine sonship and destined to the supernatural end of the immediate vision of God" (Harris, 1968: 391). Although a culture might progress and develop in many ways it saw its finest hour, so to speak, when its members were simple hunters and gatherers. And, far from being a valuable explanatory and investigative

tool, the emergence of science is only one more indication of a culture's spiritual and ethical degeneration.

The supernaturalism of Schmidt and the historical particularism of Boas then are clear examples of non-scientific explanations of socio-cultural systems. As non-scientific explanations they are opposed to the kind of theory we are concerned with here, i.e., a theory that seeks to explain cultural evolution in terms of pan-cultural laws--a scientific theory.

It should be noted here that although this thesis is concerned with scientific theories of cultural evolution, questions as to the scientific status of particular theories are distinct from questions concerning the scientific status of anthropology as a whole. And, since they are distinct, the question as to whether or not anthropology <u>is</u> a scientific discipline will not be discussed at any length. Clearly a case can be made that archaeology and biological anthropology are scientific fields of study, though some might question the scientific nature of cultural and linguistic anthropology. For the purposes of this thesis I shall follow the lead of Pertti and Gretel Pelto regarding the scientific status of anthropology. Anthropology, they argue,

> can be considered a science because it involves the accumulation of systematic and reliable knowledge about an aspect of the universe, carried out by

> empirical observation and interpreted in terms of the interrelating of concepts referable to empirical observations. Anthropology includes within its broad domain the search for panhuman generalizations about behavior and human adaptive processes and cultural products. The accumulated knowledge also includes historical description and analysis of particularistic phenomena. The fact that a great deal of anthropological research includes value decisions on the part of the researcher and intuition in the gathering of basic information does not, in our opinion, make the discipline ipso facto unscientific (Pelto & Pelto, 1978: 22).

Now, lest it should be supposed that the cart is being put somewhat before the horse by assuming, at the outset, that anthropology is a science, it should be pointed out that as far as the issues under consideration here are concerned very little depends upon this assumption. Such a statement of belief could just as well be postponed until after it has been determined if a scientific theory of culture can in fact be formulated and, moreover, whether cultural materialism is capable of producing such a theory. The point is, the scientific status of anthropology rises or falls independently of the scientific status of individual theories of cultural evolution. That is to say, we can only argue for or against the scientific status of one particular theory of culture (such as structuralism, or functionalism, etc.) or another, and not culture theory in general. For culture theory is not itself a theory of culture, but simply

a name referring to the study of socio-cultural systems. Thus, even if a particular theory of culture was demonstrated to be unscientific, the discipline of anthropology would not itself be rendered unscientific. The same would be true even if all the existing theories of cultural evolution were shown to be unscientific. Unless it could be shown that the scientific study of culture is, by its very nature, impossible (and, I confess, I do not know how this could be accomplished since it would entail proving all possible, as well as actual, theories of culture to be unscientific), questions regarding the scientific status of particular theories of culture must be considered independently of questions concerning the scientific status of anthropology as a whole.

2. The Need for a Scientific Theory of Culture.

In the same way in which the demonstration that any particular theory of culture is not a scientific theory does not prove that anthropology in general is unscientific, the assumption that anthropology is a scientific discipline does not allow us to conclude that the study of culture is, therefore, a priori a scientific enterprise. Nor, in fact, will this assumption allow us to conclude that the scientific study of culture is even possible, or what a scientific theory of culture would entail if it were possible. These questions must be answered independently of any questions

concerning the scientific status of anthropology. Likewise, the scientific status of particular theories of culture and the strategies or paradigms that produce them must be determined solely according to their own "scientific" merits, regardless of the scientific status of anthropology. There are then three questions to be investigated:

1. Is the scientific study of culture possible, i.e., can we formulate a scientific theory of culture?

2. What would a scientific theory of culture entail?

3. Is cultural materialism capable of producing such a theory?

The last question really has two parts. First we must inquire into the scientific status of cultural materialism as an anthropological paradigm, and then into the status of the theories it generates.

There is, however, a more fundamental (i.e., logically prior) question that must be considered before any other issues can be taken on. That is, not if a scientific theory of culture is possible, or what such a theory would entail, or which theory meets the necessary requirements, but rather, why a <u>scientific</u> theory of culture at all? Certainly the need for <u>a</u> theory of culture is obvious. Considering its importance as a foundation for all other anthropological inquiries, clearly

> we need a theory of culture, of its processes and products, of its specific

> determinism, of its relation to basic facts of human psychology and the organic happenings within the human body, and of the dependence of society upon the environment (Malinowski, 1944: 12).

But what reason is there to suppose that a scientific theory of culture is to be preferred to any other kind of theory?

In 1952 Kroeber and Kluckhohn also remarked on the lack of a comprehensive theory of culture.

> Perhaps a better way of putting the problem would be to say that as yet we have no full theory of culture. We have a fairly well-delineated concept, and it is possible to enumerate conceptual elements embraced within the master concept. But a concept, even an important one, does not constitute a theory (Kroeber & Kluckhohn, 1952: 181).

In addition, Kroeber and Kluckhohn also noted that as a discipline anthropology had only recently become aware of problems of theory and of the logic of science and that a fully systematic scientific theory of culture had yet to be created (Kroeber & Kluckhohn, 1952: 36). But, again, why did Kroeber and Kluckhohn suppose that it was a scientific theory of culture that was needed?

The answer to this question, I believe, lies in the characteristics that have traditionally been associated with science and scientific explanations. Science has been looked upon as an objective, truth-seeking, self-correcting process, and scientific explanations as objective, truthful,

comprehensive accounts of phenomena. The scientific explanation of a phenomenon begins with facts and observations. From these facts and observations generalizations are formed about the nature of the phenomenon under investigation. Generalizations, in turn, form the basis of theories which generate hypotheses that are tested through experiments. Moreover, scientific explanations require no dogmatic belief in their validity, for good science can always be replicated and the findings tested and retested. This is an admittedly somewhat simplistic and, perhaps, overly optimistic portrayal of the scientific process, yet it does illustrate that science has historically been associated with all that is valued in knowledge--objectivity, truth and testability.

It is precisely this belief, that science is a superior way of acquiring knowledge, that has led many anthroplogists (among them Malinowski, Kroeber, Kluckhohn, and, as we shall see, Harris) to attempt to apply the methods of scientific investigation to the study of socio-cultural phenomena. However, though they laud the greater relative value of science as a way of knowing, these anthropologists were/are by no means claiming that it is science or nothing. As the sociologist Emile Durkheim once wrote,

> We do not make science into a sort of fetish or idol, whose infallible oracles may only be received on bended knee. We see it merely as a grade of knowledge, but it is the highest grade and there is nothing else beyond it. It is

> distinguished from the humbler forms of knowledge only by greater clarity and distinctness; but that is sufficient for it to be the ideal to which all self-critical thought aspires (Lukes, 1977: 73).

Moreover, in addition to not wanting to establish science as an idol, it was also recognized that there were/are other ways of acquiring knowledge and that there are areas of experience where science is not applicable at all. I believe, Harris writes,

> that science is a superior way for human beings to obtain knowledge about the world in which we live. But I readily admit that there are domains of experience the knowledge of which cannot be achieved by adherence to the rules of the scientific method (Harris, 1980: 6).

Among the domains Harris enumerates are the aesthetic and moral insights of artists, musicians and writers; the visions and hallucinations of schizophrenics; the altered states of consciousness of drug users; and the knowledge and visions of mystics and saints (Harris, 1980: 6). Malinowski had expressed a similar opinion about the applications of the scientific method nearly forty years earlier.

> . . . [T]he scientific approach is obviously not the only interest or inspiration in the domain of humanism. Moral or philosophical points of view; aesthetic, humanitarian, or theological zeal or inspiration; the desire to know what the past was because the past appeals to our sentiments in a manner

> which need not be vindicated but cannot be gainsaid--all these are legitimate motivations in all humanities. Science, however, as a tool at least, as a means to an end, is indispensable (Malinowski, 1944: 7).

Thus, Harris and those who preceded him in the search for a scientific theory of culture see science essentially as an epistemological tool, a superior method for learning about the world around us and in which we live. A scientific theory of culture, then, would exploit this superior way of knowing to the better understanding of ourselves, our behavior and the cultural systems we build around us.

3. Theories, Research Strategies and the Structure of Science

The grand design

In the epilogue to Culture Theory, Kaplan and Manners remark that, there are certain periods within the history of scientific disciplines when new information and new questions emerge "which cannot be handled or explained by the application of traditional ideas and concepts. . . . Anthropology now seems to be going through just such a period of crisis" (Kaplan & Manners, 1972: 189). It is this crisis and the proliferation of anthropological strategies or paradigms that has come in its wake that concerns Harris in Cultural Materialism: The Struggle for a Science of Culture. More than just acknowledging the existence of an ideological

crisis which threatens contemporary anthropology, however, Harris also seeks to justify Kaplan and Manners' presupposition that anthropology is a scientific discipline, and in so doing to provide a "scientific" solution to the crisis itself. To this end Harris contends that anthropological theories can be formulated as scientific theories and that (for the reasons discussed in the preceding section) given the choice between a scientific and a non-scientific theory which purport to explain the same natural (or socio-cultural) phenomena, we should always prefer the scientific theory over the non-scientific one. More precisely, Harris intends to argue that the cultural materialist programme he formulates is a scientific research strategy and that the theories it engenders, unlike the theories produced by other anthropological paradigms, are scientific theories. As such, therefore, cultural materialist theories are to be preferred to their non-scientific counterparts. Harris realizes, however, that before he can legitimately claim that cultural materialism is a scientific research strategy it is necessary to first determine what a research strategy is, and also what it means for such a strategy to be "scientific," i.e., what it is that constitutes "science."

> . . . [C]ultural materialists must be able to provide general criteria for distinguishing science from other ways of gaining knowledge and for

> distinguishing one research strategy from another. . . . We need to know the general rules of the scientific method. Then we can go on to define what a research strategy is and to compare one with another in order to see which one best fulfills the requirements for achieving scientific knowledge about human social life (Harris, 1980: 5).

As this passage indicates, Harris' motivation for wanting to establish criteria for distinguishing science from other epistemological enterprises is two-fold. On the one hand, he needs the criteria in order to define cultural materialism as a scientific research strategy and , on the other, to provide a basis from which to compare cultural materialism with alternative paradigms that may also claim to be scientific strategies (Harris, 1980: 5).

Thus Harris begins his search for a definition of "science" and "scientific," and for what Karl Popper called a criterion of demarcation. This search inevitably and necessarily leads Harris into a examination, albeit a brief one, of the literature of the history and philosophy of science. His assessment of the literature begins in the sixteenth century with Francis Bacon's inductionism, continues through David Hume's empiricism, Auguste Comte's positivism, the verificationism and operationalism of the logical postivists and culminates finally with a discussion of the contemporary philosophers of science Karl Popper, Thomas Kuhn and Paul

Feyerabend. For Harris' purpose, however, it is the writings of Popper, Kuhn and Feyerabend that are most important.

Karl Popper. Popper's single most important contribution to our understanding of the nature of the scientific enterprise lies in his notion of falsifiability as the criterion of demarcation. Popper's belief that every good scientific theory is a theory that prohibits or forbids certain things to occur and that every legitimate test of the theory is an attempt to disprove or falsify it, led him to reject the verificationism of the logical positivists (Popper, 1965: 36). Unlike his predecessors Popper argued that, "Logically, science cannot be described as a method for verifying hypotheses. All that science can logically lead to is the falsification of hypotheses" (Harris, 1980: 16). This argument is grounded in what Popper calls the "logical asymmetry" between verification and falsification. According to this asymmetry a hypothesis like "all swans are white" cannot be verified regardless of the number of white swans that have been observed because it is always possible that the next swan to be observed will be black. On the other hand, the observation of one non-white swan is enough to confirm the hypothesis "not all swans are white" (Harris, 1980: 16).

Thus, for Popper the criterion of demarcation, i.e., the criterion for the scientific status of a theory, is that

the theory is falsifiable, or refutable, or testable (Popper, 1965: 37). If the theory is not refutable by any conceivable event, then it is non-scientific (Popper, 1965: 37). More precisely, our scientific knowledge consists of theories which "maximally expose themselves to falsification because they are conjectural, highly concise, simple statements from which a broad range of apparently improbable inferences can be made" (Harris, 1980: 17). To borrow an old phrase, a good scientific theory is one that "sticks its neck out," and, so far as Popper's criterion of demarcation is concerned, the farther the better. Implicit in this view of science is a Tarskian correspondence theory of truth and a criterion of scientific progress based on the presupposition that science learns from its mistakes and that it repeatedly overthrows old scientific theories and replaces them with better or more satisfactory ones (Popper, 1965: 216-223).

As an explanation of the nature of the scientific enterprise Popper's account suffers from three difficulties. First of all, as Popper himself realizes, one negative observation never refutes a well-established scientific hypothesis (Popper, 1965; Harris, 1980: 17). Rather than rejecting the hypothesis one can always call into question the manner in which the experiment to test it was conducted, or the quality of the apparatuses used in the experiment, or even the integrity of the experimenter him/herself.

Secondly, as Kuhn, Harris and others have pointed out, there is a decided lack of correspondence between the way in which scientific research is actually conducted and the way in which Popper portrays it. Instead of arising from the process of older scientific theories being supplanted by newer and better theories, "many of the most cherished scientific discoveries were made as a result of following either metaphysical or downright irrational beliefs" (Harris, 1980: 19). Finally, the third and most serious difficulty concerns Popper's criterion of demarcation. Although Popper formulates a criterion for the demarcation of science from non- or pseudo-science, he does not establish or provide a criterion for determining the scientific status of paradigms or strategies. Popper's criterion of demarcation operates on the level of theories only. As far as Harris is concerned then Popper's account of the nature of science presents only half of the story. It establishes a basic definition for what it means to be "scientific," but fails to provide a criterion for the comparison and evaluation of competing strategies or for determining their scientific status.

Thomas Kuhn. It is precisely because Kuhn's account of the conduct of scientific research more accurately reflects the manner in which it is actually carried out that his portrayal of science represents an improvement over Popper's.

According to Kuhn the growth or development of science consists of three phases or periods: a pre-paradigm phase, a phase of normal science and a phase of revolutionary science. The pre-paradigm period of a science is characterized by a great proliferation of paradigms and theories. Fact gathering during this phase is a random activity and there is little or no discrimination between relevant and irrelevant facts, or even between facts and myths (Kuhn, 1980: 15).

Out of the scientific chaos of this pre-paradigm period there eventually emerges a dominant paradigm. A paradigm is, at its simplest level of abstraction, a model or a pattern (Kuhn, 1970: 23). Yet it is also more than this, it is a universally recognized and accepted example of scientific practice which provides a model from which springs a particular, coherent tradition of scientific research (Kuhn, 1970: viii, 10). The emergence of a dominant paradigm ushers in what Kuhn calls a period of normal science. Normal science is the science of the average scientific researcher. It involves directed fact-gathering and experimentation designed to further articulate the paradigm (Kuhn, 1970: 27-29), and "the use of existing theory to predict factual information of intrinsic value" (Kuhn, 1970: 30). That is, normal science is predictive and well as descriptive. Moreover, normal science operates within the scope of a single paradigm, the existence of which "guarantees that at any

given moment a mature science will devote itself to puzzle solving along limited but productive lines" (Harris, 1980: 19). Puzzle solving is the be-all and end-all of normal science, but puzzles are solved not only to obtain answers to certain very specific questions; their solution also serves to further articulate and specify the paradigm itself under new or more stringent conditions (Kuhn, 1970: 23).

It occasionally happens, however, that an experiment fails to yield the predicted or expected result, while the result it does produce is anomalous and cannot be explained, or even articulated, within the existing paradigm (Kuhn, 1970: 82-83). If the anomaly persists and the reigning paradigm is not successful in suppressing it, or in sweeping it under the rug, then it may result in a scientific revolution. Such a revolution moves us into a period of extraordinary science. This period is characterized by a breakdown in the puzzle solving routine of the normal scientist and by a reevaluation and reformulation of the fundamental epistemological principles upon which the science itself is based (Kuhn, 1970: 84-85). However, within this period of soul searching and confusion there lie the seeds of a new dominant paradigm--a paradigm for which the revolution producing anomaly is not an irregularity, but an expected, predictable result. The emergence of this new paradigm as the model for further scientific research and puzzle solving brings us once again into a period of normal science.

Unlike Popper's account of science, Kuhn's conception of the nature of science is based upon a coherence theory of truth instead of a correspondence theory. A coherence theory of truth defines truth

> as a kind of systematic consistency of beliefs and propositions. The truth of a proposition is said to consist, not in the fact that the proposition 'corresponds' with something that is not itself a proposition, but in the fact that it fits consistently into a certain more general system of propositions (Chisholm, 1982: 133-134).

Thus, for Kuhn, there is no absolute, ultimate Truth. Rather, truth is relative to the paradigm within which a researcher works. Kuhn does not recognize the existence of a ultimate, objective truth to which all paradigms aspire. Indeed, he does not even see the need for such a goal.

> Can we not account for both science's existence and its success in terms of evolution from the community's state of knowledge at any given time? Does it really help to imagine that there is some one full, objective, true account of nature and that the proper measure of scientific achievement is the extent to which it brings us closer to that ultimate goal? (Kuhn, 1970: 171).

We may, Kuhn writes, have to relinguish the long-cherished idea that changes of paradigms invariably move the scientific community closer and closer to the truth (Kuhn, 1970: 170).

Connected with this theory of truth is Kuhn's belief in what he calls the incommensurability of paradigms. That is, that competing paradigms and their proponents are always slightly at cross-purposes to one another (Kuhn, 1970: 148). To be more precise, paradigms are incommensurable in at least three different ways. First of all, the proponents of competing paradigms will frequently disagree as to the kinds of problems that must be solved by a candidate for paradigm status (Kuhn, 1970: 148). Second, although a new paradigm will usually incorporate much of the language and apparatus of the previous paradigm, it nonetheless seldom employs these elements in the manner in which they were traditionally used (Kuhn, 1970: 150). Finally, paradigms are incommensurable because they presuppose different world views, as a result of which their adherents practice their trades in different worlds (Kuhn, 1970: 150).

Since competing scientific paradigms are incommensurable they lack, by the very definition of the word, a common basis from which they can be compared and evaluated. This inability to juxtapose different paradigms in conjunction with the assumption that truth is the function of a proposition's "coherence" within the general system of consistent beliefs that underlies a paradigm, leads Kuhn to reject the Popperian belief in the progressive nature of science. That is, since truth is relative to the paradigm in which a researcher works and competing paradigms cannot be compared,

there is no basis from which to argue that any given paradigm is to be preferred to, or is better than, or is more accurate than any other paradigm. There is, to be sure, progress within a given paradigm as it solves more and more problems (Kuhn, 1970: 166). This is the progress of normal science. There is, however, no necessity that demands there be progress through periods of revolutionary science, i.e., through changes of paradigms. "Why," Kuhn asks, "should progress also be the apparently universal concomitant of scientific revolutions?" (Kuhn, 1970: 166). Kuhn is sceptical about the existence of this kind of scienctific progress and the absolute, objective truth it presupposes. As he remarks, we may eventually have to give up the idea that science gradually, but inevitably, moves us closer to the truth.

As much as Harris agrees with Kuhn's characterization and analysis of the nature of scientific research in general, he nonetheless finds Kuhn's account inadequate in certain respects. Harris takes issue with both Kuhn's coherence conception of truth and the associated belief that paradigms are incommensurable. More precisely, it is the epistemological consequence of these doctrines--that competing paradigms can be neither compared nor evaluated in an effort to determine which is more accurate, objective, or true--that Harris finds less that satisfactory.

> Kuhn . . . has no theory as to why one paradigm rather than another should triumph at a particular time. Like Popper, Kuhn emphatically denies that the choice of paradigms can be attributed to a selection process favoring paradigms that get closer to the "truth." But he goes beyond Popper and insists that they are not even likely to be selected according to any kind of progressive principle whatsoever (Harris, 1980: 20).

In an effort to avoid the epistemological relativism that Harris and others have accused him of Kuhn does suggest in the postscript to The Structure of Scientific Revolutions that perhaps a set of criteria could be designed that would enable us to distinguish an earlier theory from a later theory (Kuhn, 1970: 205). Note, however, that Kuhn does not say a better theory from a worse theory, just an earlier one from a later one. Moreover, as Harris points out, the criteria that Kuhn proposes do not apply to paradigms. Rather, they apply only to the theories within paradigms. That is, when paradigms replace each other different puzzles are solved. Thus, "one can never say where a paradigm, as distinguished from a theory, fits in the overall history of science. One can never say whether science has really 'progressed' or not" (Harris, 1980: 21).

Paul Feyerabend. It is but a short step, Harris writes, from Kuhn's epistemological relativism and his rejection of the progressive nature of scientific knowledge to the epistemological anarchism of Paul Feyerabend. "Calling

for more, not less, 'epistemological anarchy,' Feyerabend believes that 'Flexibility, even sloppiness in semantical matters is a prerequisite of scientific progress'" (Harris, 1980: 22). According to Feyerabend, Kuhn's most important contribution to the history and philosophy of science is the realization that paradigms are incommensurable. As for the theories which comprise paradigms, only those sharing the same paradigm may be compared, all other theories are incommensurable like the paradigms themselves (Harris, 1980: 21). Moreover, the choice of paradigms one adheres to is, for Feyerabend, entirely a matter of choice.

> Their content cannot be compared. Nor is it possible to make a judgment of verisimilitude except within the confines of a particular theory . . . . What remains are subjective judgments, judgments of taste, and our own subjective wishes (Harris, 1980: 21).

Indeed, Feyerabend goes so far as to suggest that science, far from being a superior method of acquiring knowledge, could in fact be done away with and a (more pleasant) world constructed in which science had no role whatsoever (Harris, 1980: 22).

As with Kuhn's epistemological relativism, Harris also argues that Feyerabend's epistemological anarchism and his concomitant denial of objectivity in the search for knowledge is unsatisfactory. As a philosophical position Harris finds Feyerabend's view of science inadequate because of the

unacceptable logical consequences that such a position faces. As Frank Cunningham writes,

> If, as I think can be argued, sincerely to believe a theory is to believe that it is objectively true, then the . . . consequence of the anti-objectivist position would be that he would have to admit either that he does not believe his theory or that it is objectively true: neither alternative would be attractive to him. If he does not believe the view, why does he advocate it? If it is objectively true, why cannot other theories also be objectively true? (Cunningham, 1973: 22-23).*

Moreover, if Feyerabend does actually believe that the anti-objectivist position he espouses is objectively true, then it is difficult to see in what respect it remains an anti-objectivist position, since he has established that at least one account (his own) is objectively true. But an objectively true anti-objectivist position seems rather self-defeating.

In addition to criticizing Feyerabend's view on logical grounds, Harris also objects to the position because of its

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*There is a third possibility that Cunningham does not consider. Feyeraband might be an anti-objectivist (or as it is also known, anti-realist) with respect to theories and yet claim that he continues to advocate them simply because they are empirically adequate (cf. The Scientific Image by Bas van Fraassen). Although this would obviate Cunningham's criticism, it does not impress me as a tactic that would save Feyerabend. For to adopt an empiricist philosophy of science it would seem that Feyerabend would be forced to admit that scientific theories are the most empirically adequate theories that we have, a view that Feyerabend would find, at the very least, distasteful.

possible moral repercussions. So long as Feyerabend concerns himself with mountains on the moon or quantum mechanics, "his views cannot inflict too much damage. But there are other domains of knowledge in which epistemological relativism poses a grave threat to our survival" (Harris, 1980: 22). Among these domains is medicine. It cannot be a matter of indifference, Harris writes, whether cancer is caused by witchcraft or is the result of some defect in cellular chemistry (Harris, 1980: 22). Furthermore,

> It cannot be a matter of taste whether you believe or do not believe that pollution is a menace, that the underdeveloped countries are getting poorer, that the multinationals are promoting a nuclear arms race, that war is instinctual, that women and blacks are inferior, or that the green revolution is a hoax. Let Feyerabend stand before the ovens of Dachau or the ditch at Mylai and say that our scientific understanding of sociocultural systems is ultimately nothing but an "aesthetic judgment" (Harris, 1980: 23).

Harris considers the moral disregard inherent in Feyerabend's epistemological anarchism to be at least as, if not more, damaging than the logical difficulties it faces. For Harris knowledge carries with it certain obligations and regardless of the strategies one uses to acquire it we cannot and should not be indifferent to the immoral uses of learning under the auspices of "to each his own."

Now, it will be remembered that in addition to a definition of science and an account of the nature of scientific research, Harris also wants to establish a general set of criteria that will allow him to compare cultural materialism with other paradigms and research strategies "to see which one best fulfills the requirements for achieving scientific knowledge about human social life." According to Harris, both Feyerabend and Kuhn fail to provide such criteria. Without them, however, anthropology is condemned to be a discipline of competing and mutually incompatible paradigms, no one of which can be said to be any better or more accurate that the rest. And if this is the case, then anthropology as a science and our knowledge of human social life cannot be said to progress.

Harris wants desperately to avoid both of these consequences. He does so by arguing that there is no reason why the overarching sets of metaphysical assumptions which provide the foundations of paradigms "cannot be compared and evaluated from the perspective of scientific adequacy" (Harris, 1980: 23). But how is this interparadigmatic comparison and evaluation to be carried out? According to Harris,

> essentially by showing that theories which originate under the auspices of one paradigm are more effective at solving Kuhn's 'puzzles' than their rivals. Although these solutions may be highly tentative, they nonetheless can

> participate in a 'progressive problem shift' (Harris, 1980: 23-24).

The epistemological foundation for the kind of evaluation and comparison Harris has in mind here is the assumption that the overall goal of science is the discovery of the greatest amount of order inherent in the universe (Harris, 1980: 25). Nicolas Maxwell refers to this as "aim-oriented empiricism." Contrary to Kuhn's claim then that there is no rational basis for preferring one paradigm to another, aim-oriented empiricism argues that a rational choice is possible, since we can assess in an a priori fashion "the relative simplicity or intelligibility of the rival hard cores or paradigms, the promise which they hold out of realizing the basic metaphysical blueprint . . . of science" (Harris, 1980: 25).

The general criteria for evaluating alternative paradigms then are two-fold. On the theoretical level we can evaluate competing paradigms according to how close they come to realizing the aim of science, while on a more substantive level we can evaluate them according to how successfully the theories they engender solve the puzzles they are confronted with.

Finally, with an account of the nature of scientific research courtesy of Popper and Kuhn, and general criteria for the comparison of alternative strategies courtesy of Maxwell, Harris is now in a position to define what he means

by a scientific research strategy. A scientific research strategy,

> . . . is an explicit set of guidelines pertaining to the epistemological status of the variables to be studied, the kinds of lawful relationships or principles that such variables probably exhibit, and the growing corpus of interrelated theories to which the strategy has thus far given rise. The aim of scientific research strategies in general is to account for observable entities and events and their relationships by means of powerful, interrelated parsimonious theories subject to correction and improvement through empirical testing. The aim of cultural materialism in particular is to account for the origin, maintenance, and change of the global inventory of socio-cultural differences and similarities (Harris, 1980: 26-27).

With this definition of a scientific research strategy Harris' analysis of the theoretical foundations of science is complete and he begins the task he has set for himself, "[T]o replace the inchoate and unconscious paradigms under whose auspices most anthropologists conduct their research with explicit descriptions of basic objectives, rules, and assumptions" (Harris, 1980: 26). Cultural materialism provides just such an explicit description.

A view from the trenches.

Harris' analysis and criticism of Popper, Kuhn and Feyerabend, however, is not all there is, or needs, to be said about the nature of scientific research. In the

literature there are two discernible approaches to the philosophy of science. While some philosophers of science have attempted to illuminate the progress of science by presenting us with a grand overview of the process, there are others who have given us a view from the trenches, as it were, by examining the methodology of science, i.e., the detailed workings of the scientific method as it is applied to specific research problems by individual scientists. The former approach, as we have seen, is that taken by Popper in Conjectures and Refutations: The Growth of Scientific Knowlegde and Kuhn in The Structure of Scientific Revolutions, in which they describe the process by which science (or a science) as a whole progresses and one scientific paradigm comes to be suppplanted by another paradigm. The latter approach, on the other hand, is exemplified by Carl Hempel's Aspects of Scientific Explanation and Ernest Nagel's The Structure of Science. Instead of a description of the grand design of science, Hempel and Nagel present us with a detailed analysis of the scientific method and how it is that individual scientists go about their day-to-day jobs. From this perspective the goal of Hempel and Nagel, of course, is to explicate what Kuhn calls normal science--the science of the average researcher.

Thus, it is all well and good for a discipline to follow a process of development like that Kuhn describes for the sciences. But in order for that discipline to truly be

considered a science it is also necessary that it have, or formulate, a coherent and consistent methodology, a methodology, moreover, that establishes not only the objectives of the discipline, but also the tools, techniques and rules or procedures that are to be employed in achieving that objective. Harris devotes considerable time and effort to demonstrating that anthropology in general and cultural materialism in particular can be fit into the developmental scheme that Kuhn describes. However, Harris does not devote a comparable amount of energy explicitly developing or explaining the methodology of cultural materialism. (Neither, it should be pointed out, does Kuhn spend much time discussing the methodology of normal science.) In fact, as I shall argue in more detail later, it is the lack of a well worked out methodology that poses the greatest threat to Harris' claim that cultural materialism is a scientific research strategy.

In order to argue this point, however, we must first understand what a scientific methodology is and then formulate a general scientific methodology on the basis of which we can evaluate strategies like cultural materialism. In establishing such a methodology I shall rely primarily on the work of anthropologists Pertti and Gretel Pelto.

Essentially a methodology is a set of rules or procedures that allow the researcher to interpret data. In any discipline that claims to be a science the need for such

rules is obvious. As Pelto and Pelto write, in addition to the basic tools and instruments of observation and measurement, "a scientific researcher must have . . . sets of procedural rules (including concepts and definitions) for transforming sensual evidence into generalizations about phenomena" (Pelto & Pelto, 1978: 2). A scientific methodology, then, is a system of procedures and transformational rules that allow a scientist to process empirical data and then shift the information up and down a ladder of abstraction in order to produce new, and organize existing, knowledge (Pelto & Pelto: 1978: 2).

Using the "hard sciences" as the model, Pelto and Pelto have developed in Anthropological Research: The Structure of Inquiry a general scientific methodology that is applicable to anthropological research. As such it not only considers the essential ingredients that should be present in any sound piece of scientific research, but also takes account of the special methodological problems that confront anthropology and the other social and behavioral sciences. Foremost among these are the problems associated with planning and conducting fieldwork and with the use of information accumulated as primary evidence in formulating anthropological theories.

According to this methodology (see Figure 3), the acquisition of scientific knowledge begins, at the lowest level of abstraction, with the real world of objects and

events. This is the world of shared experiences in which we all participate to a greater or lesser degree. In particular, for anthropology it is the world of socio-cultural systems and behavior.

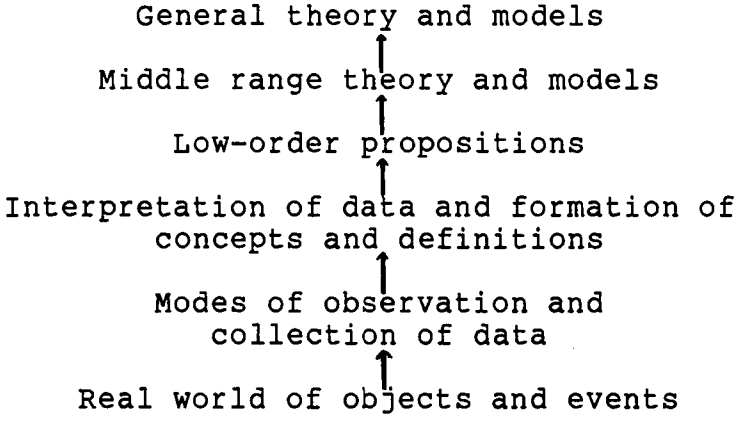


Figure 3. A schematic representation of the scientific methodology developed by Pertti and Gretel Pelto.

Upon this socio-cultural world we bring to bear the various modes of observation, i.e., the tools, techniques and the procedures that are employed by anthropologists in order to collect data. These modes of observation establish not only the methods and tools to be used in collecting data, they also specify what kinds of data to look for in the first place. As Popper pointed out, there can be no observation or data collection in the absence of some theory or set of guidelines that specifies the type of data to be sought, as well as where and how to collect it (Popper, 1965). This theory or set of guidelines is the result of

previous investigation and in turn provides the rules for the emergence of a new theory should it become necessary.

Once data has been collected it then needs to be interpreted. This is accomplished by the application of transformational rules (also a product of previous investigation and research), that allow the scientist to process the raw empirical data into useful information. This information consists of basic concepts and definitions--the fundamental building blocks of all scientific theories. On the basis of these concepts and definitions low-order propositions are then formulated. These propositions seek to establish interrelations between basic concepts (Pelto & Pelto, 1978: 22).

The final stage in this process of methodological abstraction is the generalization from concepts and propositions to theories and models. A theory, write Pelto and Pelto, is a system of interrelated concepts and propositions that is, or can be, supported by empirical observations. In addition to this, a theory also generates hypotheses, i.e., researchable propositions that are capable of confirming or disconfirming the theory itself (Pelto & Pelto, 1978: 10). A model by contrast, is somewhat more sophisticated than a theory. It is a theoretical system that can be made isomorphic with a set of mathematical notations and the tautological relationships involved in the mathematical notations, or a theoretical system that can be diagrammed or

represented schematically (Pelto & Pelto, 1978: 11). Actually Pelto and Pelto recognize two levels of theory and model development--middle range theories and models and general theories and models. The difference between them is merely one of scope. As the initial generalizations from propositions and concepts, middle range theories and models may provide only a partial theoretical account of the phenomena in question. However, as more empirical observations are made and hypotheses are generated and tested, middle range theories and models, by providing more comprehensive accounts of the phenomena, become general theories and models.

Before proceeding to the next chapter and an examination of the epistemological and methodological tenets of Malinowski's functionalism it should be noted that the methodology which Pelto and Pelto formulate is not intended to be taken as the final, decisive word on scientific methodology. Few scientists or philosophers of science harbor the belief that there is one correct and universally applicable methodology which must be adhered to by all sciences and scientists. The methodology described here then is not meant to be a <u>prescriptive</u> methodology. It does not maintain that scientific research must be conducted in one certain way and in no other. Rather, it is a <u>descriptive</u> methodology. It describes the manner in which we <u>can</u> go about the acquisition of knowledge scientifically, not how

we must go about it. Implicit in such a methodology is the realization that although the sciences are structured, rule-governed disciplines there is still a role for hunches, intuitions and even luck. The methodology of science can be described in almost unending detail, but that does not insure that all scientific knowledge will be acquired through strict and unwavering adherence to its prescripts.

CHAPTER IV

A SCIENTIFIC THEORY OF CULTURE (PART I)

> "But science cannot and will not stop in its onward march, in its movement of expansion, until it has fulfilled its potentialities to the utmost, and this means until it has embraced and subdued the whole realm of human experience."
>
> -Leslie White

1. The Beginnings of a Scientific Theory of Culture.

The science of culture vs. a scientific theory of culture.

In *The Science of Culture: A Study of Man and Civilization*, Leslie White suggests that there have been two principal obstacles to the development and acceptance of a science of socio-cultural systems (or, as White refers to it, "culturology"). On the one hand, its emergence as a viable scientific discipline has been impeded by the failure or inability of many anthropologists and sociologists (among them such notables as Franz Boas, David Bidney, Edward Sapir, Ruth Benedict, A.R. Radcliffe-Brown, R.M. MacIver and Georg Simmel), to recognize the existence of culture and cultural traits as independent, extrasomatic and supra-psychological determinants of human behavior. Instead the almost exclusive reliance on psychological explanations has led them to argue that culture *qua* culture does not exist, that it is a mental phenomena, an abstraction as it were;

that it is merely a by-product of human association and social interaction; that it is synonymous with the sum total of human behavior (White, 1949: 96, 82). White, however, is not convinced that explanations which deny the independent reality of culture are adequate to the task of describing human socio-cultural systems and behavior. Such individualistic psychologistic approaches, while they may be able to explain the purely psychological aspects associated with any given complex of behavior, say, for instance, homosexuality, cannot explain why some cultures sanction, and even encourage, homosexual practices among its members, while others condemn them as heinous crimes against God and nature. Nor can they explain why the Navajo observe the mother-in-law taboo, while their near neighbors, the Hopi, do not; nor why Tibetans practice polyandry, while Moslems practice polygyny and Christians (with the possible exception of Mormons) practice monogamy (White, 1949: 77-78). Thus, even though each of these cultural practices clearly possesses a psychological component, the differences in their acceptance and observation simply cannot be explained in terms of mental processes, emotional states, thoughts, or ideas (White, 1949: 78).

Psychological explanations fail in this regard, according to White, because in addition to the individual and social psychological factors involved in human behavior,

there is a component that is not psychological at all. This is, of course, the cultural factor.

> In addition to the individual organic component in human behavior and over and above the social factor which comes from the interaction of individuals, there is the influence of the traditional customs, institutions, tools, philosophies etc. . . . [T]hese culture traits, have an existence prior to the birth of any living person (White, 1949: 78).

These traits also exist outside the individual human organism and act upon him in the same manner as other external natural forces do.

White's point is well taken here; it seems quite obvious that cultural traits such as institutions, marriage practices, subsistence technologies, rites de passage, ideologies, etc., exist independently of human beings and in part determine their behavior. Moreover, it seems counterintuitive to argue that this is in fact not the case, that since culture and its concomitant traits are dependent upon human beings for their existence and perpetuation, they are, therefore, reducible to human psychology and behavior. Certainly there is no logical necessity whatsoever that demands that this be the case.

The strong reductionism inherent in this argument is the same as that which has prompted some philosophers and neurophysiologists to argue that there is no such thing as mind, that what we call mind is reducible to and explainable

in terms of bio-chemical brain processes. Both of these propositions are members of that class of arguments that attempts to persuade that a whole is reducible to (or, alternately, can be nothing more than) the sum of its constituent parts. As a metaphysical principle, though, this proposition is by no means obvious and in some instances is clearly contrary to common sense.

White's point, however, is not that there are no psychological elements in human socio-cultural behavior--he admits there are; nor that it is not important to take account of such elements in describing such behavior--clearly it is. Rather, White's point is that there are aspects of human socio-cultural behavior which simply cannot be explained in terms of individual and/or social psychological processes because these aspects are decidedly non- or supra-psychological. The first step towards an accurate and comprehensive account of human socio-cultural behavior then requires the realization that collective ways "of acting or thinking [i.e., cultural traits] have a reality outside the individuals who, at every moment of time, conform to it. These ways of thinking and acting exist in their own right" (Durkheim, 1962: lvi), and, consequently, that culture, itself, is a reality <u>sui generis</u> and <u>as culture</u> must be explained solely in terms of itself (Durkheim, 1938: 110, 102; Lowie, 1917: 66). Just as, in

physics, subatomic phenomena must be explained only in terms of the nature and motion of subatomic particles.

In addition to the inclination towards psychological explanations, the refusal to acknowledge the independent existence of culture and its associated traits is, in large part, also the result of an anthropocentric bias that has dominated and determined man's outlook on the cosmos since the very beginnings of human speculative thought. One has only to read the earliest prose and verse writings (which are predominantly concerned with the mythological origins of man and the universe) of the Sumerians, Egyptians, Mayas, Chinese and others to discover this. Moreover, the existence of this bias and its use as a foundation for explanations of the universe of phenomena that surround us has and continues to, in Durkheim's words, "bar the way to science" (Durkheim, 1962: lviii). Durkheim refers to this bias as the illusion of omnipotence, an illusion which manifests itself in the belief that man has complete and unconditional control over himself, his civilization and his world.* This prejudice is so strongly engrained in us in fact that, as Kroeber observes, "Our minds instinctively resist the first shock of the recognition of a thing [cultural determinism] so intimately woven into us and yet

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*This is, of course, the anthropological-sociological correlate of the classic philosophical problem of free will versus determinism.

so far above and so utterly uncontrollable by our wills" (White, 1949: 106). Thus,

> [i]t displeases man to renounce the unlimited power over the social order he has so long attributed to himself; and on the other hand, its seems to him that, if collective forces really exist, he is necessarily obliged to submit to them without being able to modify them. This makes him inclined to deny their existence. In vain have repeated experiences taught him that this omnipotence, the illusion of which he complacently entertains, has always been a cause of weakness in him; that his power over things really began only when he recognized that they have a nature of their own, and resigned himself to learning this nature from them. Rejected by all other sciences, this deplorable prejudice stubbornly maintains itself in sociology [and in the study of culture]. Nothing is more urgent than to liberate our science from it, and this is the principal purpose of our efforts (Durkheim, 1962: lviii).

This attitude or illusion of omnipotence, of being, as Protagoras of Abdera said, "the measure of all things, of things that are that they are and of things that are not that they are not," is responsible not only for the near universal denial of the independent existence of culture and cultural traits, but also determines (and is, in part, determined by) the second obstacle which has treatened the emergence of a science of culture.

According to White, the emergence of a science of culture has been hindered as the consequence of a strong

inclination, not only towards psychological explanations of human socio-cultural behavior, but also, at least historically, towards explanations that are animistic, anthropomorphic, supernaturalistic, or metaphysical rather than scientific in nature. This obstacle is, of course, bound up with the first, at least in as much as the preferential application of any of these types of explanation determines to a large degree the extent to which a proponent of one of them can acknowledge the existence of culture as an independent entity. It should not be supposed, however, that what motivates a particular anthropologist to adopt one of these approaches is always a matter of personal choice; such motives are many and various, although most no doubt take over those explanatory approaches that either (a) were socially, politically, or, even, religiously sanctioned,* or (b) were

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*One has only to consider the plights of (among others) Nicolaus Copernicus, Galileo Galilei and Charles Darwin to appreciate the difficulties, and dangers, that are associated with opposing accepted and approved explanatory strategies. In addition, and this is perhaps even more disturbing, one need only read the "Green Books" of Libyan leader Muammer Qaddafi in order to realize the kinds of aberrant explanations that can receive official sanction, and the morally suspect social policies they can inspire and seek to jusfify. At best, Qaddafi's explanations of human (socio-cultural) behavior can be considered a socially and politically dangerous perversion of, and intellectual throwback to, Lamarckism--a theory of organic evolution which maintained that characteristics acquired by parent organisms are passed on to their offspring. Interestingly enough, Lamarckism has already been revived once this century under the guise of Lyshenkoism which dominated Soviet biology and genetics under Josef Stalin and lasted well into the 1960's (Brown, 1979: 159).

employed within the tradition or paradigm in which they were educated (cf. Kuhn, 1970). Regardless of how explanatory strategies are promulgated, however, as the philosophical foundations for the description and explanation of human socio-cultural behavior, animism, supernaturalism, anthropomorphism and metaphysics are extremely limited and limiting; for confirmability, as well as for sheer explanatory prowess and versatility they simply cannot compare to scientific strategies.

> In science the human primate has come at last to a realistic and effective grasp upon the external world to which he must adjust if he is to survive. As an explanatory device, animistic, anthropomorphic and supernaturalistic philosophies were worse than worthless, for false knowledge is often worse than none at all. One has only to think of all the men and women who have been put to death as witches and heretics to get some notion of the magnitude of the disadvantages imposed by this type of philosophy. To be sure primitive philosophies had other functions than explanatory; they sustained man with illusions, they provided him with courage, comfort, consolation, and confidence, all of which had a biological survival value. But as explanatory techniques primitive philosophies were a total loss (White, 1949: 400-401).

Thus, while such explanatory approaches may be important, and even necessary, to the intellectual, emotional, social and biological well-being of primitive societies and early civilizations, their use in the description and explanation

of human socio-cultural behavior is in no way justifiable. Nor is the anthropocentric prejudice that they encourage appropriate to a discipline that purports to study man as a phenomenon in the world.

The only types of explanations upon which we can hope to construct a true anthropology, indeed, the only types of explanations that are powerful and versatile enough to give us a comprehensive account of human socio-cultural systems and behavior are those based in scientific methodologies and paradigms. Such, at least, was the opinion of Tylor when he wrote in 1871 that,

> rudimentary as the science of culture still is, the symptoms are becoming very strong that even what seem its most spontaneous and motiveless phenomena will, nevertheless, be shown to come within the range of distinct cause and effect as certainly as the facts of mechanics (Tylor, 1871: 17).

There is, however, a difference between arguing for the necessity and inevitability of a science of culture and actually attempting to formulate a scientific theory of cultural evolution and change. And, while the development of the former opinion can be traced from Tylor through Durkheim, Kroeber, Lowie, Clark Wissler, G.P. Murdock, Malinowski and White to Harris and contemporary anthropological thought, Malinowski was the first to attempt to

formulate a reasonably detailed and precise scientific theory of culture.

Bronislaw Malinowski and functionalism.

The outbreak of World War I in 1914 found Malinowski, because he had been born in the then Austrian governed city of Krakow, technically classified as an enemy alien and stranded in Melbourne, Australia. As the result of the intervention of friends in England, however, he was allowed to continue with the preparations he had already begun to conduct field research in the South Seas (Langness, 1974: 76). The outcome of the four years (1914-1918) Malinowski subsequently spent on Mailu and the Trobriand Islands in the Melanesian archipelago was a series of ethnographies and the framework from which he would later construct the functional theory of culture--which he referred to as "pure functionalism" in order to distingish it from the "structural-functionalism" of his contemporary and rival Radcliffe-Brown.

As a theory of socio-cultural evolution "pure functionalism" represents a considerable departure from both the diffusionist and historical schools that dominated anthropological thought in Malinowski's day, not only in regard to its content, but also as regards its scientific aspirations. At the heart of this theory are three fundamental concepts whose understanding is essential to any understanding of

functionalism as a research programme; these are form, function and institution.

A form is the outward manifestation of a cultural trait (trait to be understood in its broadest sense as any cultural component or reality). Moreover, the form of a trait is not simply a figment or a mental abstraction. It is a concrete type of behavior that is characteristic of any social relationship or interaction (Malinowski, 1944: 151). Consider, for instance, conjugal relations and parenthood. The form these traits take in any particular culture is the manner in which they are observed, and which differs in obstetric techniques, "in the ritual of the couvade, and the mode of parent taboos and seclusions; of baptismal rites and of keeping the infant protected, sheltered, clad, clean and nourished" (Malinowski, 1944: 152). The form, then, is the how of a cultural trait.

As a philosophical/theoretical concept, the concept of function ranks as one of the most important in the history of anthropological thought, just as certainly as it underlies the explanatory force of functionalism. If form is the how of cultural traits, then function is the why. The function of a culture trait is defined in terms of the purpose it serves, or, as Malinowski will interpret it, in terms of the need it satisfies. "For function can not (sic) be defined in any other way than the satisfaction of a need by an activity in which human beings cooperate, use

artifacts, and consume goods" (Malinowski, 1944: 39). For example, according to Malinowski the function of the family is the supply of citizens to the community; the function of the complex of processes and activities that constitute the cultural commissariat of a society is the fundamental need of nutrition; and the function of conjugal relations and parenthood is the culturally defined process of reproduction (Malinowski, 1944: 168, 155, 152). All cultural processes, practices, technologies, traditions and social organizations have a function; each and every one satisfies a need. No cultural trait exists in isolation or for spurious reasons. Even ideas and systems of knowledge have a function. Malinowski writes that, whereas it is true that systems of production and property undeniably determine the entire range of the manifestations of human life, these are in turn determined by systems of knowledge and of ethics (Malinowski, 1944, 49).

In addition to explaining the purpose of any given cultural trait, i.e., what need it satisfies, Malinowski maintains that the function of a trait always determines the form that particular trait will take. "I submit that form is always determined by function, and that in so far as we can not (sic) establish such a determinism, elements of form can not be used in a scientific argument" (Malinowski, 1944: 149).

Now, the very definition of function as the satisfaction of a need implies a further principle, one with which we can concretely integrate any phase of cultural behavior (Malinowski, 1944: 39). This is the principle of organization.

> In order to achieve any purpose, reach any end, human beings have to organize. As we shall show, organization implies a very definite scheme or structure, the main factors of which are universal in that they are applicable to all organized groups, which again, in their typical form, are universal throughout mankind (Malinowski, 1944: 39).

The result of this need to organize is the formation of what Malinowski calls a unit of human organization--an institution.

> This concept implies an agreement on a set of traditional values for which human beings come together. It also implies that these human beings stand in definite relation to one another and to a specific physical part of their environment, natural and artificial. Under the charter of their purpose or traditional mandate, obeying the specific norms of their association, working through the material apparatus which they manipulate, human beings act together and thus satisfy some of their desires, while also producing an impression on their environment (Malinowski, 1944: 39).

"Institution," then, is Malinowski's general term for any cultural trait. But, more than just being the basic

unit of human organization, more than just functioning to satisfy some need, the institution is the real isolate of cultural analysis, i.e., the fundamental unit of investigation of functionalist theory. "I would challenge anyone," Malinowski writes, "to mention any object, activity, symbol, or type of organization, which could not be placed within one institution or other . . ." (Malinowski, 1944: 161). Thus, no trait, custom, or idea is or can be defined except by considering it within the framework of its relevant and real institutional setting. No accurate description of individual existence in our own or any other socio-cultural system is possible without linking its activities with the system of institutions prevailing in that culture (Malinowski, 1944: 48-49). Such institutional analysis, Malinowski insists, is not only possible, it is indispensable.

Form, function and institution, then, constitute the conceptual foundation upon which Malinowski constructs the functional theory of culture. In particular, on the basis of these three concepts Malinowski postulates five general axioms. These axioms, whose validity are demonstrated by all experience in the field, as well as by the examination of the really important manifestions of organized human behavior (Malinowski, 1944: 150), form the theoretical core of "pure functionalism."

> A. Culture is essentially an instrumental apparatus by which man is put in a position the better to cope with the concrete specific problems that face him in his environment in the course of the satisfaction of his needs.
>
> B. [Culture] is a system of objects, activities, and attitudes in which every part exists as a means to an end.
>
> C. [Culture] is an integral in which the various elements are interdependent.
>
> D. [Cultural] activities, attitudes and objects are organized around important and vital tasks into institutions such as the family, the clan, the local community, the tribe, and the organized teams of economic cooperation, political, legal, and educational activity.
>
> E. From the dynamic point of view, that is, as regards the type of activity, culture can be analyzed into a number of aspects such as education, social control, economics, systems of knowledge, belief and morality, and also modes of creative and artistic expression (Malinowski, 1944: 150).

In addition to these general axioms and the fundamental concepts upon which they are predicated there is one further issue that requires consideration in conjunction with this examination of Malinowski's functional theory of culture, namely, the idea of a need. Although not included among the fundamental concepts of functionalism, the concept of a need is presupposed by the theory as a whole. Indeed, no account of functionalism would be complete without an examination of Malinowski's theory of needs.

The concept of a need, as something that people lack and the procurement of which (by external means) is necessary for their continued survival, is by no means unique or original to Malinowski's "pure functionalism." In fact, I would hazard to suggest, in some capacity the concept is a universal component of all anthropological theories concerning socio-cultural systems. Malinowski's use of the concept, however, is considerably more developed than most.

According to Malinowski there are three categories of needs--basic or individual needs, derived needs and integrative imperatives. The most fundamental of these are, of course, the basic or individual needs. These are needs which require satisfaction in order to insure our basic biological growth and survival, i.e., they are "the environmental and biological conditions which must be fulfilled for the survival of the individual and the group" (Malinowski, 1944: 75). Derived needs (or, as they are also known, cultural imperatives), on the other hand, are those needs that arise when man attempts

> . . . to extend his safety and his comforts, to venture into the dimensions of movement, to increase his speed, to prepare engines of destruction, as well as production, to armor himself with colossal protective devices and equivalent means of attack (Malinowski, 1944: 120).

Cultural imperatives then must be satisfied if we are to maintain and perpetuate our socio-cultural existence with its myriad institutions. Finally, there are what Malinowski calls integrative imperatives. The satisfaction of these imperatives is necessary in order to meld together the separate functionings of human beings and cultural systems into an integrated whole. That is, their satisfaction acts as a kind of socio-cultural cement, integrating the concurrent lines of development operating within a particular culture as any given time. Figure 4 presents a breakdown of Malinowski's three categories of needs along with the cultural responses they elicit.

Finally then, on the basis of the preceding discussions of the basic concepts and general axioms of functionalism, and Malinowski's theory of needs, we can construct a general functional analysis of socio-cultural systems.

As biological organisms human beings have needs imposed upon them both by their own internal biological constitutions and by the environments in which they live. Historically, in order to satisfy these basic needs human beings have banded together into increasingly larger and more complex associations. The level of complexity being determined by environmental factors in conjunction with existing and available technologies, a socio-cultural system, then, (at whatever level of complexity) is essentially a functionally effective medium through which human beings

BASIC NEEDS	CULTURAL RESPONSES
1. Metabolism/nutrition	1. Commissariat
2. Reproduction	2. Kinship
3. Bodily Comforts	3. Shelter
4. Safety	4. Protection
5. Movement	5. Activities
6. Growth	6. Training
7. Health	7. Hygiene

CULTURAL IMPERATIVES	
1. The cultural apparatus of implements and consumer's goods must be produced, used, maintained, and replaced by new production.	1. Economics
2. Human behavior, as regards its technical, customary, legal, or moral prescription must be codified, regulated in action and sanction.	2. Social control
3. The human material by which every institution is maintained must be renewed, formed, drilled, and provided with full knowledge of tribal tradition.	3. Education
4. Authority within each institution must be defined, equiped with powers, and endowed with means of forceful execution of its orders.	4. Political organization

INTEGRATIVE IMPERATIVES	
1. Transmission of experience by means of precise, consistent principls.	1. Knowledge
2. Means of intellectual, emotional, and pragmatic control of destiny and chance.	2. Magic, Religion
3. Communal rhythm of recreation, exercise, and rest.	3. Arts, Sports, Games, Ceremonies

Figure 4. A breakdown of Malinowski's theory of needs (Malinowski, 1944: 125; Langness, 1974: 77).

achieve neccessary and desired ends. That is, it is an integrated system of interrelated and interdependent institutions that allow groups to more effectively and efficiently exploit the natural environment and satisfy their basic needs. The very existence of such a complex system, however, imposes still further needs on human beings, needs which must be satisfied in order to insure the maintenance and continuation of the socio-cultural system itself. Thus, within any culture institutions must be organized, not only for the satisfaction of basic needs, but also for the satisfaction of cultural needs and integrative imperatives.

The history of the origins of socio-cultural systems, then, is nothing more nor less than the history of their institutions. And, if the description of any culture in terms of ocncrete reality consists in the analysis of all the institutions into which that culture is organized, so also the idea of cultural change over time must be understood in terms of changes in institutions.

> . . . [A]ll evolutionary or diffusion processes happen, first and foremost, in the form of institutional change. Whether in the form of invention, or as an act of diffusion, a new technical device becomes incorporated into an already established system of organized behavior, and produces gradually a complete remolding of that institution. Again, in terms of our functional analysis, we will show that no invention, no revolution, no social or

> intellectual change, ever occurs except when new needs are created; and thus new devices in technique, in knowledge, or in belief are fitted into the cultural process of an institution (Malinowski, 1944: 41).

Now, the nature of any particular institution is the function it is organized to serve, and this is determined by the need it must satisfy. It fulfills this function by stipulating the rules (technical, social, legal and otherwise) that must be followed, the actions and/or ceremonies that must be performed, and the tools or implements that must be used in order to insure the proper satisfaction of the need in question. These elements, providing as they do the information necessary for satisfying a particular need, constitute the form of an institution, which, according to functionalist theory, is always determined by the function of the institution.

Moreover, while the form of an institution, say, for instance, marriage, can (and usually does) vary from culture to culture, its function always remains the same. It is precisely for this reason, because they do maintain the same function across cultural boundaries, that institutions are the fundamental units for investigation and comparison for the functionalist cultural anthropologist. Malinowski, however, does not stop with this claim. In arguing that institutional analysis is indispensable to the study of socio-cultural systems Malinowski also means to insist that

functionalism constitutes the scientific approach to the study of culture. Scientific anthropology, he writes, consists in a theory of institutions, i.e., in the concrete analysis of the basic organizational units of socio-cultural systems (Malinowski, 1944: 41). Thus,

> as a theory of basic needs, and a derivation of instrumental [cultural] and integrative imperatives, scientific anthropology gives us the functional analysis, which allows us to define form, as well as the meaning of a customary idea or contrivance (Malinowski, 1944: 41-42).

Functionalism qualifies as a scientific theory of socio-cultural systems, according to Malinowski, because it satisfies the requisite criteria of such a theory. First of all, in the best empirical tradition, it starts from and leads to experience (Malinowski, 1944: 67). Second, it demonstrates that its fundamental unit of investigation (the institution) exists and is the legitimate isolate of all the systems it wants to describe and compare (Malinowski, 1944: 27). Third, each proposition of a functionalist theory refers to a phenomenon which can be defined by form, in the fullest, most objective sense of the term (Malinowski, 1944: 67). Fourth, each of its theoretical principles is verifiable by experience and is translatable into a method of observation (Malinowski, 1944: 67). Fifth, it possesses methods for the identification of relevant factors and the

formation of general laws (Malinowski, 1944: 14). And finally, on the most substantive level, functionalism can state clearly and precisely where the material determinants, human actions, beliefs and ideas enter into the isolates of cultural systems, how they interact and how they acquire that character of permanent, necessary relationship to one another (Malinowski, 1944: 27). Because "pure functionalism" can satisfy all of these requirements Malinowski does not hesitate in proclaiming it a scientific theory of culture.

The inadequacy of functionalism as a scientific theory.

There is no doubt but that Malinowski has played an important, perhaps even crucial, role in the development of modern anthropological methodology and theory. At the very least he is to be admired and remembered for the quality of his fieldwork. Indeed, the several books that were the outcome of the years he spent among the natives on Mailu and on the Trobriand Islands, including Argonauts of the Western Pacific (1922), The Sexual Life of Savages in Northwestern Melanesia (1929), and Coral Gardens and Their Magic (1935), attest to his brilliance as an observer and are, moreover, still considered to be classic examples of how fieldwork can and should be conducted.

Despite the excellence of the fieldwork it has generated, however, functionalism (including Malinowski's

"pure functionalism") is not without its problems, both as a theory of culture and, especially, as a scientific theory of culture. On the substantive level, as a theory of socio-cultural evolution functionalism presupposes certain doctrines and implies certain others which, individually and in combination, adversely affect its value and its effectiveness as a research strategy. As an aspiring scientific theory on the other hand, Malinowski's functionalist theory of culture is faced with certain logical and methodological difficulties that seriously call into question its scientific status--to the point, in fact, where Dorothy Gregg and Elgin Williams declare it the "dismal science." Let us consider each of these problem areas in further detail.*

Substantive Criticisms. In order to have any credibility at all as a theory of socio-cultural systems Malinowski's "pure functionalism" must presuppose some manner of lack or absence within human beings that has to be provided for. That is, it must presuppose some need which requires the organization of an activity or institution whose function, then, is to satisfy that need. This is precisely

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*Although the substantive and methodological are, in a certain sense, separate facets of any theory and thus can be considered and evaluated independently of one another, there is nevertheless a certain inevitable amount of overlap inasmuch as certain issues, doctrines, etc., will have both substantive and methodological implications for the theory.

what Malinowski has done in the form of the theory of needs, a theory which although it recognized three categories of needs--basic, derived and integrative--establishes as primary seven biophysical (basic) needs which human beings must satisfy in order to survive. Standing at the center of the theory of needs as they do, these basic needs also underlie functionalism as a whole. "The individual with his physiological needs and psychological processes is the ultimate source and aim of all tradition, activities, and organized behavior" (Malinowski, 1939: 962). In order to effectively satisfy these needs functionalist theory proceeds to paint a picture of human beings as intelligent, highly cooperative individuals organizing institutions and activities for their individual and mutual benefit. Or, as Gregg and Williams write in "The Dismal Science of Functionalism," in which they attempt (and not entirely unsuccessfully) to establish certain doctrinal similarities between functionalism and economics--the individual human beings who compose functionalist society might have stepped from any economics text. They are rational creatures and (under whatever socio-political system) they ceasely pursue their own self-interest, meticulously avoiding pain and seeking pleasure (Gregg & Williams, 1948: 596). This, argue Gregg and Williams, is nothing less than hedonism, a doctrine that economics has long embraced (Gregg & Williams, 1948: 596).

The theory of needs which underlies this hedonism, however, with its emphasis on the seven basic needs of nutrition, reproduction, bodily comforts, safety, movement, growth and health is by no means a universally accepted idea, let alone an empirically established fact. It is, in fact,

> . . . rather ad hoc--physiologists and psychologists would certainly want to make substantial emendations--and the logic connecting the various instrumentalities to their biophysical base is never more than arbitrary (Harris, 1968: 550).

Nor is the causal efficacy of these basic needs in underlying and determining the development of socio-cultural systems, to which the theory of needs (and functionalism itself) is committed, self-evidently true. Indeed, inasmuch as this conviction has been tested the resulting range of social facts has consistently supported the opposite position, i.e., that no wants and needs are to be taken for granted (Gregg & Williams, 1948: 595). Likewise, C.E. Ayres writes,

> if anything is known anywhere in the field of the social sciences today it is that "wants" are not primary. They are not inborn physical mechanisms and they are certainly not spiritual attributes. They are social habits. For every individual their point of origin is in the mores of his community; and even these traditions have a natural history and are subject to modification in the

general process of social change (Gregg & Williams, 1948: 597).

Lest it be supposed that Malinowski and Ayres are arguing at cross-purposes or about different things--Malinowski about "needs" and Ayres about "wants"--it should be pointed out that of the seven basic "needs" Malinowski proposes only nutrition could correctly be said to be a "need" in the strictest sense of the word, i.e., as the lack or absence of something whose presence is necessary. The implication here is that we have no biological control over the matter--it is not open to debate or choice. Clearly nutrition fulfills this requirement. We must absorb the necessary nutrients in order to survive, and this means we must eat! The remaining "needs" Malinowski enumerates, however, are not needs in this sense. Even reproduction, especially on the level of the individual, is not necessary in this sense (though perhaps it could be construed as such on the species level). But, Malinowski is talking about the individual and his needs, not about the species as a whole. The remaining six "needs" then can more properly be understood as things we need in the sense that we desire them or want them; things that make our existence more pleasant and worthwhile surely, but not things which our very survival mandates.

The point is not that these needs (as I shall continue to refer to them for simplicity's sake) do not exist, nor

that, as needs, they are unimportant. Rather, the criticisms are:

1. that the list of needs Malinowski proposes is entirely arbitrary. Why these seven needs in particular? Is the need for emotional comfort, for instance, any less basic than the need for bodily comfort? And what of love, and aggression, and spiritual comfort? These questions, unfortunately, are left unanswered;

2. that, excluding nutrition, the basic needs Malinowski does enumerate are not needs in the strictest sense of the term, but simply wants and desires that are not physical mechanisms;

3. that since these basic needs are not true needs, they are not causally determinate to the extent Malinowski would have us believe, or his functionalist theory requires.

Nevertheless, functionalism persists in considering wants and needs to be individual, innate physical mechanisms, and then proceeds to derive cultural and integrative imperatives and the whole range of cultural behavior and institutions from these physiological sources. The outcome of this line of reasoning, and this is the second problematic doctrine functionalism presupposes, is that all cultural institutions appear right and good by definition. Since organized behavior stems from needs, it must follow that the institutions whose goals or functions

are to satisfy these needs are reasonable, necessary and just (Gregg & Williams, 1948: 597).

On the surface, at least, this doctrine seems quite reasonable. If human beings do have certain basic needs, and if the satisfaction of these needs requires human beings to organize, and if the institutions that are the outcome of this organization effectively satisfy these needs, then surely the mere fact of their existence implies that these institutions are doing their job, that they are necessary or just. God is in His heaven and all is right with the world, as it were. The result of describing institutional behavior in this manner, then, is that it credits every cultural custom and activity, inasmuch as it serves some purpose, with instrumental efficacy (Gregg & Williams, 1948: 598).

On further reflection, however, this doctrine has some rather disconcerting and, I would also suggest, entirely unacceptable consequences. To begin with, if we define the function of institutions to be the satisfaction of human needs, and if they are, therefore, by virtue of their very existence deemed necessary and just, then how do we explain the existence of technological inefficiency and the failure of institutions to function at maximum capacity? Surely such inefficiency is contraindicated, i.e., given the theoretical position that all institutions, in satisfying the needs of human beings, are essential and just, it should follow that they do so in the most efficient and effective

manner. Why would they have been organized otherwise? Unfortunately this is not the case and, as Gregg and Williams somewhat ironically remark, it must require extensive preoccupation with such functions and goals in their [the functionalists'] appreciation

> before 'the air of indignant wonder with which technologically minded people sometimes cite the fact that actual technical performance is well below the theoretical potentialities of 100 per cent efficiency' is dissipated (Gregg & Williams, 1948: 598).

Likewise, if every institution functions to satisfy the particular need for which it was organized and thus contributes to the maintenance and harmonious operation of the cultural system as a whole, then how do we account for the existence of the considerable social unrest and intra-cultural aggression and opposition that exists in most cultures? Functionalism cannot.

Despite the fact that these features (technological ineffeciency, social unrest, aggression, etc.) exist contrary to the best theoretical predictions of the theory, functionalism does in fact offer explanations of these phenomena. It does so, however, (as will become clear when we discuss the methodological and logical criticisms of functionalist theory), at the peril of its scientific soul. Thus, is inefficiency seen as justified, social unrest as creating the "universal need" for organization by force and

compulsion, and aggression as becoming the essential cultural feature of organized and regulated antagonism (Gregg & Williams, 1948: 598-599).

More important than functionalism's ability to account for these contraindicated phenomena is the consequence of this ability. Since these phenomena can be explained they must, therefore, be considered as being or a par with other cultural institutions and activities and hence as necessary and just in their own right. In essence, then, functionalism provides carte blanche to any government or society to employ whatever policies it deems necessary for the attainment of its desired ends. Social control, the use of force and coercion, the disproportionate distribution of wealth, the usurpation and denial of legal rights to certain social classes or ethnic groups, the arbitrary division of labor, the punishment of perceived transgressions, the persecution of undesired elements--all of these social policies are condoned, since, if they were not necessary and good, they would not exist, and conversely, if they exist they must be just.

If the ramifications of these consequences of functionalist theory are still hard to appreciate consider the following two passages.

> Historical efforts to affect social control have relied greatly upon power. Power is institutionalized and its use legitimated by reference to some

> authorizing source. To the extent that power is legitimated it ceases to be power and collapses into authority; for the coercive influence is replaced by the non-coercive influence of authority (Jones, 1980: 3).

And,

> [Concerning] the field of corrections let me state that at present our society has a large minority population which--still as a matter of course--is denied common and essential respect. They have in the past denied the legitimacy of our social institutions as a result. Society has found it necessary [emphasis mine] to exercise force--to engage in violence--to suppress those elements which deny it viability (Jones, 1980: 60-61).

The quality and fineness of the distinction articulated in the first passage--which any sophisticated analysis of the power structure of social institutions might insist upon drawing--is all but obviated on a functional analysis. Since all existent institutions are necessarily good and just, we gain nothing (of anthropological importance) by distinguishing between those institutions whose "authority" is based upon respect and those whose "power" is not. In a similar manner, the situation depicted in the second quotation is one that makes a mockery of all our convictions about commitments to social justice and equality; yet on a functionalist analysis such methods of social control and

manipulation must be granted their due as functionally effective institutions. But at what cost?

These difficulties become even more serious when the line of reasoning underlying them is carried to its logical conclusion--the doctrine of cultural relativism.* Cultural relativism argues that, because they arise from the inborn wants and basic needs of individuals, socio-cultural sytems are each uniquely expressive of their constituent populations. Consequently, there are no universal standards of value or morals. What a people considers to be right is right for them, regardless of how it might appear from another cultural perspective (Gregg & Williams, 1948: 605).

The anthropological naivete of cultural relativism, however, and the social, political and, especially, moral insensitivity that it engenders is totally unacceptable. If a theory of socio-cultural systems cannot provide criteria that will allow the evaluation (as well as the comparison) of such systems, if it does not have the ability to determine at what point a society ceases to be healthy and thriving and begins the (often long and painful) process of decay, if it cannot provide a foundation on the basis of which the constructive uses of "authority" can be

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*It must be noted that, like most theoretical doctrines, cultural relativism admits of degrees. The version under discussion here has often been called "strong" cultural relativism to distinguish it from "weaker" and less problematic formulations of the doctrine.

distinguished from the destructive uses of "power" and the latter condemned, then the theory is worse that worthless--it is dangerous. The mere fact that cultures are autonomous, self-contained systems that, to a certain extent, manifest unique traits or customs does not mean that there are no corrupt socio-cultural systems or iniquitious institutions. It should be a function of the theory we articulate that it provide the criteria necessary for making such evaluations. To be able

> [t]o say that certain aspects of Naziism were morally wrong--is not parochial arrogance. It is--or can be--an assertion based both upon cross-cultural evidence as to the universalities in human needs, potentialities, and fulfillments and upon natural science knowledge with which the basic assumptions of any philosophy must be congruent (Kroeber & Kluckhohn, 1952: 178).

If a theory fails in its ability to makes such evaluations then our anthropology is reduced to a mere descriptive and sterile discipline.

It must be said in Malinowski's defense, however, that he was aware of the difficulties inherent in the extreme cultural relativism to which functionalism is committed. Most functionalists, in fact, have felt "uneasy and ill-content with such a stodgy view with its overtones of bigotry and egotism" (Gregg & Williams, 1948: 605). In addition, it would be a grave mistake to assume that Malinowski

was unaware of the great harm that socio-cultural systems are capable of engendering, or unsympathetic to the plights of oppressed peoples. Indeed, it was in response to the social and political climate of his day that Malinowski condemned the rise of totalitarianism. Under totalitarian states, he writes, the interests of the state

> . . . are made completely to overrule the elementary rights and interests of the individual. The theoretical discussion of the relation between the individual and the group has thus in our present world not merely an academic but also a deep philosophical and ethical significance. It cannot be too often repeated that any culture which kills individual initiative, and relegates the interests of most of its members to complete insignificance at the expense of a gang-managed totalitarian state will not be able to develop or even to preserve its cultural patrimony (Malinowski, 1939: 964).

This advocacy of elementary human rights despite his theoretical commitment to a view of socio-cultural systems that denies the existence of such universals, while it may assure us of Malinowski's sensivity to human problems, does not bode well for functionalism. If we are to use functionalism as a paradigm for explanation and research in the study of socio-cultural systems, then we must accept the doctrines (like cultural relativism) to which it is committed. This is the demand of internal, logical consistency.

On the other hand, if the cultural relativism to which functionalism is committed is considered to be unacceptable and conditions whose existence are explicitly denied by the doctrine are introduced in an attempt to mitigate its unacceptability, then we create a dangerous rift between the formal theory and the actual practice of functionalism as a research strategy. Malinowski, and many other functionalists as well, have opted for this latter strategy, however, despite its untenability from a theoretical standpoint. And it is precisely for this reason that critics have been led to argue (justifiably, I think) that there is little or no logical connection between the formal theory and the concrete analysis of functionalism (cf. Gregg & Williams, 1948 and Jarvie, 1965).

All things considered it is little wonder, then, that functionalism, with its commitment to the necessity and justice of prevailing cultural institutions and its advocation, albeit somewhat contradictorily, of solid Anglo-Saxon values, was the boon of British imperialist and colonial policies in the eighteenth, nineteenth and twentieth centuries, and the bane of native peoples the world over.

Logically connected with both the doctrines of hedonism and the essential goodness of existing cultural institutions (and no less problematic for functionalism) is a third doctrine--the doctrine of equilibrium. Just as by reason of its existence a cultural institution is necessary and just,

so also by the mere fact of its existence a socio-cultural system qua system is a functioning harmonious whole. Each cultural system is in a state of equilibrium wherein it is adapted to its particular environment and all its interrelated and interconnected parts function together in an efficient, effective and consistent manner, to the greater good of the culture as a whole. Consequently, there can be no "cultural lag" and no cultural flotsam and jetsam, because the survival of an institution through time is prima facie evidence of the functional effectiveness and significance of that institution (Gregg & Williams, 1948: 600-601). The functionalist strategy, then, is to examine existing societies

> and to assume that these societies are functioning harmonious wholes--are in equilibrium--by the mere fact of their existence. The functionalist notes with awe and admiration that every part is necessary for the continued existence of any given society in its given state (Gregg & Williams, 1948: 601).

This view of socio-cultural systems as existing in a state of equilibrium, as stable, self-contained and self-maintaining systems is, however, not without its difficulties. First of all, as a statement of empirical fact this doctrine simply has not been substantiated through observation. As a matter of fact, it flies full in the face of nearly all the ethnographic data available. As Gregg and

Williams remark, it is change, and change of a rather rapid and cumulative nature that strikes the eye in the study of socio-cultural systems, not "balance" and "equilibrium" (Gregg & Williams, 1948: 595). The history of contemporary ethnography, in fact, is the history of a desperate attempt to observe and record for posterity as many native cultures as possible before they are changed (Westernized) beyond recognition or disappear entirely.

The persistence of customs and traditions is not such as to guarantee that only positive or, perhaps, neutral cultural institutions survive, or that institutions which actively interfere with a cultural system's internal harmony (equilibrium) will be eliminated. Moreover, there is no evidence whatsoever to indicate that any eternal tendency towards harmony or equilibrium in human affairs exists at all, and much to indicate the opposite is true--that there is an uncontrollable tendency towards disequilibrium and rapid change (Gregg & Williams, 1948: 602). Entropy is as much a part of social and cultural systems as it is natural systems.

The mere existence of such non-venerable institutions as the Spanish Inquisition, the genocidal racial policies of Nazi Germany, the apartheid of South Africa and the present U.S.-Soviet nuclear arms strategy of MAD (Mutual Assured Destruction) is enough to convince most people (whether anthropologist or mechanic) that deleterious, irrational and

even imbecilic sentiments and affects are to be found as essential institutional components in socio-cultural systems. "If what the Western world has now in the way of institutions is 'functioning, active, efficient' the outlook is dim indeed . . ." (Gregg & Williams, 1948: 602).

Finally, in contradicting established ethnographic fact by stressing the essential stability of cultural systems the doctrine of equilibrium renders funtionalism de facto incapable of accounting for cultural change--and especially not the rapid change suggested by the ethnographic data, nor, even, the institutional change that Malinowski, himself, recognizes as an essential component of cultural evolution (cf. Malinowski, 1944: 41). In order to account for structural change within socio-cultural systems functionalism would have to be able to weigh certain variables causally, i.e., make judgments about which institutions or structures are more fundamental, more functionally effective than others. But such causal weighing (as we have seen) can never be accomplished by a strictly functional strategy (Kaplan & Manners, 1972: 60). In fact, Malinowski's functionalism can only really explain how intra-cultural tensions and conflicts are reduced or eliminated, but never how or why they originate, or, how or why they instigate changes. Thus, instead of a theory of cultural change, all Malinowski succeeds in creating is a theory of no-change.

For this reason functionalism never gets off the ground (Harris, 1968: 559-560).

The substantive difficulties associated with any one of the three doctrines we have discussed (hedonism, the essential justice of institutions and equilibrium), are enough to cast serious doubt on the value of functionalism as a theory of socio-cultural systems. But when considered together the result is an almost inescapable web of contradiction and tautology. The doctrine of hedonism acts to divert attention from the actual behavioral consequences to the general goals and functions of institutions. This creates a false impression of equilibrium, in which institutions and the needs they satisfy stand forever in balance. To this rather selective perception each and every actualized situation appears as necessary and right, a part of the natural order (Gregg & Williams, 1948: 604). Thus, the study of socio-cultural systems

> is reduced to making excuses for the organism whose vagaries, while often brutal, flow from the heart, and to filling in the blanks of an eternally-given paradigm, any change in which is equivalent to the end of society (Gregg & Williams, 1948: 604).

Functionalism is full of good intentions, but good intentions do not a sound research strategy make.

Logical and methodological criticisms. More important than the substantive pitfalls of functionalism, for our purposes at least, are the logical and methodological difficulties that it faces. For these difficulties, unlike the substantive ones, reflect directly upon functionalism's status as a scientific theory of socio-cultural systems. And, unfortunately, functionalism fares little (if any) better methodologically and logically than it does substantively. To put it another way, in portraying functionalism as a scientific theory Malinowski has, instead of increasing its theoretical and explanatory power, succeeded in increasing its problems and limitations.

Functionalism's logical and methodological limitations can be subsumed under two basic categories:

1. those which concern the theory's ability to generate acceptable explanations of socio-cultural phenomena, i.e., to use Kuhn's terminology, its puzzle-solving ability;

2. those which concern the testability or falsifiability of the hypotheses it formulates.

As regards the limitations that arise from the former category I shall argue that not only are functionalism's explanations logically unsatisfactory, but also that, as a consequence, the theory as a whole lacks explanatory power. Concerning the difficulties that emerge from the latter category I shall argue that, because of certain methaphysical assumptions to which functionalism is

committed, the hypotheses it formulates and, indeed, the theory itself, are unfalsifiable.

We might attempt to demonstrate the unsatisfactoriness of functional explanations of socio-cultural phenomena by examining every functional explanation and showing in what way each is unsatisfactory as an explanation. This method, however, is obviously not very practical, nor is the prospect of such a task an attractive one. There is, fortunately, another more acceptable and effective method of demonstrating the unsatisfactoriness of functional explanations. This procedure rests upon the fact that all explanations possess a certain similar structure--a structure demanded by the fact that they are all derived from the functional theory of culture. It is the limitation(s) of this form that renders functional explanations logically unsatisfactory. The clearest manner in which we can illustrate this structure is by examining a typical functional explanation. Consider then the explanation of magic Malinowski offers in the essay "Magic, Science and Religion."

> What is the cultural function of magic? We have seen that all the instincts and emotions, all practical activities, lead man into impasses where gaps in his knowledge and the limitations of his early power of observation and reason betray him at a crucial moment. Human organism reacts to this in spontaneous outbursts, in which rudimentary modes of behavior and rudimentary beliefs in their efficiency are engendered. Magic fixes upon these beliefs and rudimentary

> rites and standardizes them into permanent traditional forms. Thus magic supplies primitive man with a number of ready made ritual acts and beliefs, with a definite mental and practical technique which serves to bridge over the dangerous gaps in every important pursuit or critical situation. It enables man to carry out with confidence his important tasks, to maintain his poise and his mental integrity in fits of anger, in the throes of hate, of unrequited love, of despair and anxiety. The function of magic is to ritualize man's optimism, to enhance this faith in the victory of hope over fear. Magic expresses the greater value for man of confidence over doubt, of steadfastness over vacillation, of optimism over pessimism (Malinowski, 1954: 90).

Clearly Malinowski intends this statement as an explanation of the existence of magic. The reason individuals in more primitive societies practice magic is to combat and counteract those elements or episodes in everyone's life that tend to induce feelings of helplessness or being out of control, increase anxiety and despair, and diminish confidence, faith and optimism. The function of magic in primitive cultures, in short then, is to maintain mental health and some measure of control in the face of the ever-present uncertainty of life.

To appease our scientific consciences we must now ask what kind of explanation Malinowski's statement purports to be. This question is especially important in light of the fact that Malinowski heralded functionalism as a scientific theory. Is his functional explanation of magic as a means

of ritualizing optimism and enhancing faith scientifically acceptable? To be more precise, what we want to examine are the explanation's logical credentials. To do this we must first render it into the logically accepted form for a deductive argument.*

The cultural phenomena to be explained is, obviously, the existence of magic among primitive cultures. Thus, the conclusion we ultimately want to reach is,

(c) Primitive cultures practice magic.

This is called the explicandum of the argument and according to the formal structure of a deductive argument it must be the logically necessary consequence of the explanatory premises (i.e., the explicans).

> Accordingly, in explanations of this type the premises state a sufficient (and sometimes, though not invariably, a necessary) condition for the truth of the explicandum . . . . It has been widely regarded as the paradigm for any 'geniune' explanation and has often been adopted as the ideal form to which all efforts at explanation should strive (Nagel, 1979: 21).

In addition to logically necessitating the conclusion it is also important that the premise(s) be independent if the argument as a whole is to provide a satisfactory explanation. This is necessary so that the truth of the

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*The broad format of the argument that follows is adapted from I.C. Jarvie's "Limits to Functionalism and Alternatives to It in Anthropology." The example itself, however, as well as other details, are my own.

premise(s) can be tested independently of the truth of the conclusion (Jarvie, 1965: 22), otherwise we are left with an argument like,

Primitive cultures practice magic

∴ Primitive cultures practice magic,

which, while logically valid, is tautological and entirely unsatisfactory as an explanation for the existence of magic among primitive cultures. Fortunately, however, Malinowski's explanation is not so obviously uninspiring as this. Rather, on the basis of the passage quoted above the explanation can formulated as follows,

(p) People in primitive cultures must have faith and optimism in order to survive,

(q) The practice of magic increases faith and optimism,

∴ (c) Primitive cultures practice magic.

This is clearly a more satisfactory explanation of the existence of magic from the point of view of the information it contains. Unfortunately it is not a logically valid derivation. In a valid deductive inference the truth of the premises entails the truth of the conclusion. In this argument, however, even given that the premises (p) and (q) are true they do not necessitate the truth of (c). It could be either true or false since it is entirely possible that some other practice, such as meditation or prayer, could also increase faith and optimism, and that the natives are doing that as well as, or in stead of, practicing magic. At best

the practice of magic is only one possible way of increasing faith and optimism. Thus, all that we may validly conclude from (p) and (q) is,

(c') In some primitive cultures magic may be practiced,

which is hardly the conclusion we are seeking. Even if we alter (q) to say,

(q') All practice of magic increases faith and optimism,

we get no closer. For from (p) and (q') we can only conclude,

(c'') All primitive cultures in which magic is practiced increase the faith and optimism of their members, and in those cultures where magic is not practiced faith and optimism may be increased in other ways.

Again, this falls short of the desired conclusion.

In order to infer (c) and for this argument to be deductively valid as well as satisfactory it would have to be formulated in the following manner,

(p) People in primitive cultures must have faith and optimism in order to survive,

(q'') The only means of acquiring this faith and optimism is through the practice of magic.

∴ (c) Primitive cultures practice magic.

In this form the argument is logically valid, since if the premises (p) and (q'') are true, then conclusion (c) must be true. Are the premises true, though? The truth of (p) we have already granted, but the truth of (q'') is by no means

obvious. Surely faith and optimism can be acquired by other means than the practice of magic. The available ethnographic data simply does not support the claim made by (q''). The problem here is with the word "only." However, if the word "only" is removed from (q'') the inference is no longer valid and we are no closer to (c) than we were before. Thus, as Jarvie points out, to make a purely functional explanation valid we must strengthen it unacceptably (Jarvie, 1965: 24).

Finally, let us consider a more complicated, but perhaps more realistic, formulation of Malinowski's explanation.

(p) People in primitive societies must have faith and optimism in order to survive,

(r) All cultures have ceremonial rituals and practices,

(s) All ceremonial rituals and practices act to enhance faith and optimism,

(t) Magic is a ceremonial practice.

Although they are not all drawn directly from the passage quoted above, these premises are in keeping with the spirit (if not the letter) of Malinowski's explanation. Despite their greater realism and complexity, however, these premises will still not allow us to conclude,

(c) Primitive cultures practice magic.

At best from (p), (r), (s) and (t) we may deduce,

(c''') When cultures practice magic they are increasing the faith and optimism of their members.

But is this a scientifically acceptable explantion for the existence of magic in more primitive cultures? Not, I would argue, if we mean the explanation to be anything more that a simple heuristic. As it stands the argument may be above reproach logically, but as an explanation it leaves too many important questions unanswered: "Is magic the only means of increasing faith and optimism?" "Does the practice of magic serve any other cultural function?", etc. Nor is there any assurance that, even if we could answer these questions, the answers would bode well for functionalism. For when we have tried to strengthen the functional explanation we have done so at the price of logical validity. But without the merits of both a strong and logically valid explanation we can never be certain just how accurate the functional explanation of a cultural practice or institution is. And without a reasonable degree of certainty in its explanations how can functionalism be taken seriously as a research strategy. In any case, Jarvie argues that unless functional explanations can be made valid, functionalist theories explain nothing. They have no explanatory power (Jarvie, 1965: 24).

Perhaps it was considerations of this nature that led Ernest Nagel to classify functional explanations as a distinct type of scientific explanation, as opposed to deductive, probablistic and genetic explanations (Nagel,

1979: 20-26). But even should we grant that functional explanations are *sui generis* (and consequently should not be faulted for not being translatable into deductive explanations), or, to take a different tack, even should it be argued that their logical difficulties can be surmounted, the question remains: Are functional explanations satisfactory scientific accounts of the phenomena they purport to explain? There are two fundamental reasons that require that this question be answered in the negative.

To begin with there is a question of circularity. Not at the level of individual explanations, for, as we have seen, functional explanations are not *that* simplistic. Rather, the problem of circularity emerges at the theory level, and the consequence is entirely unacceptable.

> A theory makes a satisfactory explanation when it is not circular, not *ad hoc*, and is testable independently of the facts it is intended to explain. But a functional theory does not go beyond the facts it intends to explain; therefore a certain tinge of circularity, or *ad hoc*-ness, is an inevitable consequence. To be told that the function of churchgoing is to express and reinforce social solidarity and that the main test of the desire to express and reinforce social solidarity is churchgoing is to get into a circle that cannot be broken in favor of a "deeper" explanation. Circular, or *ad hoc*, or nonindependently testable explanations do not tell us anything new, they are methodologically unsatisfactory (Jarvie, 1965: 25).

Unless something can be done to remove this circularity at the theory level, then, regardless of the status of individual functional arguments or explanations, functionalism as a whole must be judged inadequate as a scientific theory of culture.

This judgment is further supported when we consider the second fundamental problem mentioned above--the level of analysis of functional theories. Writing in the introduction to Technical and Social Change: A Transdisciplinary Model, Jacob Fried and Paul Molnar argue that the reason, at least historically, for the failure of sociologists and anthropologists to develop a viable "science of society" is that they have focused on substantive, complex and qualitative conceptual categories as the fundamental units of analysis and theoretization (Fried & Molanr, 1978: 4). Their point here is not to question the existence or non-existence of such conceptual entities as culture, or society, or institution,

> but to state firmly that analysis cannot and should not proceed from consideration of the qualities and characteristics of such diffuse substantive categories. We relegate the consideration of the histories and behaviors of such macro-entities to the very legitimate enterprise of humanistic scholarship. Scientific enquiry must proceed by bypassing consideration of the nature of such complex entities themselves, and concern itself with the principles or rules that explain how behaviors emitted

> by empirically observable entities operate (Fried & Molnar, 1978: 5).

Fried and Molnar then proceed to classify as too complex and diffuse Leslie White's concept of "energy," Talcott Parsons' "universal pattern variables," Ruth Benedict's "patterns of culture," Max Weber's "legitimacy," and Durkheim's distinction between "organic" and "mechanical" solidarity (Fried & Molnar, 1978: 6). These and similar concepts, they argue, "are really classificatory in nature and simply sort and resort unexplained phenomena in different groupings which in fact substitutes description for the analysis of process" (Fried & Molnar, 1978: 6).

The concepts upon which Malinowski's functionalism are built are no less susceptible to this criticism than are those of White, Parsons, Benedict, and the others. His functionalist theories are permeated with talk of "culture," "society," "kinship patterns," and "commissariats" to name only a few of the concepts. In addition, the concept of "institution," as has been shown, stands at the very heart of the functionalist programme. Moreover, these are the very conceptual entities that Malinowski considers to be the basic units of analysis with which functionalism is to be concerned. And it is precisely to the extent that it has been concerned with these diffuse and all-encompassing concepts as its units of analysis that functionalism has remained a primarily classifactory and descriptive enterprise.

Its level of analysis is simply too broad for functionalism to have succeeded in producing a viable scientific theory of socio-cultural systems.

The second category of difficulties which call into question functionalism's logical and methodological adequacy concerns the testability (or falsifiability) of its hypotheses. According to Popper the criterion of any given theory's scientific status is the testability of the hypotheses it generates (Popper, 1965: 37). That is to say, the extent to which a particular theory's hypotheses are testable is the extent to which that theory is to be adjudged scientific. If the theory and its hypotheses cannot be tested, of falsified, or refuted, it is not scientific. Thus the scientist

> should look upon a theory from the point of view of whether it can be critically discussed: whether it exposes itself to criticisms of all kinds, and if it does --whether it is able to stand up to it. . . . Only if a theory successfully withstands the pressure of these attempted refutations can we claim that it is confirmed or corroborated by experience (Popper, 1965: 256).

Since Popper first formulated the principle of falsifiability as the criterion of scientific demarcation in the 1920's and 1930's many philosophers of science have argued that he over-emphasized the role this criterion plays in demarcating scientific theories from pseudo-scientific

theories. Indeed, Popper himself subsequently relented his initial strong position and admitted that there are degrees of testability. Nevertheless, regardless of the emphasis placed on this principle as a criterion of scientific demarcation, few philosophers of science would deny that being testable (and, hence, potentially falsifiable), is an important, if not essential, characteristic of scientific theories.

Unfortunately, although they were contemporaries, Malinowski's functionalism did not benefit from Popper's discussions of the nature of scientific theories, and, even more unfortunately, Malinowski seems not to have arrived at Popper's principle on his own. As a consequence of this, one of the criticisms often leveled against functionalism concerns the testability of its claims. How do we go about the task of confirming or disconfirming them, especially when

> one of the major problems in attempting to substantiate functional claims is the failure or inability to specify just what it is that is being maintained or the mechanisms by which this maintenance is accomplished (Kaplan & Manners, 1972: 61).

How, for instance, would one test such claims as: "The function of kinship is the supply of citizens to the community"; or, "The function of social control is the codification and regulation of action"; or, "The function of

magic is to increase faith and optimism"; or, "The function of the commissariat is to meet the metabolic and nutritional needs of its members"? Malinowski's functional theory of culture makes each of these claims, and although they range from the tautological, to the obvious, to the far-from-obvious, Malinowski does not tell us how to go about testing their truth, other than the command to "observe"! Nor does he discuss the conditions under which any of them might conceivably be falsified.

This inability to be falsified does not limit itself only to individual functional hypotheses; it extends to the very assumptions upon which functionalist theories are built. The same assumptions that underlie the substantial criticisms discussed above. As Jarvie writes, insofar as functionalism assumes that all cultural behaviors and institutions have a function and that all cultures are well integrated, harmoniously operating and "seamless,"

> it is taking on the character of a metaphysical theory; that is, a theory that cannot be shown to be false. A theory which clashes with no possible experience. If a theory clashes with no possible experience, it is compatible will all possible experiences and thus has no power to explain any particular statement of experience. It is also immune to attack. Functionalism asserts: "There exists a function for every action and institution," and, of course, failure to find such a function does not refute the theory; it only spurs one to further searching (Jarvie, 1965: 27).

This passage points out the dilemma functionalism is faced with clearly enough; however, it does not go far enough in explaining exactly why functionalism is compatible with all possible experience. This condition is the consequence of the way in which the fundamental assumptions which underlie functionalism fit together. Recall the three assumptions we discussed earlier:

1. that human beings have certain needs which they satisfy through the organization of activities and institutions;

2. that the institutions which exist satisfy some need and are therefore necessary and good;

3. that all socio-cultural systems exist in a state of equilibrium and harmony.

When these doctrines are combined the picture that emerges is one in which socio-cultural systems are viewed as collections of institutions and activities, each of which was organized by rational, self-interested human beings to satisfy some particular need. Because they satisfy some need each institution and activity is necessary and just. The line of reasoning here is that if an institution or activity did not satisfy a need it would not exist, since the reason for their existence in the first place is to satisfy some need. Finally we add to this the fact that since all institutions and activities satisfy some need and

are necessary and just, then socio-cultural complexes are integrated, harmonious and stable systems.

The explanatory power of this theory is immediately obvious. Quite simply, it explains everything. Every institution has a purpose, every institution serves its purpose, every institution is just, and the culture is stable. If it happens that we do not know the particular function of an institution there is no cause for concern, for the theory assures us that it must satisfy some need, else it would not exist. In addition, the mere fact of its existence also assures us that it is necessary and just. All we need do under this theory is work out the details.

From a scientific point of view such explanatory power is extremely problematic, because if the theory can explain everything, then there is no conceivable set of conditions under which it might be falsified.

> [F]unctionalism as fruitful heuristic is based on the metaphysical or unfalsifiable formulation of functionalism--the formulation, that is, which makes it compatible with all possible experience. Indeed most experience can easily be interpreted as giving it support. Recalcitrant experience can always be dismissed as not sufficiently explored or understood. Ability to absorb all experience, irrefutability, is often taken to be a virtue, to indicate truth. This is an error. "Irrefutable" means not open to criticism (Jarvie, 1965: 30).

Far from being an advantage, then, the inability to test functionalist hypotheses and the ability of the theory to accomodate all possible states of affairs serve to render functionalism methodologically inadequate as a scientific theory of socio-cultural systems.

It might be asked at this point why so much space and time has been devoted to an analysis of Malinowski's functionalism in a thesis obstensibly concerned with the scientific status of cultural materialism. Such a detailed analysis is appropriate, I would suggest, for two reasons. First, although this thesis <u>is</u> primarily concerned with cultural materialism, it is also concerned with the need for, and efforts to formulate, a scientific theory of culture. Historically, Malinowski's functionalism represents one of the very first claimants to this status. As such it is appropriate to examine functionalism's scientific credentials for the initial attempt to formulate a scientific theory that it represents. Second, by examining functionalism's credentials and indicating the ways in which it is inadequate <u>as</u> a scientific theory--and this clearly is the case--a much more reliable picture emerges as to what would be required of a theory in order to justify our acknowledging it as a scientific theory. This will be invaluable in the subsequent discussion and analysis of the scientific status of cultural materialism.

CHAPTER V

A SCIENTIFIC THEORY OF CULTURE (PART II)

> "The scientific analysis of culture . . . can point to another system of realities that also conforms to general laws, and can thus be used as a guide for field-work, as a means of identification of cultural realities, and as the basis of social engineering."
> -Bronislaw Malinowski

1. Marvin Harris and Cultural Materialism.

Cultural materialism as a scientific research strategy.

Like functionalism in anthropology, and quantum mechanics in physics, cultural materialism is not itself a theory. It is, rather, what we have called a research strategy or paradigm. As such it guides the formation of theories about natural phenomena, or, in this case, socio-cultural phenomena. Like functionalism also, cultural materialism claims to be a scientific research strategy, capable of producing scientific explanations of socio-cultural phenomena.

Consequently, in its commitment to the rules of the scientific method cultural materialism opposes other strategies that deny the legitimacy or the possibility of scientific accounts of human socio-cultural behavior. In particular, it opposes humanistic claims that there is no determinism in human affairs. Because it requires that

priority be given to research concerned with the material conditions of socio-cultural phenomena, cultural materialism is also opposed to those strategies that assert the causal efficacy of words, ideas, ideologies, moral values, and aesthetic and religious beliefs in the determination of human socio-cultural phenomena (Harris, 1980: ix).

Cultural materialism is predicated on the simple premise that human socio-cultural life is a response to the practical problems of day-to-day existence in this world. Instead of ideas, or moral values, or religious beliefs, it emphasizes the encounter between womb and belly and earth and water (Harris, 1980: ix). It directs attention to interaction between behavior and the natural environment as mediated by the human beings and their cultural apparatus. "It does so as an order of priority in conformity with the prediction that group structures are responsive to these classes of material conditions" (Harris, 1968: 659). Hence the "materialism" in cultural materialism. This emphasis derives from Marx's formulation of the determining influence of production and other material processes, i.e., that the production of the material means of subsistence forms the foundation upon which human socio-cultural life has evolved, and in terms of which they must be explained (Harris, 1980: x-xi).

> . . . [T]he analogue of the Darwinian strategy in the realm of sociocultural

> phenomena is the principle of techno-environmental and techno-economic determinism. This principle holds that similar technologies applied to similar environments tend to produce similar arrangements of labor in production and distribution, and that these in turn call forth similar kinds of social groupings, which justify and coordinate their activities by means of similar systems of values and beliefs. Translated into a research strategy, the principle of techno-environmental, techno-economic determinism assigns priority to the study of the material conditions of sociocultural life, much as the principle of natural selection assigns priority to the study of differential reproductive success (Harris, 1968: 4).

Unlike the materialism of Marx and Engels, however, cultural materialism opposes Hegelian idealism with its emphasis on dialectics. The epistemology of cultural materialism is rooted, instead, in the work of David Hume and the British empiricists (Harris, 1980: xi).

Yet cultural materialism should not be construed as simply a monistic or mechanical alternative to dialectical materialism.

> Rather it is concerned with systemic interactions between thought and behavior, with conflicts as well as harmonies, continuities and discontinuities, gradual and revolutionary change, adaptation and maladaptation, function and dysfunction, positive and negative feedback (Harris, 1980: xii).

In light of this, the task of cultural materialism as a scientific research strategy is to formulate a pan-human science of culture, a science whose findings can be accepted and replicated on logical and evidentiary grounds by the pan-human community (Harris, 1980: xi).

The epistemological assumptions of cultural materialism.

As a result of its logical and methodological commitments empirical science is the foundation of the cultural materialist way of knowing. But, Harris cautions us, merely to propose that cultural materialism "should aim at meeting the criteria for scientific knowledge is to say very little about how scientific knowledge of the soicocultural field of inquiry can be acquired" (Harris, 1980: 29).

Unlike the objects of investigation of, say, physics or chemistry, the human beings which are the subject matter of cultural anthropology are unique in that they are both "objects" and "subjects." It is essential, therefore, that we recognize the existence of these two separate roles and distinguish between them, i.e., between human beings' external behavior and their internal mental life. Indeed, according to Harris, the way in which it treats the relationship between what individuals say and think as subjects and what they say and think and do as objects of scientific investigation decisively characterizes a research strategy (Harris, 1980: 29).

What is at issue, however, is not which of these aspects of human existence is more real than the other, although this has often been interpreted to be the case. Marx and Engels made this mistake, for instance, when, in focusing on the material conditions of existence as the real determinants of human socio-cultural life, they implied that thoughts and ideas were somehow unreal. Thoughts are neither more nor less real than behavior. Moreover, the question of whether thoughts or material entities are the basis of reality is not even an epistemological issue. It is an ontological issue and, properly speaking, outside the province of anthropology. The real epistemological issue is how we can acquire separate and valid scientific knowledge of both these realms. If materialists are to solve this problem, Harris contends, they must do so in terms of two sets of distinctions--the distinction between mental and behavioral events, and the distinction between emic and etic events (Harris, 1980: 30).

Mental and behavioral events. Any scientific study of human socio-cultural life must concern itself equally with both the mental and behavioral realms of phenomena of human existence. That these realms of phenomena are in fact distinct is guaranteed by the fact that distinctive operations must be employed to make scientifically credible statements about each of them (Harris, 1980: 31).

> To describe the universe of human mental experiences, one must employ operations capable of discovering what people are thinking about. But to describe body motions and the external effects produced by body motions, one does not have to find out what is going on inside people's heads . . . (Harris, 1980: 31).

Within the realm of mental experiences, moreover, we can distinguish two different types of data--how people think things should be, and how they think things really are. Thus,

> . . . there are at least three different classes of data: (1) a people's notions of the way things ought to be; (2) their conceptions of the way their group actually behaves; (3) what does in fact occur, as objectively determined. The anthropologist gets the first class of data by interviewing and by observing manifestations of approval and disapproval. He gets the second class from interviewing. The third is established by observation, including photography and other mechanical means of recording. All three classes of data constitute the materials from which the anthropologist abstracts his conceptual model of the culture (Kroeber & Kluckhohn, 1952: 162).

Although essential, the distinction between the mental and behavioral realms of human life alone is not sufficient to solve the epistemological quandry that confronts the cultural anthropologist. There remains the fact that these realms can be viewed from two different perspectives--from

the perspective of the members of a culture themselves, or from the perspective of the observers of that culture. In each instance, Harris argues, objective, scientific accounts of both the mental and behavioral realms are possible. In the first instance, the observers would employ categories that are meaningful and appropriate to the people being studied, while in the second situation they would invoke categories that are meaningful and appropriate to the observers. On either perspective knowledge of mental and behavioral events may be acquired, so long as the criteria of empirical replicability and testability are met. The accounts rendered, however, might be different (Harris, 1980: 31). In order to avoid the confusion that would result from employing the terms "objective" and "subjective" Harris borrows the terms "emic" and "etic" from the anthropological linguist Kenneth Pike to refer to these two perspectives.

Emic and etic perspectives. The emic perspective has as its hallmark the elevation of the native informant to the status of the ultimate judge of the adequacy of the anthropologist's description and analysis of socio-cultural phenomena. It further assumes that access to data concerning the natives' inner states is essential for an understanding of their behavior and for an accurate description of their socio-cultural system. In conducting

research in the emic mode then the anthropologist attempts to discover the concepts, distinctions, categories and rules that one must know in order to think and behave as a native. The true test of the adequacy of emic analyses is their ability to generate statements that natives will accept as accurate, meaningful, or appropriate (Harris, 1980: 32; Harris, 1968: 574). Conversely, emic analyses can be falsified if it is shown that they contradict the cognitive calculus by which natives determine that entities are real, meaningful, significant, or in some other sense "appropriate" or "acceptable" (Harris, 1968: 571). In short then the goal of emic analyses is ". . . to grasp the native's point of view, his relation to life, to realise his vision of his world" (Malinowski, 1961: 25). Or, as Boas put it, "[i]f it is our serious purpose to understand the thoughts of a people the whole analysis of experience must be based on their concepts, not ours" (Boas, 1943: 314).

In contrast, the etic perspective has as its hallmark the elevation of the anthropologist as the ultimate judge of the categories and concepts to be employed in the description and analysis of socio-cultural systems. Instead of trying to discover and employ categories that are necessarily real or meaningful to the natives being observed, the anthropologist

> . . . is free to use alien categories and rules derived from the data language

> of science. Frequently, etic operations involve the measurement and juxtaposition of activities and events that native informants may find inappropriate or meaningless (Harris, 1980: 32).

The categories, distinctions and rules invoked by etic operations depend for their validity, not on their correspondence with native categories, distinctions and rules, but upon phenomenal distinctions judged appropriate by the community of scientific observers (Harris, 1968: 575). The final test of the accurateness of etic accounts, therefore, is simply their ability to generate scientifically productive theories about the causes of sociocultural similarities and differences (Harris, 1980: 32), theories, moreover, whose hypotheses and predictions can be verified through tests carried out by independent observers using similar etic operations.

When research strategies are built around either emic or etic operations several important differences emerge with respect to the methodologies they employ and the theories they subsequently formulate to explain socio-cultural phenomena. From the point of view of emic research strategies, for instance:

1. the primary method of collecting data is through interviewing, in depth, in the native language;

2. the intent of the research strategy is to discover the categories of thought, behavior and meaning, as nearly

as possible in terms of the ways "the natives define things";

3. the natives' definitions of meanings and their idea systems are seen as the most important "causes" or explanations of their behavior;

4. systems and patterns are isolated by means of logical analysis, especially by the quasi-linguistic analysis of contrast sets;

5. cross-cultural generalizations must wait until culturally specific patterns and meanings are converted into more abstract, intercultural categories;

6. the methodological strategy that is employed is fundamentally inductive, because research cannot proceed until the categories of meaning employed by the natives have been isolated (Pelto & Pelto: 1978: 62).

According to etic research strategies, on the other hand:

1. the primary method of collecting data is the observation of behavior;

2. the intent of the research strategy is to discover patterns of behavior as defined by the observer, in conjunction with the scientific community;

3. impersonal, nonideational factors, especially the material conditions of human existence, are seen as the significant determinants of human action;

4. systems and patterns are identified by means of the quantitative analysis of events and actions;

5. cross-cultural generalizations can be made immediately by applying the same methods of observation and employing the same externally derived categories to two or more different cultures;

6. the methodological strategy can range from induction to various mixtures of inductive and deductive reasoning (Pelto & Pelto, 1978: 62).

From these descriptions it is easy to see that research strategies characterized by emic operations are very different from strategies characterized by etic operations, especially as regards the fundamental epistemological assumptions they make and the research methodologies they employ to collect and interpret data. Now, if, as Harris suggests, the problem confronting the anthropologist is how to acquire valid knowledge about both the mental and behavioral realms of human socio-cultural life, and if a complete account of such phenomena requires an anthropological research strategy to take into account each of these realms, then the question is: Which type of operation--emic or etic--is capable of providing us with the necessary knowledge of both mental and behavioral events; which type of perspective should our research strategy employ? More particularly, which mode of explanation when built into our research

programme will support the formulation and testing of objective, scientific accounts of socio-cultural phenomena?

For Harris the answer to these questions is unproblematic. Only etic research strategies will suffice to provide us with objective knowledge of the thoughts and behavior of the people being observed. Only etic research strategies are capable of generating scientifically acceptable and testable explanations of human socio-cultural phenomena. In both of these respects, argue Harris and other anthropological theorists, the theories generated by emic research strategies are decidedly inadequate. As Kaplan and Manners write,

> if one wishes to produce accounts which convey what the culture is like from the viewpoint of someone inside the culture, then one ought to strive to produce an account in terms of native concepts, categories, and interpretations. But if one sees ethnographic description as contributing to a body of theory which explains how cultures come into being, how they are maintained, and how they change, then one cannot be content with just an inside view of the system (Kaplan & Manners, 1972: 22).

This does not mean that what native actors say they are doing, or the categories and concepts they employ are not important. Just the opposite. Harris readily admits the importance of analyzing verbal behavior, although doing so requires different methods from those used to analyze non-verbal behavior. In fact, the verbal descriptions of

natives are often useful sources of information about what to look for and to expect in observations of complex interactions. Harris' criticism then is not that such descriptions are unimportant, but that they should not be used as the primary evidence for actual behavior (Pelto & Pelto, 1978: 61).

The reason why the verbal descriptions of the members of a culture are problematic (indeed, inadequate) as evidence for their actual behavior, and thus a poor foundation upon which to base a description of their culture, has been pointed out by many anthropologists. Succintly put it is because the members of a culture are for the most part ignorant of the nature and workings of the cultural system in which they live, even unto the reasons for their own behavior. This ignorance is through no fault of their own, however; it is simply the result of the fact that much of culture is implicit, i.e., not formally or consciously articulated. Thus, implicit culture, the forms of which are "unconscious canons of choice," is comprised of "those cultural themes of which there is characteristically no sustained and systematic awareness on the part of most members of a group" (Kroeber & Kluckhohn, 1952: 170).

Even the forms of the explicit culture, according to Edward Sapir,

> are themselves patterned . . . 'into a complex configuration of evaluations,

> inclusive and exclusive implications, priorities, and potentialities of realization' which cannot be understood solely from the descriptions given by even the most articulate of culture carriers (Kroeber & Kluckhohn, 1952: 169).

Not only are native actors unaware of much of their culture; there are several reasons why an inside view may in fact be very misleading. For one thing, in addition to a very limited understanding of it, many individuals actually have a distorted view of how their cultural system works. Furthermore, a person's interpretation of his/her culture, and especially his/her own behavior, is often heavily loaded with rationalizations and justifications of things as they "ought to be" (Kaplan & Manners, 1972: 22). That is, the models of native actors differ from those of the anthropologist in that they are centered around their own place in society. They are, necessarily, models-for-action rather than models-for-comparison. They are grounded in the actors' knowledge of their culture, but they also represent their ideals and aspirations. Their models represent, therefore, not only the world as they know it, but also the world as they would like it to be (Pitt-Rivers, 1967: 31-32).

The lack of conscious awareness on the part of natives of many of the forms (explicit and implicit) of the culture in which they live, and the subsequent unreliability of their verbal descriptions, should not be considered as

a problem facing only the anthropologist studying less developed cultures. It is a fact of life about individuals in all cultures.

> In a highly self-conscious culture like the American which makes a business of studying itself, the proportion of the culture which is literally implicit in the sense of never having been overtly stated by any member of the society may be small. Yet only a trifling percentage of Americans could state even those implicit premises of our culture which have been abstracted out by social scientists. In the case of the less self-conscious societies the unconscious assumptions bulk large. They are what Whorf has called "background phenomena." What he says of language applies to many other aspects of culture: ". . . our psychic make-up is somehow adjusted to disregard whole realms of phenomena that are so all-pervasive as to seem irrelevant to our daily lives and needs . . . the phenomena of a language are to its own speakers largely . . . outside the critical consciousness and control of the speaker. . . . " This same point is often expressed by historians when they say: "The really important thing to know about a society is what it takes for granted." (Kroeber & Kluckhohn, 1952: 170).

By their very nature, then, verbal descriptions given by native actors to explain their own behavior and the culture in which they live can be problematic as an evidentiary foundation upon which to base an anthropological description of that culture. The limited and distorted understanding of a cultural system that such descriptions contain requires that the anthropologist be extremely careful and cautious

regarding the value she/he places on them in her/his own analysis. Certainly the anthropologist is not justified in assuming unquestioningly the accuracy and truth of the verbal descriptions of native informants, let alone that native actors are the ultimate judge of the accurateness or appropriateness of anthropological analyses. Yet, as we have seen, this is precisely the assumption that emic analyses require us to make. As a consequence of this assumption, then, we must question the ability of emic research strategies to formulate acceptable accounts of human socio-cultural phenomena.

Furthermore, if a knowledge of native categories is indispensable to successful emic explanations, and if the verbal accounts of native actors which are the primary source of information about these categories are unreliable, then emic strategies have set for themselves an essentially unobtainable goal. If the primary source of data cannot be trusted, i.e., if we cannot rely on the ability of natives to provide us with the categories and concepts they employ in ordering and describing their world, then how else are we to acquire knowledge of these categories and concepts? Without the verbal accounts of natives as an avenue to these categories any knowledge concerning their internal mental states is beyond the ken of even the most brilliant and indefatigable researcher.

The inadequacy of emic research strategies, however, is the consequence of more than just the questionable value they place on the verbal descriptions of native actors. In addition to this unjustified assumption, many emic theorists also assume an excessively idealistic theory of human behavior.

> They place strong emphasis on the power of ideas and language forms as causal factors in human affairs. This tendency is evident in the frequent statements by the emicists that equate understanding of native categories of thought with predictability of cultural behavior. (Pelto & Pelto, 1978: 59-60).*

The importance of idea systems is not at issue here. Clearly the importance of political ideologies, religious belief systems and philosophies cannot be denied. The point is that any adequate description of socio-cultural phenomena must involve a careful consideration and evaluation of non-ideational factors, such as material conditions, social structure and technological sophistication as part of the explanatory methodology (Pelto & Pelto, 1978: 60).

Furthermore, Pelto and Pelto argue, although emic research methods have some relevance to the problem of describing folk taxonomic systems, these methods have thus far

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*For a thorough critique of this claim see Harris' "Why a Perfect Knowledge of All the Rules One Must Know to Act Like a Native Cannot Lead to the Knowledge of How Natives Act." The Journal of Anthropological Research, 30 1974): 242-251.

failed to provide a general theoretical framework for the analysis of all human behavior (Pelto & Pelto, 1978: 58). Emic strategies have also failed to deal satisfactorily with a host of methodological issues, such as that of intracultural variations, which requires answers to questions of the representativeness of informants and the statistical examination of data (Pelto & Pelto, 1978: 59).

Finally, on a more substantive level Harris argues that the available logical and empirical evidence indicates that emic rules of behavior are a very poor guide to historical events and etic regularities in social, economic, and political subsystems. "If permitted to develop unchecked, the tendency to write ethnographies in accord with the emic rules of behavior will result in an unintentional parody of the human condition" (Harris, 1968: 590). In particular, the lack of attention paid to the distinction between emic and etic methods has been especially deleterious in the analysis of traditional economic systems where the descriptions of essential economic processes have been obscured and distorted through emic descriptions of actual behavior (Harris, 1968: 582).

If as students of culture our goal is to go beyond mere descriptions of what cultures are like from the native's point of view; if it is to be able to study cultures in a comparative context and to formulate theories about human socio-cultural phenomena that are scientifically credible,

independently testable, and that contribute to a body of theory that is concerned with the evolution of cultural systems, then it seems we must abandon emic research strategies. The epistemological and methodological limitations of such strategies render them inadequate to the task of making such a contribution and the ontological commitments they force upon the theorist/researcher are clearly unacceptable.

Etic research strategies, however, show every promise of allowing us to realize these goals. Unlike emic strategies, etic strategies deny outright the epistemological assumption that explanations of socio-cultural phenomena must be made in terms of native categories and concepts and that, consequently, native actors are the best judges of the adequacy of anthropological analyses. As we have seen native cognitive categories are designed to get native actors around in their cultural system. As such they are, more often than not, accepted and employed unreflectively. The categories that the anthropologist employs in analyzing culture, on the other hand, are designed for a different purpose,

> they are not intended to reproduce 'cultural reality' but to render it understandable in a comparative frame. Moreover, the categories used by the anthropologist are subject to constant revision and self critical appraisal in a way that is normally not true of the cognitive categories used in one's day-

> to-day activities (Kaplan and Manners, 1972: 186).

In denying the primacy of native categories in explaining socio-cultural phenomena etic research strategies are also denying the primacy of native verbal descriptions as a means of discovering these categories, and as evidence of actual behavior. As a consequence of this; etic strategies avoid the problems that arise from the inherent unreliability of the verbal accounts of native actors as primary evidence for their actual behavior. Such descriptions are valuable, but only as supplements to accounts derived from the actual observation of native behavior, accounts made, moreover, in terms of categories accepted by the community of scientific observers.

A cultural materialist view of culture.

For the cultural materialist the starting point of all socio-cultural analysis is the existence of an etic human population located in etic space and time. Given such a population, a society is defined as a maximal social group containing individuals of both sexes and all ages and exhibiting a wide range of interactive behavior. In contrast, culture

> refers to the learned repertory of thoughts and actions exhibited by the members of social groups--repertories transmissible independently of genetic heredity from one generation to the

> next. . . . The cultural repertories of particular societies contribute to the continuity of the population and its social life. Hence the need arises for speaking of sociocultural systems, denoting the conjunction of a population, a society, and a culture, and constituting a bounded arrangement of people, thoughts and activities (Harris, 1980: 47).

As a research strategy, then, cultural materialism is concerned with discovering and investigating the relationship that exists between the parts of socio-cultural systems and with the evolution, maintenance and change of such relationships, parts and systems (Harris, 1980: 47). As a realizable goal, however, this is possible only if all socio-cultural systems possess a comparable structure, i.e., only if their constituent parts and the relationships between these parts are similar; otherwise, as Kroeber and Kluckhohn point out, "a comparative science of culture would be ex hypothesi impossible" (Kroeber & Kluckhohn, 1952: 175-176).

Infrastructure, structure and superstructure. Cultural materialism does in fact posit a universal structure common to all socio-cultural systems. This universal structure is postulated, furthermore, on the basis of what cultural materialism takes to be the biological and psychological constants of human nature, and on the distinctions between thought and behavior and emics and etics (Harris, 1980: 51).

In terms of the distinctions between thought and behavior and emics and etics cultural materialism isolates four major universal components common to all socio-cultural systems: the etic infrastructure, the etic structure, the etic superstructure, and the emic superstructure (see Figure 5).

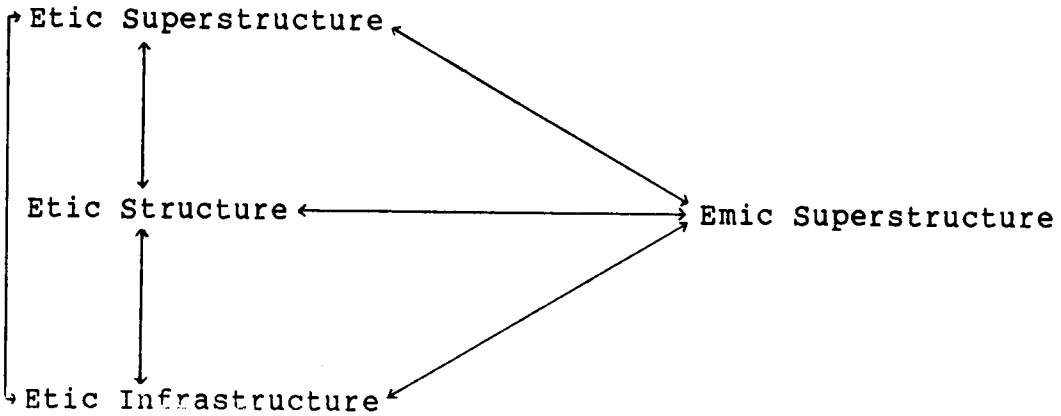


Figure 5. The universal structural features of socio-cultural systems. The double arrows indicate causal pathways, i.e., that each of these components can affect every other component directedly as well as indirectly through one another.

Among the bio-psychological constants of human nature that cultural materialism recognizes are the need to satisfy the minimum requirements for physical subsistence, the need to reproduce and the need to maintain secure and orderly behavioral relationships between groups of individuals, both on the domestic level and on the level of the society as a whole, as well as between societies themselves. In addition

to these needs there is also the recurrence of certain productive behavior patterns among individuals within the same culture that stands as a constant (Harris, 1980: 51-52).

In terms of these bio-psychological constants cultural materialism adds further detail to the quadrapartite structure presented in Figure 5 by analyzing the etic infrastructure and etic structure into their constituent etic behavioral categories. The result is six universal emic and etic categories.

The etic infrastructure is concerned with the two most fundamental constants of human socio-cultural existence--subsistence and reproduction. Subsistence is the concern of the mode of production of a cultural system. It involves the technology and practices that a cultural system employs for expanding or limiting basic subsistence production, "especially the production of food and other forms of energy, given the restrictions and opportunities provided by a specific technology interacting with a specific habitat" (Harris, 1980: 52). The mode of reproduction of a culture, on the other hand, concerns the technology and practices employed for decreasing, maintaining, and increasing population size (Harris, 1980: 52).

The etic structure of a socio-cultural system is the component concerned with maintaining orderly social relationships on all levels of the system. Thus, it consists of

the domestic economy which establishes the organization of basic production, reproduction, exchange and consumption within domestic settings such as the home, or camp, or apartment; and the political economy which establishes the organization of reproduction, production, exchange and consumption within and between bands, villages, states, countries and empires (Harris, 1980: 52-53).

In addition to these four etic categories there remain, as illustrated in Figure 5, the etic superstructure and the emic superstructure. In contrast to the etic infrastructure and structure the etic superstructure has no further subdivisions. It consists of recurrent patterns of behavior that lead to etic, recreational, sportive and aesthetic products and services (Harris, 1980: 53).

Like the etic superstructure the emic superstructure has no major subdivisions. As a universal structural component of socio-cultural systems the emic superstructure contains the mental parallels of each of the elements found in the etic components.* It consists of the explicit and

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*Although Harris acknowledges that there are mental and emic parallels to each of the elements within each of the three etic components he classifies the entire set of emic and mental elements as the emic superstructure. Harris does this because, although the parallels do exist, there are no one-to-one correspondences. Elements that belong to different etic structures may nevertheless have the same emic parallel. To avoid any possible confusion then anthropologists as a rule follow Harris in collapsing the emic infrastructure, structure and superstructure of a cultural system into just the emic superstructure.

mutually shared ideas that the members of a given socio-cultural system hold about the universe, society and themselves; ideas that are supported by implicit, often unconscious cognitive structures (Van Binsbergen, 1976: 107).

The total arrangement of these elements is the emic superstructure of a cultural system. This superstructure defines the central concerns of a society, as well as its major institutions and basic norms and values. The emic superstructure is also the central respository of meaning for the members of a culture. As such it provides them with an explanatory framework. On the level of action, however the superstructure does more than just satisfy the intellectual needs of members of a culture it also patterns behavior into recognizable, predictable and approved roles, roles which the members learn in the course of their socialization. Thus the emic superstructure provides the members of a culture with a sense of competence as well as meaningfulness in their dealings with each other, their society and with the world at large (Van Binsbergen, 1976: 107).

Universal cultural categories. A final level of detail can be added to the universal structure of socio-cultural systems that we have been characterizing by isolating the universal cultural categories that comprise the six emic and etic categories. Figure 6 illustrates these categories along with the broader categories they comprise.

ETIC INFRASTRUCTURE

- Mode of production
  - Technology of subsistence
  - Techno-environmental relationships
  - Ecosystems
  - Work patterns
- Mode of reproduction
  - Demography
  - Mating patterns
  - Fertility, natality, mortality
  - Nurturnace of infants
  - Medical control of demographic patterns
  - Contraception, abortion, infanticide

ETIC STRUCTURE

- Domestic Economy
  - Family structure
  - Domestic division of labor
  - Domestic socialization, enculturation, education
  - Age and sex roles
  - Domestic discipline, hierarchies, sanctions
- Political Economy
  - Political organization, factions, clubs, associations, corporations
  - Division of labor, taxation, tribute
  - Political socialization, enculturation, education
  - Class, caste, urban, rural hierarchies
  - Discipline, police/military control
  - War

ETIC SUPERSTRUCTURE

- Art, music, dance, literature, advertising
- Rituals
- Sports, games, hobbies
- Science

EMIC SUPERSTRUCTURE

- Symbols, myths
- Aesthetic standards and philosphies
- Epistemologies, ideologies
- Magic, religion, taboos
- Science

Figure 6. A schematic breakdown of the universal structure of socio-cultural systems according to cultural materialism.

As universal categories these categories represent the fundamental building blocks around and out of which all socio-cultural systems are organized, and in terms of which they can be described and analyzed. Although the details as to how particular cultures manifest these categories may differ, i.e., what may be considered an acceptable mating pattern or practice in one culture may be considered entirely inappropriate in another, the existence of the categories themselves is an established etic ethnographic fact. And it is precisely this fact that makes cross-cultural anthropology possible. These categories, moreover, are the product of the community of scientific observers, derived in accordance with the canons of scientific research.

As Kroeber and Kluckhohn write, there is a generalized framework that underlies the more striking and apparent differences between cultures.

> All cultures constitute so many somewhat distinct answers to essentially the same questions posed by human biology and by the generalities of the human situation. . . . Every society's patterns for living must provide approved and sanctioned ways for dealing with such universal circumstances as the existence of two sexes; the helplessness of infants; he need for satisfaction of the elementary biological requirements such as food, warmth, and sex; the presence of individuals of different ages and of differing physical and other capacities. The basic similarities in human biology the world over are vastly more massive

> than the variations. Equally, there are certain necessities in social life for this kind of animal regardless of where that life is carried on or in what culture. Cooperation to obtain subsistence and for other ends requires a certain minimun of reciprocal behavior, of a standard system of communication, and indeed of mutually accepted values. The facts of human biology and of human group living supply, therefore, certain invariant points of reference from which cross-cultural comparison can start without begging the questions that are themselves at issue. . . . (Kroeber & Kluckhohn, 1952: 176).

Therefore, since most of patterns of all cultural systems crystalize around the same concerns and problems, there are significant respects in which each culture is not a self-contained, isolated system, but rather related to and comparable with every other cultural system (Kroeber & Kluckhohn, 176).

Some theoretical principles of cultural materialism.

As a research strategy cultural materialism emphasizes the role that the material conditions of human existence play in the determination of socio-cultural phenomena. This emphasis derives ultimately, Harris acknowledges, from Marx's realization that "The mode of production in material life determines the general character of the social, political, and spiritual processes of life" (Marx, 1970: 21). Harris also acknowledges that this principle was a pivotal one in the subsequent development of the social and

behavioral sciences, comparable in fact to Wallace and Darwin's formulation of the principle of natural selection. As the central theoretical principle of cultural materialism, however, Harris argues that Marx's principle is inadequate and that it requires reformulation.

The inadequacy of Marx's principle results from his failure to recognize the determining force of odes of reproduction, as well as production, in the evolution of socio-cultural phenomena. As Harris remarks, "There is no more important aspect of production than reproduction--the production of human beings" (Harris, 1980: 70). Thus, as Har-ris formulates it, the central theoretical principle (TP1) of cultural materialism reads:

> (TP1) "The etic behavioral modes of production and reproduction probabilistically determine the etic behavioral domestic and political economy, which in turn probabilistically determine the behavioral the mental emic superstructures" (Harris, 1980: 55-56).

For the sake of brevity I will follow Harris in referring to this as the principle of infrastructural determinism.

The significance of the principle of infrastructural determinism lies not only in the fact that it states a conviction on the part of the cultural materialist as to the primary causal efficacy of the etic infrastructure in determing socio-cultural phenomena, but also in the fact that it establishes a set of priorites for the formulation and the subsequent testing of theories and hypotheses about the causes of socio-cultural phenomena (Harris, 1980: 56). As a

research strategy cultural materialism places the highest priority on the effort to formulate and test theories in which infrastructural variables are the primary causal factors. Failure to isolate the causal factors in the infrastructure requires that priority then be placed on the formulation and testing of theories in which structural variables are postulated as the primary causal factors. If the causes are not discovered in the etic structure priority is then given to efforts to locate the primary causal factors in the etic superstructure. Finally, cultural materialism places the lowest priority on theories that bestow causal primacy on factors located in the emic superstructure; such theories are to be formulated only as the last recourse.

In asserting the strategic priority of etic and behavioral conditions and processes over emic and mental conditions and processes, and of infrastructural over structural and superstructural conditons and processes, however, cultural materialism is not denying that emic, mental, structural and superstructural factors may achieve some degree of autonomy from the etic behavioral infrastructure. Rather, it merely postpones the formulation of theories in which causal efficacy is bestowed on non-infrastructural factors in order to guarantee the fullest possible investigation of the determining forces exerted by the etic infrastructure (Harris, 1980: 56). If this investigation

fails to yield proof that infrastructural variables are the causal agencies, then cultural materialism stipulates that they should be sought in the remaining structural components of a socio-cultural system--provided, of course, that this search is conducted along the programmatic lines established by the principle of infrastructural determinism.

The strategic priority given to the etic behavioral infrastructure in the search for the causes of socio-cultural phenomena also represents an attempt on the part of cultural materialism to formulate theories about culture that incorporate lawful regularities occuring in nature (Harris, 1980: 56). Like all biological organisms, human beings must expend energy to create energy (as well as other life-sustaining products). And like all biological organisms, human beings can produce children faster than they can obtain energy for them. The strategic priority of the infrastructure rests upon the fact that human beings can never change these laws. At best we can attempt to strike a balance between production and reproduction and the consumption of energy (Harris, 1980: 56).

But why is the etic infrastructure so important? What makes it the most likely locus of the variables responsible for socio-cultural change? In the Introduction I observed that the paramount importance of culture lies in the fact that it acts as an interface, a buffer between human beings

and the natural environments in which they live. Cultural materialism wants to be more precise than this. It is in fact the etic infrastructure that is the principal interface between human beings (and the rest of their cultural system) and the natural environment. It is the boundary across which "the ecological, chemical and physical restraints to which human action is subject interact with the principal sociocultural practices aimed at overcoming or modifying those restraints" (Harris, 1980: 57).

In emphasizing the causal efficacy of infrastructural variables over those of the remaining behavioral components and finally over those of the emic superstructure, then, the order of cultural materialism's research priorities explicitly reflects the increasing distance of these components from the culture/nature interface. Thus, since the infrastructure represents the sector under the greatest direct restraints from the natural environment, the general orientation of science and the logic of theory building necessitate that cultural materialism place strategic priority on the etic infrastructure (Harris, 1980: 57).

> Unlike thoughts, patterns of production and reproduction cannot be made to appear and disappear by a mere act of will. Since they are grounded in nature they can only be changed by altering the balance between culture and nature, and this can only be done by the expenditure of energy. Thought changes nothing outside of the head unless it is accompanied by the movements of the body or

> its parts. It seems reasonable, therefore, to search for the beginnings of the causal chains affecting sociocultural evolution in the complex of energy-expending body activities that affect the balance between the size of each human population, the amount of energy devoted to production, and the supply of life-sustaining resources (Harris, 1980: 58).

As the central theoretical principle of cultural materialism there are a number of corollary principles which can be derived from the principle of infrastructural determinism; principles which serve to further refine its intent as well as support it. Although Harris does not formulate these corollaries explicitly they are nonetheless obvious consequences of the principle of infrastructural determinism and it is possible to isolate several of them. Among them are the following principles:

> (COR1) Without the necessary infrastructural conditions human thought alone is inadequate to produce cultural change.
>
> (COR2) When the necessary infrastructural conditions exist, appropriate thoughts will occur.
>
> (COR3) The outcome of most innovations, whether originating in the infrastructure, structure, or superstructures, is system-maintaining negative feedback.
>
> (COR4) Changes in the infrastructure are likely to be amplified and propogated, resulting in changes in the structural and superstructural sectors.
>
> (COR5) There is no class of structural or superstructural components whose variation leads regularly to deviation amplification rather than negative feedback.

(COR6) Functionally related changes initiated in the infrastructure, structure and superstructures simultaneously will increase the probability of systemic change.

The first two of these corollary principles further illustrate the cultural materialist conviction that it is the material conditions of existence which exert the primary determining forces on socio-cultural evolution. As Marx put it "It is not the consciousness of men that determines their existence, but on the contrary, their social existence that determines their consciousness" (Marx, 1970: 21). More precisely, it is the conditions of human social existence that determine which ideas or thoughts are acted upon. That is, if ideas have any causal efficacy at all it is because they occasion certain behaviors or activities. Thought alone is impotent.

Corollary principles 3, 4, 5 and 6 further define the strategic research priority given to etic structures over emic ones, and the infrastructure over the structure and superstructure. The etic infrastructure is more causally efficacious because changes in the modes of production or reproduction are more likely to result in positive changes which are reflected throughout the soico-cultural system as a whole. Such changes are less likely to result from innovations within the other structural components. Innovations occurring within the etic infrastructure are more likely to result in system-wide changes, however, when they

are accompanied by simultaneous innovations in the etic structure and the etic and emic superstructures.

These six corollaries of the principle of infrastructural determinism by no means represent an exhaustive catalogue of the supplementary principles that Harris does or would want to derive from the principle of infrastructural determinism. There are undoubtedly many more such principles that might be formulated. It was my intention, however, to isolate only a few of the most important corollaries that Harris alludes to.

I have discussed the principle of infrastructural determinism at such length because it is the preeminent theoretical principle of cultural materialism. It is not, however, the only important principle that cultural materialism postulates. There is, in fact, another no less essential theoretical principle which also underlies cultural materialist theories, and that has no direct logical connection to the principle of infrastructural determinism. This theoretical principle (TP2), which I shall hereafter refer to as the principle of individual selection, is taken over from evolutionary biology.

> (TP2) The selection processes that are responsible for the divergent and convergent evolutionary paths of socio-cultural systems operates primarily on the individual level.

The underlying purpose of the principle of individual selection, according to Harris, is the essential task of

establishing a link between the behavioral choices of particular individuals and the aggregate responses of socio-cultural systems. This link is necessary if cultural materialism is to be able to demonstrate, in terms of concrete bio-psychological principles applicable to the behavior of the individuals participating within a socio-cultural system, why certain behavioral options are more likely than others (Harris, 1980: 60).

The concrete bio-psychological principles Harris is referring to are the same as those discussed in the section above. However, here Harris actually formulates what he considers to be four bio-psychological constants of human nature:

> 1. People need to eat and will generally opt for diets that offer more rather than fewer calories and proteins and other nutrients.
> 2. People cannot be totally inactive, but when confronted with a given task, they prefer to carry it out by expending less than more energy.
> 3. People are highly sexed and generally find reinforcing pleasure from sexual intercourse--more often from heterosexual intercourse.
> 4. People need love and affection in order to feel secure and happy, and other things being equal, they will act to increase the love and affection which others give them (Harris, 1980: 63).

These four bio-psychological constants, which are justified because similar bio-psychological dispositions are found among most members of the primate order (Harris, 1980: 63),

provide us with a picture of human nature that is for the most part consistent and predictable. As such they provide the basis of explanations as to why human beings will and do adopt certain behavioral options over others. This is exactly the link Harris sought.

According to the principle of individual selection then aggregate cultural patterns change as the result of the fact that individuals choose one course of action and not another. Thus cultural evolution, like biological evolution, takes place through opportunistic changes that increase benefits and lower costs to individuals (Harris, 1980: 60-61). A species does not "struggle to survive" as a collective, it survives or dies out as a consequence of the adaptive changes of individual organisms. Similarly, sociocultural systems survive or collapse as a consequence of the adapatively advantageous changes in thought and behavior of individuals who respond opportunistically to cost-benefit options (Harris, 1980: 61).

The principle of individual selection and the principle of infrastructural determinism (and its corollaries) form the theoretical backbone of the cultural materialist research programme and its theories. The principle of individual selection tells us that it is the choices made by the individual that are ultimately responsible for cultural changes, while the principle of infrastructural determinism establishes that it is innovations in the modes of

production or reproduction that are most likely to produce system-wide socio-cultural changes. As theoretical principles these principles represent not only intellectual convictions, however, they also establish certain research priorities for the cultural anthropologist. The question that remains then is whether or not, once we have put all the boards together, cultural materialism floats?

2. Analysis: Cultural Materialism and Science.

Cultural materialism and the nature of science.

In the course of his discussion of research strategies and the structure of science in Chapter One of Cultural Materialism (see Chapter III) Harris touches on a number of important issues in the philosophy of science. It is the desire to establish cultural materialism as a scientific research strategy and to generate genuinely scientific explanations of socio-cultural phenomena that leads to Harris's interest in these issues, and his interest in the philosophy of science in general--an interest that is not common to many cultural anthropologists. In this part of the analysis of cultural materialism's scientific credentials I want to examine Harris' treatment of certain of these issues directly. Discussion of the remaining issues will be left to the analyses of the aspects of the cultural materialist programme to which they are more directly connected.

The goal of science. No analysis of the scientific merits of any research programme or theory can proceed (or even be undertaken) without some conception of the nature and goals of science itself. Harris, as we have seen, adopts his characterization of science and its goals from the aim-oriented empiricism of the philosopher of science Nicolas Maxwell. Maxwell rejects standard empiricism and its thesis that the aim of science is to discover more and more about the phenomena under investigation as such. In the face of Hume's devastating critique, Maxwell argues, standard empiricism cannot be saved from the conclusion that it fails as an ideal of rationality and scientific propriety. It fails most importantly in this regard because, as it portrays the aim of science, there will always be the possibility of an infinite number of formulatable theories which are, from a rational standpoint, just as good as one another (Maxwell, 1974a: 140).

According to Maxwell's aim-oriented empiricism the fundamental goal of science

> is to discover more and more about an underlying simplicity, coherence, unity, harmony, order, beauty, or intelligibility which we conjecture to be inherent in the universe (or inherent in the phenomena we are invesitgating) (Maxwell, 1974a: 140-141).

Underlying this characterization of the basic aim of science is the metaphysical assumption that the world, or the domain of phenomena under investigation, is in fact intelligible.

> At the very least, there is the metaphysical conjecture that the phenomena are such that it is in principle possible to develop theories of increasing simplicity, unity, coherence or intelligibility which also meet with increasing empirical success. The fundamental aim of science is, in other words, to develop successive theories which progressively articulate and make precise more and more of a metaphysical conjecture M (which asserts, roughly, that the phenomena are intelligible) in such a way that these theories meet with more and more empirical success. To assert M (i.e. that the phenomena are intelligible) is just to assert that there is some theory T, compatible with M, which successfully predicts the phenomena of the domain under consideration (Maxwell, 1974a: 141).

Maxwell refers to the metaphysical conjecture M as the (metaphysical) blueprint of science.

As Harris interprets this characterization of the scientific enterprise the fundamental aim of science becomes the search to "discover the maximum amount of order inherent in the universe or in any field of inquiry," while the goal of particular scientific research strategies is to account "for observable entities and events and their relationships by means of powerful, interrelated parsimonious theories subject to correction and improvement through empirical testing" (Harris, 1980: 25, 26).

Although Maxwell takes pains to distinguish it from standard empiricism, as it is characterized aim-oriented empiricism is nevertheless a clear formulation of what has come to be known as an empiricist philosophy of science. Therefore, inasmuch as Harris adopts and endorses the aim-oriented empiricist formulation of the nature of science and its fundamental goal he is placing the epistemological foundations of cultural materialism incontrovertibly within the empiricist tradition.

As empiricist philosophies of science the views of science that Maxwell and Harris endorse are to be distinguished, most notably, from realist philosophies of science, such as those defended by Wilfrid Sellars, Hans Reichenbach, Wesley Salmon and others. The essential differences between these two approaches to the philosophy of science can be seen:

1. in their conceptions of the aims of science;

2. in their attitudes towards scientific theories;

3. in the ontological status they ascribe to the entities that scientific theories invoke in their explanations.

According to Bas van Fraassen a minimal formulation of scientific realism would be the claim that the aim of science is to provide us, in its theories, with a literally true account of what the world (or the phenomena under investigation) is like. Acceptance of these theories, moreover, involves the belief that they are true and that the

entities they invoke (such as atoms and molecules in chemistry, or quarks and leptons in physics) are real (Van Fraassen, 1980: 8).

Scientific empiricism, on the other hand, does not see science as committed to the search for a "literally true" account of what the world is like. Rather it sees the fundamental aim of science as an attempt to present us with theories that correctly and adequately describe the phenomena under investigation. Acceptance of these theories does not involve the admission or assumption of their truth, nor does it require the belief that the entities they invoke are real. Their acceptance requires only the belief that they correctly describe what is observable, that they, in van Fraassen words, "save the phenomena."

The philosophy of science that Maxwell and Harris defend is then a version of scientific empiricism. Instead of "correctly describing what is observable," they interpret the aim of science to be the search for the order, or coherence, or intelligibility that they assume the universe and all its constituent phenomena to possess. The words may be different, but the underlying concept is the same--the aim of science and scientific research strategies is to provide us with an "account of observable entities and events and their relationships . . . ." Science is not a search for truth, rather it is the search for order and intelligibility.

As with all theoretical orientations, aim-oriented empiricism is not entirely unproblematic. Indeed, it faces its own share of difficulties. I should like at this point to consider one of these difficulties, one that emerges from aim-oriented empiricism's presupposition that there is a "metaphysical blueprint" which underlies science and the scientific enterprise.

Maxwell himself anticipates this problem in "The Rationality of Science Part I: The Traditional Rationality Problem." The empirical heart of aim-oriented empiricism is the conviction that research strategies must provide us with testable theories about observable phenomena and their relationships. Given this, how can an aim-oriented empiricist (or an empiricist of any kind) consistently and in good conscience claim that the blueprint of science is the metaphysical conjecture M (i.e., that the universe is intelligible), when, as a metaphysical conjecture, this blueprint is patently beyond the scope of any empirical process to substantiate?

Maxwell offers two responses to this query, only one of which, however, is satisfying enough to be considered an adequate answer to the question. Initially Maxwell tells us that from an intellectual, practical and technological perspective,

> our need for there to be intelligibility inherent in the universe is so enormous,

> so utterly irreplaceble, that we have no alternative but to take for granted that intelligibility does exist even though we can have not the slightest reason for supposing this assumption to be true. To cast doubt on the existence of intelligibility is idle, not because we have such wholly convincing reasons for holding it to be true that intelligibility does exist (quite the contrary!), but rather because if intelligibility does not exist at all, then our case is hopeless, and both science and, ultimately, life become impossible (Maxwell, 1974: 142).

Less than a page later, however, Maxwell offers the following somewhat different justification for the metaphysical conjecture M that purportedly underlies science.

> We should see the whole raison d'etre of pure science to be the discovery of beauty or intelligibility in the universe. And indeed as pure scientists we should hold the discovery of beauty, harmony, simplicity, intelligibility inherent in the world to be of such supreme importance, to be a wonder, a joy, of such outstanding value, that quite rationally we are willing to undertake the "long and difficult labors" of scientific research merely on the off chance that what we hope to find really does exist (Maxwell, 1974: 143-144).

Furthermore, from the standpoint of this second response, empirically successful aberrant theories (i.e., theories that will not help realize the aim of science), even if

true, are to be dismissed because they can have no intellectual value (Maxwell, 1974: 144).*

The second of these responses I find to be wholly unsatisfactory as a justification for the metaphysical blueprint of science which aim-oriented empiricism postulates. It smacks too much of Pascal's infamous wager to be taken as a serious response to the above query. Pascal sought to prove that given the choice between believing in God and not believing in God it was more rational to do the former, since if God does indeed exist and we choose not to believe in him we stand to lose more than if believe in him and he turns out not to exist. In other words, the rational wager is to place your bet where you stand to gain the most and lose the least if, by chance, you should turn out to be right. In Pascal's case believing in God is the most rational choice because, even if there is only a slight chance that he exists, there is more at risk (our future, perhaps, eternal happiness) by not believing in his existence than by believing in it. In Maxwell's version of this argument, on the other hand, we are told that it is rational to believe that the universe is intelligible because there is more to

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*To be honest I am at a complete lost as to how a theory that gives us a true account of a given phenomenon could possibly be at odds with a theory that is the result of the search for the order or intelligibility inherent in that phenomena. What could capture the order or intelligibility of a particular phenomenon any better than a true account of it?.

gain (the wonder and joy that we feel about an ordered, intelligible and coherent universe) by believing it than by not believing it.

This argument is as unsatisfactory and uncompelling as a justification for believing in God as it is as a justification for the metaphysical conjecture aim-oriented empiricism postulates as the blueprint for science, especially when in the latter case it could possibly require us to dismiss true theories. If we are to take this argument seriously as a basis for choosing our beliefs, then our most rational choice (in the case of religion) would be to worship Quetzalcoatl or, perhaps, Descartes' evil demon, since they hold out the possibility of being even nastier to us should they turn out to exist, than does the Judeao-Christian God. He at least is forgiving and no longer requires human sacrifices. Similarly, in the case of knowledge, would not our most rational choice be to believe in and practice, say, magic or sorcery, since they are potentially the most effective and efficient means of gaining knowledge of and power over the physical (and spiritual) universe. If you do not like any of these choices, however, you are completely at liberty, in keeping with this argument, to imagine your own worse-case scenario and to believe accordingly.

Maxwell's first response to the query in question is more satisfying and to the point as a justification for accepting metaphysical conjecture M as the blueprint of

science, although it too could be more clearly and forcefully stated. This response I take to be a purely pragmatic one. The fact is that we can never be sure that M is true. But it is also true that, guided by this assumption, science works! It provides us with knowledge and technological power. It feeds, clothes, houses, guards, entertains and transports three billion human beings. To cast doubt on M then is in a sense idle and unproductive. For without M we face even more puzzling quandries--how to explain why science does in fact seem to work and, even worse, how any knowledge at all is possible. It is certainly philosophically legitimate to question unsubstantiated assumptions, but unless we are to become complete skeptics the process must stop somewhere. There is nothing irrational, I think, about not wanting to be reduced to such skepticism. It is appropriate, if not rational, therefore, to accept those conjectures (even if unsubstantiated) that hold the most promise for allowing us to realize our goals. It is the particular goal, then, which must determine which out of the possible metaphysical conjectures is the most rational.

Although it does not support M directly, there is another consideration, which Maxwell only touches on it passing, that supports in general the role of metaphysical blueprints in science. If anything should have been learned from the failure of logical positivism, it is that it is impossible to rid science completely of metaphysics. Despite

their best efforts and the work of brilliant thinkers the logical positivists could not effect this elimination--though at times they thought that they had.*

All science, indeed all human knowledge, is built on certain fundamental metaphysical distinctions, without which all knowledge, scientific or otherwise, would be impossible. The most fundamental of these distinctions is that between subject and predicate, substance and property--the driving force behind subject-predicate logic. No amount of empirical investigation will prove the existence of, say, blueness apart from blue objects, or of roundness apart from round objects, or of humanity apart from individual human beings.

I do not want to digress here into a lengthy discussion of the origins of these distinctions. Suffice it to say that regardless of their origins these distinctions are not the outcome of pure unaided empirical observation. Yet the distinction between objects and their properties is as much a fundamental assumption of science as it is of analytic philosophy. Thus, the need for metaphysical assumptions in science, while it does not justify belief in any particular

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*See, for example, Rudolf Carnap's "The Elimination of Metaphysics Through Logical Analysis of Language," and Moritz Schlick's "Positivism and Realism," in Logical Analysis, edited by A.J. Ayer; and Carnap's "The Methodological Character of Theoretical Concepts," in Minnesota Studies in the Philosophy of Science Vol. I, edited by H. Feigl and M. Scriven.

metaphysical blueprint for science, should at least eliminate the stigma often attached to sciences and scientists that seek to make their metaphysical commitments explicit.

Harris, himself, is to be criticised at this point not because he endorses Maxwell's responses to the question of metaphysical blueprint M's justifiability, or any other response for that matter, but because he does not address the question explicitly at all. For all his profession of concern with the structure and logic of science Harris, here as elsewhere, appears entirely insensitive to some rather important issues and questions. The fault here, as elsewhere, however, is more the result of a sin of omission rather than one of commission, i.e., Harris is to be faulted because he fails to consider the issue and not because of any existing or suspected flaw in his basic programme. This is especially true since I have indicated the direction that Harris might take in justifying the conjecture that the world is intelligible.

The evaluation of metaphysical blueprints. Since I have argued for the necessity of metaphysical blueprints in science the problem that now emerges is how to choose between rival blueprints, i.e., between blueprints that make different metaphysical assumptions about the nature of the order or intelligibility that underlies the phenomena under investigation. According to Harris there does in fact

exist as part of the conceptual armamentarium of aim-oriented empiricism a rational, a priori method of appraising different blueprints that can be employed in addition to any empirical considerations. Unfortunately, Harris does not discuss this method of appraising metaphysical blueprints in any depth. Because of its potential importance, however, it is essential that we understand this process more fully.

The assumption underlying this evaluative mechanism is that, while the fundamental aim of all science may be the discovery of the intelligibility presupposed to be inherent in the universe, specific formulations of this aim in the form of blueprints may differ. As examples of different metaphysical blueprints for science, all of which take the overall goal of science to be the discovery of intelligibility, Maxwell lists the Einsteinian view that the universe is made up of a single unified field, Boscovich's point-atomistic view of the universe, Aristotle's teleological metaphysical system, the corpuscular view proposed by seventeenth century natural philosophers, and so on. In light of the fact, then, that the fundamental aim of science is to discover the intelligibility inherent in the universe, and "since our science places an intrinsic premium on intelligibility, we will always be rationally entitled, other things being equal, to choose the most intelligible blueprint" (Maxwell, 1974: 147). Indeed, not only are we entitled to

make such choices, everything depends on making the right choice of metaphysical blueprint. For if we choose correctly, then there is every possibility that our science, since it is based on a blueprint that corresponds, at least roughly, to the way things really are, will achieve great empirical success (Maxwell, 1974b: 249).

The importance of the metaphysical blueprint, then, renders it essential that we make the process of choosing a blueprint as explicit, as open and as objective as is possible, because it is only if our choice of blueprint is a rational choice that our science stands even the faintest chance of succeeding (Maxwell, 1974b: 251). It is also important in making a rational choice of metaphysical blueprint that we consider alternative possible aims; i.e., it is essential that we be constantly prepared to modify, improve and even alter drastically our chosen blueprint. To achieve this end Maxwell formulates the following rules of choice.

Rule 1. Other things being equal, we should choose that metaphysical blueprint which is the most intelligible, simple, coherent, harmonious, explanatory, beautiful and unified (Maxwell, 1974b: 257).

This rule is further amplified and explained by the following five sub-rules. These sub-rules are concerned with the adequacy, the objectivity, the nonarbitrariness,

the generalizability and the coherence of metaphysical blueprints, respectively.

> 1A. An acceptable blueprint must be such that it is at least conceivable that all relevant phenomena can be explained and understood in terms of the blueprint.
>
> . . . . . .
>
> 1B. Given two blueprints B1 and B2, if B1 is intelligible in a more objective fashion than B2, then, other things being equal, B1 is to be judged more intelligible than B2.
>
> . . . . . .
>
> 1C. A blueprint which can only be made precise (to form a testable physical theory) in an arbitrary fashion, is to be judged to have an intelligibility flaw on that account.
>
> . . . . . .
>
> 1D. If B1 is a generalization of B2, so that additional specific assumptions need to be added to B1, then, other things being equal, B1 is a more intelligible blueprint than B2.
>
> . . . . . .
>
> 1E. Given two blueprints A+B1 and A* (where A can be combined with B1. . . Bn which differ radically, and A* is a generalization from A where B1 can be dispensed with without loss of adequacy), then A* is to be judged a more intelligible blueprint than A+B1 in that it is a more coherent or unified blueprint (Maxwell, 1974b: 286-287).

Rule 2. If the theories of a blueprint B are meeting with great empirical success, then, other things being

equal, it is rational to narrow blueprint B, if it can be done in an nonarbitrary way (Maxwell, 1974b: 258).

Rule 3. If the theories of a blueprint B are not meeting with empirical success, then, other things being equal, it is rational to broaden blueprint B (Maxwell, 1974b: 258).

Rule 4. Other things being equal, choose that metaphysical blueprint which holds the best a priori promise of leading to an empirically successful research strategy (Maxwell, 1974b: 258).

The metaphysical foundations of cultural materialism. Keeping in mind these rules for blueprint choice and the necessity of metaphysical blueprints in science we are now in a position to articulate and appraise the metaphysical blueprint of cultural materialism. Although Harris does not formulate them specifically we can nonetheless isolate three metaphysical assumptions to which cultural materialism, as a scientific research strategy concerned with the evolution of socio-cultural systems and behavior, is committed.

1. The principle of sufficient reason.
2. The principle of the uniformity of nature.
3. The principle of the uniformity of human nature.

These principles are by no means unique to cultural materialism. The first and second principles are in fact part of the metaphysical underpinnings of all science, indeed, all knowledge, while all three principles together form the

common metaphysical blueprint of all cross-cultural anthropological and sociological research strategies.

The principle of sufficient reason, first formulated by G.W. Leibniz, can be seen a refinement of the metaphysical conjecture that the world is intelligible. It stipulates that the intelligibility of the world is such that there is a sufficient reason for everything that happens, i.e., that every phenomenon which occurs has a cause. In other words, nothing happens gratuitously.

The principle of the uniformity of nature further refines the kind of intelligibility we presuppose the universe to have by asserting that, not only is there a cause for everything that happens, but that there is a uniformity among these causes, and among their effects. Thus, if gravity causes objects to fall towards the ground in the United States, then it is reasonable to assume that it is also gravity that causes objects to fall towards the ground in Mozambique, and on the Mars, and on any other planetary body we might care to name. According to this principle, then, there exist what have come to be known as laws of nature, laws that govern the creation, interaction and destruction of natural phenomena.

Finally, the principle of the uniformity of human nature conjectures that, as with nature as a whole, there is a uniformity of human nature. That is, that all human beings possess a common biological and psychological nature.

Equipped with this common nature they then face similar environmental, climatological, social, cultural and individual problems. The claim here is not that there are not important and discernible differences between human beings; clearly there are. There are important and discernible differences between other natural phenomena as well. Rather, the principle of the uniformity of human nature simply states that human beings are everywhere much the same.

These three principles are not meant to be an exhaustive listing of the metaphysical commitments of cultural materialism. Undoubtably there are others. Given Harris' other theoretical and methodological commitments, however, the principles of sufficient reason, the uniformity of nature and the uniformity of human nature are the most obvious and important of the metaphysical conjectures that underlie cultural materialism, and which serve to individuate it, as well as any other research strategies that presuppose these principles, from other kinds of anthropological research strategies.

The advantages of the cultural materialist blueprint. If we grant that the fundamental aim of science is to discover the intelligibility or order inherent in the universe, then in light of Maxwell's rules for blueprint choice the metaphysical blueprint just outlined can be seen to confer a

number of distinct advantages on cultural materialism as an anthropological research strategy.

First and foremost it is the conjunction of the three principles which together comprise the blueprint of cultural materialism that makes possible a science of cross-cultural anthropology. In particular it is the principle of the uniformity of human nature that makes the cross-cultural study of human cultures and behavior a viable undertaking. For without the conjecture that human beings possess a common biological and psychological nature it would be impossible to generalize across cultural boundaries. In this event it could at best assumed that human beings within the same culture possessed a similar nature. With the assumption of a common human nature, however, we create the possibility of pan-cultural generalizations.

This becomes more apparent if we consider the assumption of a common human nature in conjunction with the assumption of the uniformity of nature. If nature operates according to the same laws, processes and mechanisms everywhere, and if all human beings share the same biological and psychological constitution, then it is reasonable to assume that when confronted with similar natural (i.e., to say environmental and climatological) situations human beings will react in similar manners. At the very least the research strategy that presupposes the principles of the uniformity of nature and human nature is in a position to generate

hypotheses designed to test this further assumption, an alternative not open if the uniformity of human nature is not conjectured.

Thus, the metaphysical blueprint that underlies cultural materialism serves to distinguish it from anthropological research strategies committed to the doctrine of cultural relativism. Underlying this doctrine, since it insists that each socio-cultural system is the unique product of its human members, is the explicit denial of the validity of cross-cultural generalizations. Consequently, research strategies which presuppose the doctrine of cultural relativism are incapable, by their very nature, of producing a genuine science of culture. At best they can produce scientific accounts of particular socio-cultural systems.

Thus, since the blueprint which underlies cultural materialism allows for the formulation, at least in principle, of a cross-culturally valid scientific account of the evolution of socio-cultural systems, it is capable of rendering the world of socio-cultural phenomena more intelligible, ordered and coherent. As a blueprint for anthropological research strategies, therefore, it is to be preferred to rival blueprints which presuppose the phenomena under investigation to be less intelligible. Furthermore, since it conjectures a more intelligible world this blueprint also holds out the best promise of leading to (more) empirically successful research strategies.

The only caveat that must be made with respect to the metaphysical blueprint which cultural materialism presupposes, is that while it does serve to distinguish cultural materialism from strategies which presuppose rival and less adequate blueprints (such as historical particularism), it does not distinguish cultural materialism from rival strategies which presuppose the same metaphysical blueprint (such as functionalism, or structuralism). That is to say, research strategies which share the same metaphysical blueprint cannot be judged more adequate or effective than one another on the basis of that blueprint. For such comparisons another set of evaluative criteria must be employed--the criteria of empirical successfulness which we will discuss momentarily.

The cultural materialist research programme.

Paradigms revisited. One of the most difficult and important of the philosophical and scientific problems that Harris wrestles with concerns the nature of paradigms (or research strategies). To be more precise, it concerns the supposed incommensurability of paradigms as argued for by Kuhn and Feyerabend. Harris does not accept this incommensurability. To do so would be tantamount to admitting that the non- and anti-scientific research strategies that pervade contemporary cultural anthropology are just as valid as the scientific research strategy he wants to formulate.

Furthermore, in light of Kuhn's three stage characterization of scientific development, the existence of numerous competing paradigms would mean that anthropology, since it has no dominant paradigm, is at a preparadigmatic stage of development and, hence, is not a true science. Moreover, it will remain at this stage until a dominant paradigm finally does emerge, a situation that is unlikely to occur as long as there is no consensus among anthropologists as to the value of one kind of explanation over all others.

The second of these conclusions, in and of itself, is not very damnning (especially since the scientific status of anthropology is a question still much debated). In response, however, it should be noted that Kuhn's three stage schema is by no means an established or accepted fact. Indeed, the historical evidence actually suggests that "Virtually every major period in the history of science is characterized by the co-existence of numerous competing paradigms, with none exerting hegemony over the field . . ." (Laudan, 1979: 74). This view is echoed by Imre Lakatos who, Laudan writes, allows for, and even stresses the historical importance of the existence of several rival research strategies within the same field of investigation, at the same time (Laudan, 1979. 74).

That research strategies are incommensurable, on the other hand, is a conclusion that Harris obviously wants to avoid, cutting as it does against the grain of his

empiricist commitments. To avoid it, however, requires the existence of criteria in terms of which research strategies can in fact be evaluated and compared. It is one of the hallmarks of aim-oriented empiricism that it provides such criteria.

Aim-oriented empiricism provides in fact not one, but two evaluative and comparative mechanisms in terms of which rival research strategies can be appraised. The first mechanism we have already examined in some detail; it involves the evaluation of research strategies in terms of the metaphysical blueprints to which they are committed. That is, in judging metaphysical blueprint X to be more intelligible than metaphysical blueprint Y we are de facto asserting the research programmes to which X gives rise to be better than the programmes to which Y gives rise. Since this method of appraising research strategies is concerned only with the metaphysical commitments of the strategies the resulting evaluations can be made, as Harris and Maxwell point out, in the absence of and prior to any empirical considerations whatsoever.

According to the second evaluative mechanism aim-oriented empiricism employs, research strategies can be evaluated and compared substantively in terms of their relative productivity and empirical success.

> In other words, we can assess the relative empirical success of the rival

> research programs to which the blueprints give rise, in the kind of way described by Lakatos. Some blueprints . . . can be construed as having led to enormous, ostensible empirical success, recognized by all, whereas other blueprints have at best only led to some empirical success acknowledged only by adherents of the blueprint in question (Maxwell, 1974: 146).

In evaluating research strategies in terms of their empirical success what we are focusing on are their relative puzzle or problem solving effectiveness, their ability to generate comprehensive, testable theories which, in keeping with the aim of science, render the phenomena under investigation intelligible. The choice of one research strategy over its rivals, then, represents a rational choice precisely to the extent that the chosen strategy is a better puzzle solver than its competitors (Laudan, 1979: 109). In support of this type of evaluative mechanism Laudan adds that it has three distinct advantages over previous methods of evaluation and comparison,

> (1) it is workable: unlike both inductivist and falsificationist models, the basic evaluation measures seem (at least in principle) to pose fewer difficulties; (2) it simultaneously offers an account of rational acceptance and of scientific progress which shows the two to be linked together in ways not explained by previous models; and (3) it comes closer to being widely applicable to the actual history of science than alternative models have been (Laudan, 1979: 109).

Harris, however, wants to push the evaluation of rival research strategies a step further than the kinds of appraisals that are possible solely in terms of the two evaluative mechanisms employed by aim-oriented empiricism. In his criticisms of Paul Feyerabend's epistemological anarchism Harris invites Feyerabend to stand before the ditch at Mylai or the ovens at Dachau if he seriously wants to claim that the scientific study of socio-cultural systems is nothing more than an "aesthetic judgment." For Harris it is imperative that we not only be able to compare and evaluate paradigms in terms of (1) the intelligibility of the blueprints they presuppose, and (2) their problem solving effectiveness and ability to generate testable theories, but also be able to compare and evaluate them on the basis of their possible moral and ethical repercussions.

That is, we might want to dismiss witchcraft as a medical research strategy not only because its tenets are untestable but also because its methods of cure are unsafe and unpredictable. Similarly, we might want to dismiss functionalism as an anthropological research strategy not only because it fails to generate testable theories about socio-cultural phenomena, but also because of the extreme cultural relativism to which it is committed, a doctrine which can be, and has been, invoked to justify the most heinous cultural practices and socio-political policies, from slavery to ritual maiming and scarification to genocide.

Aim-oriented empiricism, however, provides only the two kinds of evaluative and comparative mechanisms discussed. The one mechanism allows for the a priori evaluation of research strategies only in terms of the blueprints or aims they presuppose for science. The other mechanism, in contrast, allows for the evaluation of rival research strategies solely in terms of the empirical success of the theories to which they give rise. The question is: Under which of these mechanisms, a priori or empirical, can we subsume the evaluation and comparison of rival strategies in terms of their possible ethical and moral repercussions?

The answer is not altogether obvious. The kinds of judgments involved in evaluating research strategies according to their moral and ethical repercussions would seem to require information that is not available to either of the evaluative mechanisms aim-oriented empiricism employs. For one thing, moral and ethical judgments presuppose the existence of a right and a wrong way of doing things. In addition, such judgments would also seem to presuppose the existence of a way of discovering which ways of doing things are right and which are wrong. Therefore, in order for research strategies to be evaluated according their moral and ethical repercussions there must ostensibly exist both a standard of right and wrong and a means of acquiring knowledge about that standard, otherwise such evaluations will

be invalid and, hence, completely meaningless as comparative criteria.

Concerned as it is with the comparison of rival blueprints or aims that are postulated for science, the a priori evaluative mechanism has, at best, access to only half of the information needed to make the kinds of evaluations Harris envisions. In keeping with the presupposition that it is rational--for intellectual, practical and technological reasons--to believe that the world is intelligible it might further be argued that, as part of this intelligibility, it is also rational to believe that there exists a moral standard in terms of which actions or policies might be evaluated and compared. In effect, then, we are making the belief that a moral standard exists, like the belief that the world is intelligible, a metaphysical conjecture. But, in doing so we are also making it a metaphysical commitment of our research strategy, and of the scientific enterprise as a whole.

Even if we overlook the fact that there are many scientists who would find this kind of metaphysical commitment completely unacceptable and grant that as a part of the belief that the world is intelligible there is also the belief that there exists a moral standard, we still face a formidable problem: How is it that we acquire knowledge of this standard? The knowledge obviously cannot be acquired "metaphysically," for the line of argument so far has been that

there is no straightforward metaphysical knowledge, only metaphysical conjectures.

In order for the knowledge of a metaphysically conjectured entity to be acquired in a non-empirical manner it would require the existence of some other faculty than the senses, some rational faculty such as those described by Descartes or Kant. It is one thing, however, for an empiricist to admit that the cornerstone of science is an metaphysical conjecture, it is quite another to presuppose the existence of some non-empirical faculty that presents us with confirmation of these conjectures. This is not a theoretical stance, I think, that even the most liberal of empiricists would want to commit themselves to.

If there is to be any knowledge of the conjectured moral standard at all it seems as though it must be acquired empirically. But how is this possible? If the existence of a moral standard is considered to be a metaphysical conjecture, then it has been effectively removed from the scope of any and all empirical investigative techniques to confirm or refute it. The problem here is similar to that of the metaphysical conjecture that the world is intelligible. So, I suggest, is the solution.

It is obvious that we can never have empirical confirmation of either the conjecture that the world is intelligible or that there is a moral standard. The former conjecture, however, is necessary in order for science to be

possible. So we accept it, despite its unconfirmability, for pragmatic reasons and science proceeds to discover this intelligibility. The conjecture that there exists a moral standard must be treated in the same manner. True, there is no proof that such a standard exists, i.e., that there is any right and wrong, nevertheless, for pragmatic reasons we may continue to accept it. The problem here stems from the fact that we presupposed, if the evaluation of research strategies in terms of their ethical repercussions was to be justified, that there must exist not only a moral standard in terms of which such evaluations might be made, but there also must exist some way of acquiring knowledge of this standard. No such conditions were placed on the conjecture that the world is intelligible, however. The conjecture was made, its ultimate unprovability was noted and accepted, and science carried on. Why, then, should these conditions be placed on the conjecture that there exists a moral standard? As long as we are willing to accept the consequences of the fact that we will never know if such a standard exists, there is no reason why we cannot assume its existence for the same intellectual and practical reasons that we assume metaphysical conjecture M.

It is absolutely necessary, however, that the basis or criteria upon which evaluations of right and wrong are formulated be made explicit. Such evaluations might be

based on a concept of essential human rights*, or the sanctity of life, etc. Kroeber and Kluckhohn suggest, for instance, that moral evaluations can be made on the basis of empirical cross-cultural evidence as to the universalities in human needs, potentialities and fulfillments (Kroeber & Kluckhohn, 1952: 178).

Harris, unfortunately, does not spell out in any explicit form the criteria upon which the evaluation of research strategies in terms of the moral and ethical repercussions are to be based. That he wants to make such evaluations, however, is certainly clear. It is quite probable that the criteria he has in mind are similar to those suggested by Kroeber and Kluckhohn. But without an explicit acknowledgment of this, it would be putting words in Harris' mouth to argue that these are in fact the criteria he has in mind. Again Harris is to be criticized not for the inadequacy of the position he expounds, but for failing to consider the issue at all. If as philosophers of science Harris wants us to take his explication of cultural materialism as a scientific research strategy seriously there are certain important issues that must be addressed and questions that must be answered.

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*Such a concept might easily be developed, for instance, from the concept of domains formulated by Carolyn M. Schafer and Marilyn Frye in their paper "Rape and Respect," in Women and Values, Readings in Recent Feminist Philosophy, edited by Marilyn Pearsall.

If the argument I have been outlining is valid, then, as students and scientists concerned with the scientific study of socio-cultural systems we now have at our disposal three distinct evaluative mechanisms that can be brought to bear upon the numerous research strategies that comprise contemporary anthropology. We can evaluate rival research strategies initially in terms of the metaphysical blueprints to which they are committed. If this method fails to determine which is the superior strategy we can then compare research strategies in terms of their relative problem solving effectiveness and their ability to generate empirically testable theories. Finally, we can evaluate research strategies on the basis of the moral and ethical repercussions of the metaphysical, epistemological, theoretical and methodological doctrines to which they are committed. We have already seen how cultural materialism compares to other types of research strategies in terms of the metaphysical blueprint to which it is committed. How it compares in terms of its empirical success and its ethical repercussions will be the focus of the remainder of this section and the next.

Before continuing, however, it should be noted that the choice of the method employed in evaluating rival research strategies is not always an either/or proposition. There are cases in which it will be necessary to employ all three mechanisms in conjunction in order to determine which of the

rival paradigms being compared is the superior research strategy.

The theoretical principles of cultural materialism. Just as important as the criteria for evaluating competing research strategies are the theoretical principles of cultural materialism. The strategic importance of these principles lies in the fact that they establish for the cultural materialist a set of research priorities, i.e., a set of guidelines that determine the priorities to be given to, or weight to be placed on, particular sources of causal factors in the search for explanations of socio-cultural phenomena.

According to Harris, there are two fundamental theoretical principles of cultural materialism: the principle of etic infrastructural determinism and the princple of individual selection. For the cultural materialist, then, the question of research priority translates into precedence being given to etic infrastructural factors in the search for the causes of socio-cultural phenomena. Following infrastructural factors, in their order of importance as causal factors, are etic structural factors, etic superstructural factors and, finally, emic superstructural factors. These at least are the research priorities established by the principle of infrastructural determinism.

The principle of individual selection establishes a different, but parallel, set of priorities. By asserting that socio-cultural changes begin with the individual this principle gives priority to explanations that take into account first the changes wrought on individuals, and then explains the changes in groups, then societies, then cultures in terms of these. To put it another way, selection operates first on individuals, then groups, then societies, then cultures. As a rather uncomplicated and trivial example consider fashion. A change in fashion usually begins with a few individuals, fashion designers, and from there it spreads to a few small enclaves, the elite and wealthy circles in which designers live and work. As the new fashion look filters down into the world of large scale commercial garment production it is taken up by larger and larger groups, then if really successful the entire society, and ultimately the culture as a whole. For the anthropologist, then, the principle of individual selection specifies that the causes of particular socio-cultural phenomena be sought first in the changes wrought in the lives of individuals.

Together the principles of infrastructural determinism and individual selections establish an explicit and detailed set of research priorities to guide the investigations of the cultural materialist. This research programme is given further substance, and power, by the commitment to and reliance upon etic behavioral accounts as opposed to emic mental

accounts that underlies these theoretical principles. That is, cultural materialism gives strategic priority not only to infrastructural factors and factors effecting changes on the individual level, it also seeks explanations in terms of these factors on the basis of etic behavioral accounts of what is actually happening. The emic mental accounts of the members of the culture being studied are also used, but only in conjunction with etic accounts and never as primary evidence.

The fundamental units of investigation. Throughout the exegesis of the cultural materialist research strategy in this chapter and periodically in the analysis of it in the present section there has been much talk of "accounts" and "explanations" of socio-cultural phenomena. The time has come now to ask a very important question: What are accounts or explanations of socio-cultural phenomena accounts or explanations of? To be more precise: What are the fundamental units of investigation out of which cultural materialism constructs its accounts of socio-cultural phenomena?

The most obvious answer is that accounts of socio-cultural phenomena are accounts of socio-cultural systems and that these are the units of investigation. This answer while true is, however, almost as vague and uninformative as the phrase "socio-cultural phenomena." Indeed, the very existence of the word "system" implies that there are more

specific answers, more fundamental units. What then are accounts of socio-cultural systems accounts of? The next most obvious answer would suggest that they are accounts of societies, institutions, behavior patterns, etc., and that these are the units of investigation. Again, while true this answer is also problematic, especially in light of cultural materialism's scientific aspirations.

One of the principal reasons for functionalism's failure to develop into a viable science of culture is that the category of entities--institutions--which it determined to be the most fundamental units of investigation are in fact too diffuse, and the entities themselves too complex. As Fried and Molnar argued such conceptual categories as "institution," "society," and "patterns of culture," are really classificatory in nature and as such are too substantive, complex and qualitative. They are, consequently, inadequate as the fundamental units of scientific analysis and theoretization. Indeed,

> [t]raits of any sort growing out a descriptive approach to data cannot perform the function of true abstract, relational variables, which alone are appropriate to the analysis of process . . . . Such descriptive or concrete traits have no bearing on the principles underlying the organization of observed behavior and their manipulation cannot help formulate theories with abstract, organizational properties (Fried & Molnar, 1978: 6).

The research difficulties surrounding "institutions," "societies" and similar descriptive entities as the fundamental units of investigation, then, are not that they are unimportant, clearly cultural materialism, as well as other anthropological research strategies, wants to talk about Azande society or the institution of marriage among the Maori. The problem is that no anthropologist, no matter how well trained and perceptive, ever observes Azande society, or the institution of marriage of the Maori, or the subsistence pattern of the Cherokee, or the government of the United States. All that is observed by the anthropologist engaged in fieldwork are individual, concurrent or successive behavioral episodes involving one or more human beings, a spatial location, a temporal duration, and certain physical props. That is, all that can be observed is an instance of Azande society, say a meeting of witches. Similarly we can never observe the institution of marriage of the Maori, the subsistence pattern of the Cherokee, or the government of the United States, but only particular marriage ceremonies, individuals hunters and farmers, or specific governmental functions or activities, respectively. It is for this reason that such broad, substantive categories as "institution" are inadequate as the fundamental units of analysis of the cultural anthropologist.

Although interested in and aware of the importance of these broader, more substantive categories, cultural

materialism also recognizes the observational pitfalls they represent as units of investigation. The solution to this problem, according to the cultural materialist research strategy, is to operationalize these concepts.

> A strong dose of operationalism is desperately needed to unburden the social and behavioral sciences of their overload of ill-defined concepts, such as status, role, superordination and subordination, group, institution, class, caste, tribe, state, religion, community, aggression, exploitation, economy, kinship, family, society, social, culture, cultural, and many others that are part of every social scientist's basic working vocabulary. The continuing failure to agree on the meaning of these concepts is a reflection of their unoperational status and constitutes a great barrier to the development of scientific theories of social and cultural life (Harris, 1980: 15).

To operationalize fundamentally unobservable concepts like "institution" and "state" is to interpret or define them in terms of more basic entities that are observable. This is precisely the task that Harris set for himself in The Nature of Cultural Things. In this work Harris, through detailed analysis, isolates the most fundamental units in terms of which the unoperationalized concepts listed above can be defined and the anthropological analysis of sociocultural systems must be conducted. Harris cautions us, however, that what he has isolated here are not the most

fundamental natural units, but rather the most fundamental scientifically useful units (Harris, 1964: 31).

The most fundamental scientifically useful entity which Harris isolates is the actone. An actone consists of a bit of body motion (including verbal communication) and an environmental effect produced by by that motion. There are two provisos to this definition:

1. neither the body motion nor the environmental effect can be so small as to fall below an observer's naked perceptual thresholds;

2. all observers must agree that a particular actone has occurred when and only when it has occurred (Harris, 1964: 36).

While the smallest scientifically isolatable unit, the actone is not, however, the unit that is the primary concern of the anthropologist. One should not presume, Harris writes, that it is the anthropologist's task to record every actone in every observational interval, or that it is the primary intent of ethnography to provide a complete and comprehensive account of all the actones of the human behavior stream. Such descriptive thoroughness, besides placing an almost impossible burden on the anthropologist, contains little in the way of scientific merit (Harris, 1964: 45).

What is important to the anthropologist are supra-actonic regularities, that is, recurrent chains of actones. At the level with which the anthropologist is primarily

concerned these recurrent chains resolve into behavioral episodes. In addition to its constituent actones a behavioral episode also consists of an actor (or actors), a place, a time and sometimes a physical object (or objects) (Harris, 1964: 53).

It is impossible at this point to examine in any detail the process whereby Harris constructs episodes from actones, and higher level units from episodes; for this I shall refer the reader to The Nature of Cultural Things. For our purposes it is important only to recognize that Harris has provided cultural materialism a detailed and sophisticated method of operationalizing unobservable entities in terms of observable ones, a way of contructing progressively more and more general and abstract entities out of more concrete units.

The research advantages of cultural materialism. Although the success and importance of a research strategy is primarily a function of its ability to formulate empirically adequate and testable theories, we are in a position at this point to make a preliminary evaluation of cultural materialism in terms of the three characteristics of its research programme we have been discussing: the criteria of paradigm choice it employs, the theoretical principles it postulates and the fundamental units of investigation it isolates. These characteristics, while not directly concerned with the

adequacy and testability of cultural materialist theories, are nevertheless essential aspects of the research programme and bestow upon cultural materialism certain research advantages.

The three-fold set of criteria for the evaluation and comparison of rival research strategies stands cultural materialism in good stead for several reasons. To begin with the rules for blueprint choice allow, before any considerations of empirical substance, the evaluation of rival research strategies in terms of the intelligibility and adequacy of their metaphysical commitments. The existence of this evaluative criteria is unique for the explicit recognition of the role of metaphysics in science that it represents. Historically scientists and philosophers of science have eschewed this role, or denied it altogether. The connection between science and metaphysics exists nonetheless and the acknowledgement of this and the attempt to formulate a set of criteria that allow us to appraise the metaphysics of scientific research strategies represents a distinct improvement over previous attempts to avoid or deny this issue.

The criterion of empirical success, while perhaps the least radical of the three mechanisms cultural materialism employs to evaluate rival research strategies, is no less important. Implicit in this criterion is the denial of the Kuhnian belief that research strategies are incommensurable.

Research strategies are intellectual tools formulated in order to help human beings understand and describe the world in which they live. As such they can be evaluated according to the adequacy of the description and understanding they generate. The importance of the criterion of empirical success lies in the fact that it provides a means for overcoming the live and let live attitude towards rival research strategies that has, in anthropology at least, resulted in a proliferation of incompatible and contradictory paradigms. If a particular strategy is not successful, if the theories it generates are not comprehensive and testable, then it is justifiable (if not obligatory) to abandon that strategy.

The evaluative criterion that seeks to appraise rival research strategies in terms of their possible moral and ethical repercussions is perhaps the most radical of the three evaluative criteria cultural materialism employs. For Harris, though, the need for such a criterion is imperative. Harris argues for it initially as a way of countering the moral disregard that he sees as lying at the heart of Feyerabend's anti-scientific epistemological anarchism. In doing so, however, Harris' argument points out a more general problem. Although one would not necessarily suspect it, the metaphysical, epistemological, theoretical and methodological commitments of a research strategy <u>can</u> have moral and ethical repercussions. The example I have been using is that of functionalism, though it is by no means unique in

this regard. Because of its commitment to the doctrine of cultural relativism functionalism does not have a legitimate basis from which to argue that any particular cultural practice, or socio-political policy is wrong. But as Kroeber and Kluckhohn point out, "To say that certain aspects of Naziism were morally wrong--is not parochial arrogance" (Kroeber & Kluckhohn, 1952: 178). Neither, I would add, are the claims that aspects of aparthied are morally wrong, or that the state sponsorship of terrorism is morally wrong, or that the systematic denial of the rights of women or minorities is morally wrong, mere parochial arrogance. In and of itself culture is not good or bad, right or wrong; it is a survival mechanism. However, to assume because of this that particular socio-cultural systems, practices or policies cannot be wrong is the worst kind of naivete.

Lest the point I am trying to make here be misunderstood perhaps I should explain it further. I take the argument that the possible moral and ethical repercussions of a research strategy must be considered as part of the evaluation of rival research strategies to be more or less self-explanatory. However the claim that cultural materialism is to be preferred to functionalism because of functionalism's unacceptable moral consequences is ambiguous. In arguing that functionalism has unacceptable moral repercussions it is not being claimed that functionalism itself is morally wrong--a research strategy is fundamentally just a tool.

Rather what is being claimed is that functionalism, because of its particular commitments, cannot legitimately argue that certain cultural practices or socio-political policies, such as aparthied, or terrorism are wrong. The unacceptable moral consequences of functionalism, then, stem not from the fact that it gives rises to racist or sexist policies, but from its inability to appraise the rightness or wrongness of particular socio-cultural systems and their constituent policies and practices. And this is morally unacceptable, moreover, precisely because it allows a situation to exist in which functionalism is powerless to make moral evaluations. Thus to evaluate rival research strategies in terms of the moral and ethical repercussions is to appraise their ability to evaluate socio-cultural systems in terms of the rightness or wrongness of the behavior and attitudes they sanctions.

As with the criteria of paradigm choice we can also make a preliminary evaluation of the research potential of cultural materialism in terms of the theoretical principles it formulates and the entities it holds to be the fundamental units for the scientific analysis of socio-cultural systems. The advantages these characteristics confer lie in the great promise they hold for the empirical success of cultural materialist theories over those of rival research strategies.

I take it to be uncontroversial that the object of cultural anthropology is a knowledge of socio-cultural systems. Now, regardless of whether this knowledge is conceived to be scientific or non-scientific some empirical data about the socio-cultural system(s) being studied is necessary if there is to be any knowledge at all. Even Sir James Frazer, author of The Golden Bough and perhaps the greatest armchair anthropologist of all time, recognized the supreme value of the empirical observations he acquired from numerous anthropologists, adventurers, missionaries and other world travelers.

In light of the importance, the indispensability, of empirical data, then, is there a research commitment that offers a greater possibility for its accumulation? This is the question that lies at the heart of the controversy between emic and etic accounts of socio-cultural phenomena. Emic accounts of socio-cultural phenomena, as we have discussed, are accounts couched in the categories which native actors employ in their understanding of the world. As such they rely on information gleaned principally from interviews with native informants (by means of which the researcher hopes to discover/elicit native categories of meaning and interpretation), as primary evidence for the explanations they formulate. Yet, we have seen that the reliance on the verbal accounts of native informants is problematic at best.

At worst it represents a commitment to a source of information that is completely unreliable. The average members of most cultures are usually unaware of the reasons behind much of what they do, and even when they are aware their descriptions are as likely as not to be formulated in terms of how things ought to be rather than how things are. This results in an interesting paradox. The object of emic analyses is to formulate accounts of socio-cultural phenomena in terms of native categories. The primary methodology for discovering these categories is interviewing native informants. The verbal accounts of native informants which result form these interviews, however, are unreliable as primary evidence. How, then, is emic analysis capable of providing adequate accounts of socio-cultural phenomena? Not without considerable qualifications and some method of evaluating the accuracy of native accounts. Such a method, however, does not exist.

Through its commitment to etic analysis the cultural materialist research strategy avoids the potential investigative pitfalls inherent in emic analyses' reliance on the accounts of native informants. Etic analysis, unlike emic analysis, does not look to native actors for its analytic categories, but proceeds on the basis of objective categories of meaning and interpretation established by the scientific community of observers, in this case the community of anthropologists. Consequently, these categories can be

corrected, discarded, or replaced when the scientific community determines that they are no longer valid. This is not an option available on emic analysis.

The greater potential of cultural materialism over research strategies committed to emic analysis to provide accurate empirical data through its commitment to the analysis of behavior on the basis of categories established by the community of anthropologists, is further enhanced when we consider the entities it postulates as the fundamental units of analysis--behavioral episodes.

Behavioral episodes are defined in terms of a series of actones, an actor (or actors), a time, a place and sometimes a physical prop (or props). Each of these elements of the behavioral episode, unlike the thoughts and mental processes of native informants, is available to the scrutiny of the anthroplogist, and, what is even more important, because a single behavioral episode, say a rite of passage, is an instance of a recurrent cultural behavior, similar episodes are available to the scrutiny of other anthropologists who can either confirm or deny the descriptions of the original observer.

As an anthropological research strategy, then, what cultural materialism proposes to study, what it considers the fundamental entities out of which accounts sociocultural phenomena are to be constructed, are recurrent behavioral episodes. Moreover it proposes to investigate

these episodes etically, i.e., in terms of categories developed and sanctioned by the community of anthropologists, not emically, i.e., in terms of categories elicited from native informants.

As the result of its research commitment to observable behavioral units and to accounts of socio-cultural phenomena based on the observation of these units cultural materialism, in contrast to such emically based research strategies as structuralism, psychological anthropology, historical particularism, symbolic anthropology, ethnoscience, culture-and-personality, and cognitive anthropology, holds out a greater promise of being able to provide us with adequate and testable accounts of socio-cultural phenomena. The final test of whether or not cultural materialism actually keeps this promise, however, lies in the nature of the theories that it generates. It is to an analysis of this nature that we now turn.

The nature of cultural materialist theories.

The nature of scientific theories. Perhaps the most crucial test of a research strategy's scientific status lies in the nature of the theories it generates. In determining the nature of a particular strategy's theories there are, at least, four questions we might ask.

1. Do the theories conform to the structure of scientific theories in general?

2. Do the theories adequately account for the phenomena under investigation?

3. Are the theories testable?

4. Is there a method for deciding between rival theories?

If the answer to all four of these questions is yes, then I think a solid prima facie case can be made for the scientific status of the theories and the research strategy that generated them.

Since the fourth question can be answered independently of any considerations of the actual substance or content of cultural materialist theories it is appropriate that we answer it first, before addressing the first three questions which do require a knowledge of the actual theories themselves.

Theory choice in cultural materialism. For the aim-oriented empiricist the process of evaluation and comparison is the same for theories as it is for research strategies. The mechanisms employed in these evaluations are the same as well. Thus, the methodological rules of scientific enquiry favor those theories that are: (1) compatible with the metaphysical blueprint the research strategy is committed to, and (2) empirically successful (Maxwell, 1974: 141).

According to the first evaluative rule our choice of theories should be guided by the metaphysical blueprint of science which underlies our research strategy. Theories that are incompatible with this blueprint must be disregarded, despite any empirical success they might have, for the obvious reason that considering them would be self-defeating since they cannot help us realize the fundamental aim of science as our research strategy defines it (Maxwell, 1974: 141). Assessments of a theory's compatibility or incompatibility with the metaphysical blueprint are to be made on the basis of whether or not the theory, if empirically successful, will provide an account of the phenomena under investigation in terms consistent with the intelligibility postulated by the blueprint.

When a particular research strategy is held up to its rivals as being more empirically successful, what is in fact being said is that the theories the research strategy has generated are more empirically successful than those generated by its competitors. Within the research strategy itself, the choice between rival theories must also be guided by the criterion of empirical success. This success is judged in terms of a theory's ability to effectively solve empirical puzzles, and measured against the anomalies and conceptual problems it generates (Laudan, 1977: 68).

> Theories are inevitably involved in the solution of problems; the very aim of

> theorizing is to provide coherent and adequate solutions to the empirical problems which stimulate inquiry. Theories, moreover, are designed to avoid (or to resolve) the various conceptual and anomalous problems which their predecessors generate. If one looks at inquiry in this way, if one views theories from this perspective, it becomes clear that the central cognitive test of any theory involves assessing its adequacy as a solution of certain empirical and conceptual problems (Laudan, 1977: 68).

From the perspective of the metaphysical blueprint then to assert M is just to assert that there exists some theory T, which is compatible with M and which successfully accounts for the phenomena under investigation. In addition, to assert that a theory T belongs to our knowledge is just to claim that T helps us towards realizing the basic goal of articulating the blueprint in a precise and testable form (Maxwell, 1974: 141).

Forbidden flesh, incest and male dominance: a selection of interconnected cultural materialist explanations. To adequately understand the origin of food taboos, male dominance and incest taboos we must first understand the general cultural and ecological conditions that existed prior to and at the time of their emergence. Thus our story begins with the emergence of hunter-gatherer bands during the paleolithic (approximately 1,000,000 B.C. to 10,000 B.C.).

By their nature hunter-gatherer bands rely on dispersed wild flora and fauna for their subsistence. This reliance typically leads to a mobile existence, following the migrations of herd animals and the seasonal ripening of edible fruits, nuts, tubers and grains. The inability to control the rate of production and reproduction of the biota, however, necessitates a low regional density of human population as well as a socio-political organization characterized by small, highly mobile bands. As a rule hunter-gatherer bands have between twenty-five and fifty or sixty members at any one camp and a regional density of less than one person per square mile (Harris, 1980: 80).

Though small the membership of hunter-gatherer bands is also fluid, their size fluctuating according to seasonal and other forms of environmentally induced variations in the abundance and availability of the biotic targets. Moreover, since the maintenance of nutritional standards requires seasonal, as well as the daily, assemblage and disassemblage, bands benefit significantly from having a non-rigid structure. Throughout the course of the year the small family groups benefit from their ability to move between bands, and under potentially hostile conditions to establish independent bands of their own. Consequently, the domestic life of hunter-gatherer bands usually revolves around independent nuclear families who are related to one another through marriage and common descent and who, although maintaining

separate hearths, share food through reciprocal exchanges (Harris, 1980: 80).

Further details of the nature and structure of hunter-gatherer bands are elaborated in the following extended description of this earliest of organized human socio-cultural systems taken from Cultural Materialism.

> Hunter-gatherers achieve their lability on the structural level by intermarriages between neighboring bands. The resultant network of kin ties facilitates visiting throughout the year. Bands reinforce their intergroup solidarity by making joint encampments and by engaging in common ceremonial activities during seasons when resources are abundant. . . .
>
> Political egalitarianism is another theoretically predictable consequence of the hunter-gatherer infrastructure. Since settlements are small, membership is labile, and production goes from hand to mouth, therefore daily reciprocal exchanges among camp-mates cut labor costs. Hunters and collectors can afford to return empty-handed or with half-filled baskets on the expectation that some camp-mates will be luckier. The balance between giver and taker shifts from day to day, thereby ensuring everyone that individual misfortunes will routinely be buffered by the group's collective product. This leads to a theory of economic exchange; reciprocity is the dominant form of hunter-gatherer exchanges, while "big man" redistributive types of exchange systems are correspondingly rare. The infrastructural reason for this is that bigmanship is a political-economic instrument for the intensification of production. But intensification, however, poses an immediate threat to hunter-gatherer ecosystems, especially with respect to prey species. Hunters are

active no more that one or two days a week; more frequent hunting under the goad of big-man redistribution would rapidly deplete the harvestable animal biomass. Hence hunter-gatherer political-economic ideologies are more likely to insist that the successful hunter be modest and reticent about his productivity . . . . Boasting is bad form when extra effort cannot increase the overall availability of animal protein, but can easily and permanently destroy its availability for everyone . . . .

Egalitarianism is also firmly rooted in the openness of resources, the simplicity of the tools of production, the lack of nontransportable property, and the labile structure of the band. Friction between those who live at a campsite can easily be resolved by the movement of aggrieved parties to new campsites or to the campsites of their relatives. Since there are no standing crops, permanent houses, or heavy equipment, the question of who gets up and moves away and stays is of little significance. Hence extremes of subordination and superordination are unknown. Headmen, if they are identifiable at all make suggestions but issue no orders . . . .

It seems to me not unlikely that women played a more active role in the hunting of big-game animals during the Pleistocene times, when such animals were more abundant than they are now. This . . . cultural materialist theory of hunter-gatherer sex roles begins with the hypothesis that prolonged and intensive lactation was a important means of fertility control throughout much of the paleolithic. The effectiveness of the lactation method for spacing births appears to be related to the balance between protein calories and carbohydrate calories in the diet . . . . A diet high in protein and low in carbohydrates is optimal for the lactation method because it prevents the accumulation of body fat, the putative signal for the resumption of postnatal ovulation, while

> sustaining the health of the mother through the strain of producing milk for three or four years at a time. According to this theory, there would be few benefits to be derived from making women into specialist homebodies and plant gatherers. Women are not continuously pregnant, nor are they always nursing helpless infants. There are long intervals between births, and nursing children are big enough to be left at the campsite in the company of older children or other camp-mates. Since the paleolithic hunter-gatherers appear to have hunted big-game herd animals mainly by driving them into pitfalls, over cliffs, and into bogs, women would be important at least as drivers and beaters and would also render valuable service as butchers and bearers once the wounded animals had been dispatched. Nor is there any reason to suppose that women did not carry spears and participate in the actual killing of trapped animals.
>
> Under optimum ecological conditions, therefore, the relatively slight degree of human sexual dimorphism . . . would not impair the highly egalitarian bent of hunter-gatherer social life. Theoretically, the more abundant the game and the more effective lactation as a means of fertility control, the less common such alternative fertility control measures such as abortion and infanticide would be. Abundance of game would also have a dampening effect on intergroup hostility, so warfare would be infrequent; this in turn would dampen any tendency to overvalue males and undervalue females. Women would not be used as the reward for male bravery in combat, sex ratios would be in balance and serial monogamy for both sexes would prevail (Harris, 1980: 81-83).

The origins of incest taboos and male dominance can be traced directly to the productive and reproductive pressures

associated with the emergence of hunter-gatherer socio-cultural systems in the paleolithic. On the broadest level incest regulation, in the form of prohibitions against endogamy, is a means of reinforcing the intergroup solidarity and insuring the lability of hunter-gatherer bands that occupy the same geographical area, because it forces prospective brides and bridegrooms to look outside their own family and band for suitable marriage partners. The systems of kinship ties that are established through intermarriages between neighboring bands thus prevent the competition for resources from escalating into warfare.

The prohibition of brother-sister, father-daughter and mother-son sexual relationships, on the other hand, reflect a selection against groups who failed to develop inter-band marital alliances. As the consequence of this failure these groups suffered from a lack of lability and mobility which resulted in a constricted resource base and the lack of trading partners and potential allies in the event armed conflict did erupt (Harris, 1980: 81). The tremendous amount of guilt, anxiety and symbolism invested in incest taboos reflects a deep confusion and ambivalence concerning the cost-benefits of incest; therefore the need arises for the imposition of unquestionable "sacred" social rules that will effectively cut through that ambivalence and prevent succeeding generations from repeating the trials and errors of preceeding generations (Harris, 1980: 81).

The origin of male dominance as a universal socio-cultural phenomena also reflects the efforts of paleolithic hunter-gatherers to come to grips with the same productive and reproductive pressures that led to the emergence of incest taboos. Originally hunter-gatherer bands found themselves in a practical Eden. The regional population density was low and there was an over-abundance of vegetable and animal foodstuffs, as well as other natural resources. Under these conditions the hunter-gatherer bands flourished and social-political egalitarianism held sway.

Even with extended periods of lactation in women limiting the possibility of pregnancy to once every three or four years, however, the consequence of a high standard of subsistence is the slow but inexorable growth of the population. Initially the effects of this growth are mitigated through the bifurcation of bands. But the resources and land in a geographical region is not unlimited and eventually the creation of new bands does nothing to eliminate the increasing competition for natural and biotic resources.

A direct consequence of the growing competition for resources is that foodstuffs become scarcer, in particular animal protein becomes less abundant. Since it is primarily responsible for the extended lactation period of mothers, the decrease in animal protein in their diet results in a corresponding decrease in the interval between births. Women thus get pregnant more often and their mobility decreases

dramatically. The population rises even faster (Harris, 1980: 83).

As the population density continues to increase the competition for food and other natural resources grows increasingly fierce. This eventually results in the increase of inter-band tensions, and the frequency of warfare goes up. As the incidence of warfare increases a premium is placed on the rearing of aggressive, combat-ready males, while females are universally devalued and are raised to be the passive rewards for aggressive males (Harris, 1980: 83) That is, the emergence of warfare required the organization of bands around a resident core of fathers, brothers and their sons. The organization led to the control over resources by paternal and fraternal interest groups and to the exhange of sisters and daughters between such groups as a reward for male agressiveness. The allocation of drudge work to women and their physical, mental and ritual subordination and devaluation follows directly from the need to reward males at the expense of females and to provide a sacred, supernatural justification for the entire male supremacist complex (Harris, 1977: 86).

From the cultural materialist perspective, therefore, the emergence of male superiority as a univeral cultural phenomena is to be seen as a response to increasing productive and reproductive pressures that assailed the hunter-gatherer bands in paleolithic times. Once established and

reinforced by social and religious conventions, however, this supremacist complex has continued to exert a hegemony long past when it ceased to be necessary or justifiable, if, indeed, it ever was.

Up to this point we have been discussing the origins of two very general and pervasive socio-cultural phenomena, incest taboos and male dominance. I would like to turn now to the origins of two specific phenomena, the Judaeo-Islamic prohibition on the eating of pork and the Hindu prohibition on the eating of beef.

Unlike the origins of incest taboos and male dominance, the origins of the Judaeo-Islamic interdiction on pork and the Hindu interdiction on beef cannot be traced directly to paleolithic hunter-gatherers. These practices emerged in more recent times.

The pig is only one of many animals whose consumption is prohibited in the Old Testament books of Leviticus and Deuteronomy. Other interdicted species include coneys, ferrets, hares, camels, rock badgers and many species of birds and fish. Unlike most of these other animals, however, the pig is domesticated. There is, then, at least the initial assumption that the pig has great utility. Yet unlike other prohibited domestic species the pig was domesticated exclusively as a source of meat. It is not a source of milk as are cows, goats and even horses, it does not catch mice or other rodents and it cannot be ridden. Nor can it pull a

plow, herd other animals, or be used as a beast of burden. The utility of the pig, therefore, lies primarily in its flesh. As a source of meat in fact the pig is unrivaled. According to a National Research Council report the pig is one of the most efficient converters of carbohydrates into proteins and fat in the animal kingdom, being three times more efficient than the cow and two times more efficient than the chicken. Considering its advantages, then, why would the pig find its way onto the list of species interdicted in Leviticus and Deuteronomy, especially since the archaeological evidence indicates that the pig was actually eaten in the Middle East during the Bronze Age and on into biblical times (Harris, 1980: 192 and 1977: 196).

Originally the pig was a creature of swamps, forests and river banks. It is not physiologically adapted to high temperatures and direct sunlight because it has no physiological mechanism for the regulation of its body temperature. That is, unlike most mammals pigs cannot sweat. To survive in hot climates, therefore, pigs require an external source of moisture to keep their body temperature regulated. The pig also cannot subsist on grass, like horses, cows, goats and camels. They are no better than human beings in this respect. Thus, the original domestication of the pig took place during the period when extensive tracts of forest covered the Taurus and Zagros mountains of the Levant (Harris, 1980: 192-193 and 1977: 197).

From around 7000 B.C. onward, however, the geographical spread and intensification of neolithic subsistence economies of mixed farming and herding resulted in the conversion of millions of acres (about 82%) of forests to grasslands, and the grasslands to deserts. The regions most devastated were those taken over by pastoralists. Throughout the history of this region, then, agriculture contracted as the desert expanded, while the population decreased correspondingly (Harris, 1980: 193).

Enter the pastoral nomadic Israelites into the Levant during the late to middle iron age, around 1200 B.C. Already vast tracts of forests had disappeared. But as the forests disappeared so also the areas suitable for raising pigs on natural forage became increasingly restricted. To continue to raise pigs in the absence of natural forage meant that, since they cannot eat grass, they would have to be fed grains as a dietary supplement. This, however, would make them directly competitive with human beings. Their costs would further increase due to the necessity of providing them with artifical moisture to regulate their body heat (Harris, 1980: 193 and 1977: 198).

Pastoral nomads, therefore, never raise pigs because they cannot be herded over long distances in hot climates, they cannot live on grass and they cannot swim across rivers. Seminomadic groups, as well as settled farmers, in arid areas that have undergone considerable deforestation,

erosion and dessication would also be especially likely to develop strong explicit prohibitions against raising and eating pigs. Although both groups might find it very tempting to raise the pig for its short term meat producing benefits, in the long run such a practice would be extremely costly and maladaptive as it intensified, threatening ultimately the entire subsistence economy. Complete interdiction by appeal to sacred and religious sanctions is the predictable consequence in situations where the immediate advantages of a practice may be great, but where the eventual repurcussions on the socio-cultural system may be devastating (Harris, 1980: 193 and 1977: 197).

The origin of the Hindu taboo on the eating of cattle is an even more recent cultural phenomenon than the neolithic Judaeo-Islamic interdiction on the consumption of pork. Like the earlier taboo on pork, however, analysis will demonstrate that the taboo on beef is a response to the same or similar kinds of ecological and infrastructural pressures.

Cattle were already present in the Indian sub-continent in pre-Vedic times (4000 B.C. to 2000 B.C.). Their remains are found with those of sheep and goats in the earliest known neolithic sites in the Indus Valley. At this time, however, cattle were used as a source of meat as is evidenced by the existence of charred cattle bones, along with those of sheep and pigs, in and around house sites. Cattle,

especially oxen, continued to be eaten in the Vedic period (2000 B.C. to 800 B.C.). The direct testimony of the Rig-Veda and other sacred religious texts attest clearly to this practice. During this time, however, the slaughter of cattle and the consumption of meat in generally became increasingly ritualized. According to Om Prakash, the general feeling during this period was that meat should be served to guests as a measure of hospitality and should be used as offerings to gods and manes (a function which was controlled by Brahmins), otherwise animals should not be killed (Harris, 1980: 249-250).

The rise of Buddhism and Jainism in India in the sixth century B.C. was closely associated with a direct challenge to the control of the Brahmin caste over animal sacrifice and the redistribution of meat. Both the Buddhists and the Jains condemned the practice of animal sacrifice and meat eating. Nevertheless, through the early Maurya and Sunga periods (300 B.C. to 75 A.D.) Brahmins and royalty continued to eat cattle, as well as other domesticated animals. In addition there is evidence indicating that meat eating continued to flourish in both of these classes throughout not only the period from 75 A.D. to 350 A.D., but also, according to Prakash, during the ensuing Gupta period which lasted until 750 A.D. (Harris, 1980: 250-251). It is only at the end of the Gupta period that the prohibition on eating cattle begins to take on its present form. Why did this

conversion from cattle consumption to veneration occur at this time?

The regional population density in the Ganges river valley in 1000 B.C. was low and dispersed into small villages. During Vedic times cattle were used extensively as work animals and the principal indication of wealth was the size of the herd one possessed. By the fourth century B.C., however, the Ganges Valley held vast irrigation systems, great cities and an estimated population of between fifty and one hundred million people (Harris, 1980: 251).

As a consequence of the destruction of vast primeval forests (and hence their natural reserviors of rain) and the settlement of marginal lands that was the result of the increase in population and the proliferation of towns and cities, India became subject to severe droughts and famines. The Ganges Valley became, then, a classic example of environmental depletion created by the intensification of production needed to support a rising population (Harris, 1980: 252).

Just as in the Middle East, therefore, an animal that was previously raised as a source of meat became too costly to be used as food because of fundamental changes in the ecosystem and the mode of production. Its flesh, therefore, became the focus of social and religious prohibitions, in particular, the doctrine of ahimsa (respect for life). Unlike the pig, however, the cow becomes not an abomination,

but an object of veneration. This is because the prohibition on slaughtering and eating beef reflects the indispensability of cattle as a source of traction and thus as the backbone of the Indian subsistence economy. But why was it the cow that became holy and not, say, the Indian buffalo? Indian cattle are small, nondairy traction breeds which are selected for the ability to pull plows at low maintenance cost and for their remarkable resistance to heat stress that is brought on by India's hot climate during the dry season. Throughout most of the year the cattle are maintained at the bare subsistence level. At plowing time, however, the diet of bullocks is supplemented so as to raise them from their normal state of semistarvation and enable them to work. By contrast the Indian buffalo, as well as horses, camels and donkeys, are considerably less versatile and cost-beneficial than cattle (Harris, 1980: 252-253).

Thus the Hindu interdiction on the slaughter and eating of cattle reflects an adaption to drastic changes in environmental and infrastructural conditions. As the result of these changes the majority of domesticated species could no longer be allowed to share the land. Cattle, however, were the one species that could not be eliminated since they were crucial not only to the individual farmer but also to the entire cycle of rainfall agriculture which supported the Indian civilization in the Ganges Valley. As the sole domestic animal left, however, they were also the only potential

source of meat. Yet to slaughter them for meat would constitute a dire threat to the infrastructure of the Indian socio-cultural system. Cattle inevitably and necessarily fell, therefore, under strong religious taboos on meat eating (Harris, 1977: 220).

The structure of cultural materialist theories. The question as to whether cultural materialist theories possess the logical structure of scientific theories in general is a more difficult question to answer than the question concerning its methodology for theory choice. The foremost obstacle here is the fact that there is no agreement among scientists and philosophers of science as to the logical structure of scientific theories. The structure one postulates depends upon whether one is a scientific realist or empiricist, and then again on exactly what kind of realism or empiricism one endorses.

For cultural materialism this problem is further compounded by the fact that Harris does not discuss the structure of scientific theories at all. This is no doubt due, at least in part, to the fact that no real agreement as to what this structure is exists. In light of this a reluctance to enter into such a complex issue is perhaps understandable. Still, it is important to the argument that cultural materialist theories are scientific theories that at

least some general characteristics of scientific theories be specifiable.

To isolate these characterisitics we need to reacquaint ourselves with certain concepts that were first introduced in Chapter III. These are the concepts theoretical model and theory. To these ideas we must now add the further concepts, hypothesis and law.

To understand the concept of theoretical model, writes Ronald Giere in Understanding Scientific Reasoning, it helps to think of the world as composed of various interconnected natural systems. The virtue of talking about natural systems is that it encourages us to think of the world as a complex whole made up of

> many interacting systems, each of which has its own type of structure. Things do not just happen. They are related to other things in regular, systematic ways. It is the job of scientific theories to capture these systematic relations (Giere, 1984: 80).

A theoretical model is also a type of system. To be more precise, a theoretical model is a system whose characteristics are specified by an explicit definition. This definition stipulates how certain terms are to be used (Giere, 1984: 80). There are in fact two types of theoretical models--deterministic theoretical models and stochastic theoretical models. A deterministic model is a model of a system in which the state of the system at any one moment

completely determines the state at all other times. A stochastic model, in contrast, is a model of a system in which the state of the system at any given time only probabilistically determines the states at later times (Giere, 1984: 92-92).

What makes theoretical models, of either type, unique as systems is that they are attempts to model natural systems and their interrelationships. Their value lies, then, in the degree of similarity that exists between the structure of the theoretical model and the structure and systematic relations of the natural systems it is a model of. The degree of similarity between their structures is the degree of isomorphism between the theoretical model and the natural systems.

A hypothesis is a general scientific statement or proposition that is either generated by a theory or as the result of direct observation. A theoretical hypothesis, however, is a special kind of hypothesis that uses a theoretical model to make a contingent claim about a real system, i.e., it claims that a particular natural system is similar to a specified theoretical system in certain respects and degrees (Giere, 1984: 81, 82). Hypotheses possess varying degrees of generality depending upon the degree of similarity they claim between the model and the real system..

A scientific theory is a component part of a theoretical model. It is a general theoretical hypothesis, i.e., it

is a system of interrelated concepts and propositions (hypotheses) that asserts that a designated class of natural systems are (approximately) systems of a particular type (Giere, 1984: 84). As such the function of a theory is to account for or describe some aspect of the structure or relations of the natural systems the theoretical model is concerned with. The explanatory scope of a theory, then, is considerably more limited than that of the theoretical model it belongs to.

Finally, there are what have traditionally been called scientific laws, like Kepler's laws of planetary motion and Newton's law of universal gravitation. The feature most commonly associated with such laws is universality. That is, as laws they ostensibly apply to everything, everywhere and at all times. They are in effect hypotheses about everything in the universe (Giere, 1984: 85-86). This interpretation of scientific laws, Giere suggests, is a holdover from eighteenth and nineteeth century conceptions of science when physics and chemistry were the only highly developed sciences. With the emergence of biology and geology as mature sciences, however, Giere argues that whatever plausability this view of scientific laws had acquired as an interpretation of the universal generalizations of physics and chemistry was lost. The hypotheses of biology and geology "would not cease to be scientific hypotheses if it turned

out that their models applied only to systems in our small corner of the universe here on Earth" (Giere, 1984: 86).

Giere's solution to this problem is to interpret hypotheses like Newton's law of universal gravitation to be a part of the definition of the theoretical model--Newtonian Particle System. In this manner we can then consider other theoretical hypotheses of varying degrees of generality that could be made with reference to the model (Giere, 1984: 86). Thus, even if the most general hypothesis (the statement of the universal law itself) is false, or cannot be justified, there is still exists a range of important, although less general, hypotheses that could be both true and justified.

Little reflection should be required, I think, to see that each of these four characteristics can be isolated as components of cultural materialist theories. The theoretical model that cultural materialism invokes was examined in some detail in the section above. This model characterizes human cultures as complex stochastic systems comprised of four structural components, an etic infrastructure, etic structure, etic superstructure and an emic superstructure. Further, these components are systems in their own right which interact in regular and systematic ways. The nature of these systematic interactions is captured in the principles of infrastructural determinism and individual selection, according to which the present state of a sociocultural system only probabilistically determines its future

states. Thus, the theoretical model is a stochastic model and socio-cultural systems stochastic systems.

With little difficulty we can also isolate theoretical hypotheses and general theoretical hypotheses, both in the cultural materialist theories presented above and, I would suggest, in cultural materialist theories in general. A theoretical hypothesis employs a theoretical model to make contingent statements about a real system. Examples of this from the theories discussed are the hypotheses that the Hindu interdiction on the slaughter and consumption of cattle and the Judaeo-Islamic prohibition on the eating of pork are functions of reproductive and productive pressures brought on by a rapidly changing environment. Both of these statements invoke the quadrapartite structure of socio-cultural systems and the principle of infrastructural determinism, as described in the theoretical model, to account for the origins of the particular food taboo in question. Likewise, the accounts of the origins of incest taboos and male dominance invoke this model to make claims about real (socio-cultural) systems.

In contrast to a theoretical hypothesis, a general theoretical hypothesis, i.e., a scientific theory, is a system of interrelated concepts and theoretical hypothesis that asserts that certain natural systems are (approximately) systems of a specified type. Again, examples of this are to be found in the theories examined above. The theory of the

origin of cattle veneration in India is more than just the hypothesis that such worship is a function of productive and reproductive pressures resulting from the intensification of rainforest agriculture. The theory itself is a complex of many interrelated concepts and theoretical hypotheses. Similarly, the theories of the origins of incest taboos and male supremacy are complexes of interrelated concepts and theoretical propositions. Cultural materialist accounts of the origins of socio-cultural phenomena, then, are general theoretical hypotheses which assert that certain natural systems (the ancient Israelite and Islamic socio-cultural systems, the eighth century Hindu socio-cultural system, the hunter-gatherer socio-cultural system, and so on) are approximately systems of the type specified by the cultural materialist theoretical model of socio-cultural systems.

Finally, what of scientific laws? These too can be isolated in the corpus of cultural materialist theories. They are not called laws, however, but principles and are interpreted as part of the definition of the theoretical model cultural materialism employs. Cultural materialism's equivalent to Boyle's ideal gas law and Newton's law of universal gravitation are the principles of infrastructural determinism and individual selection. Although this was not intentional on Harris' part, this characterization of cultural materialism's "laws" is entirely in keeping with the analysis of scientific laws that Giere offers. At the very

least it should be obvious that hypotheses generated on the basis of cultural materialism's theoretical principles are capable of being both true and justified.

If my analysis here is correct, and I think it is, then there is clear evidence that cultural materialist theories conform to the structure of scientific theories in general, insofar as such structure can be determined at all. There is certainly no a priori reason to dismiss them as unscientific. The question that remains, however, is: Are they good scientific theories? That is, are they testable and are they adequate?

The testability of cultural materialist theories. It is with regard to their testability that cultural materialist theories differ most conspicuously and dramatically from the theories formulated by other anthropological research strategies. To be more precise, it is with regard to their testability that the research, explanatory and scientific superiority of cultural materialist theories over the theories of rival strategies is established.

But what exactly is meant by the "testability" of a theory? To say that a particular theory is testable is to say that there is some set of conditions, which either exist or can be designed, under which the claims of the theory can be empirically corroborated or not. In sciences such as physics and chemistry this usually takes the form of

designing a laboratory experiment the results of which will either confirm or disconfirm the hypothesis in question. Testing an anthropological theory is not quite so easy, however. Because of the nature of the phenomena being investigated laboratory experiments, with the appropriate controls and caveats, are impractical, if not impossible. Even the most fecund of agars has as yet failed to produce an acceptable socio-cultural system. When we speak of testing anthropological theories, therefore, what is meant is that there exists a set of conditions under which an anthropologist in the field could empirically observe the truth or falsity of the hypotheses in question. This kind of testability, while not as rigidly scientific as the methods available to the more exact sciences, nevertheless allows for the empirical confirmation or disconfirmation of anthropological theories.

This interpretation of testability, however, points out a potentially serious problem. Concerned as they are with the origins of past, as well as present, socio-cultural systems and behavior a large body of cultural materialist theories involve retrodiction rather than prediction. That is, they attempt to account for the origins of socio-cultural phenomena that emerged in the distant, pre-historical past. By their very nature these theories are not directly testable by any known empirical methods or techniques, since the conditions under which the phenomena they are concerned with

emerged, and under which they could be tested, no longer exist.

This problem is not unique to anthropological theories. Many of the theories of the physical and biological sciences are also concerned to explain phenomena not directly accessible to empirical testing. Consider, for example, the biological theory of the evolution of man, or the astrophysical theory of the origin of the universe, or the geological theory of the origin of volcanos. These theories are not avowed to be any less scientific, however, because of the fact that they are not directly testable.

The solution to this problem has historically been sought in extending the definition of "testable" to include not only "directly testable" but also "testable in principle." To say that a theory is testable in principle is to say that, while the conditions do not currently exist that would allow direct testing, conditions did at one time exist, or will at some time exist, or could be imagined to exist, under which the theory could be directly tested. A scientific theory satisfies the criterion of testability, then, if it is either directly testable or testable in principle. Although this might seem on the surface a rather ad hoc attempt to eliminate a potentially serious problem, without any consideration of this sort for theories that are not subject to direct empirical testing we would be forced to condemn a large body of important and powerful theories

as unscientific. In establishing criteria to demarcate the scientific from the unscientific we traverse the often fine line between the too loose and the too rigid. In the give and take that follows it seems worth it to have some partially unsubstantiated, though in princple testable, scientific theories which explain a wider range of phenomena rather than only substantiated, directly tested, scientific theories which explain lesser range.

Of course it is always possible that a theory, while not being directly testable, could nevertherless be indirectly tested according to its predictive consequences. Consider again the origins of incest taboos. According to the cultural materialist theory of their origin the prohibitions of incest and the emergence of endogamy among paleolithic hunter-gatherers reflected the need to establish the inter-band alliances necessary for the mobility, trading and protection upon which life depended. If this theory is true a predictable consequence is that, if there was no need to establish alliances (or if there was a positive need not to), if the resource base was sufficient enough not to require trade and if physical mobility was not essential, then we should see a relaxing of incest taboos. The ethnological evidence indicates that this in fact is the case. According to Harris the pharoahs of Egypt, the ruling elites of the Hawaiians and Inca and the early Chinese emperors routinely practiced brother-sister marriage as a way of consolidating

their political and economic power (Harris, 1980: 131). In each of these cases there was a positive incentive not to prohibit brother-sister marriage since doing so would have meant a weakening of the ruling family's power base. While not a direct test of the cultural materialist theory of the origins of incest, the ability to predict and explain conditions under which the normally expected behavior or phenomenon would not occur provides considerable indirect support for the theory.

Cultural materialist theories, then, like scientific theories in general, fall under both the categories of directly testable and testable in principle. The essential point, however, is that they <u>are</u> testable, unlike the theories formulated by rival research strategies. Consider, for example, the structuralist theories of Claude Levi-Strauss. No long or convoluted process is required to demonstrate the essential untestability of structuralist theories since they are based on an acknowledged disregard for empirical facts and observation. Levi-Strauss conceives of ethnology to be essentially psychology; therefore, structuralism aims at discovering basic mental processes and structures that underlie all thought. Mind is the ultimate explanation of socio-cultural phenomena (Harris, 1980: 166). A structuralist explanation then consists essentially of discovering the binary oppositions that lie within the hidden meanings of

human thoughts. Oppositions such as life:death, me:other, culture:nature (Harris, 1980: 167).

In the pursuit of the universal structures of mind Levi-Strauss and other structuralists eschew empirical observation and data. Levi-Strauss has in fact gone so far as to remark that structuralist models have no empirical significance; that, for instance, social structure has nothing to do with empirical reality (Harris, 1980: 169).

With its methodological commitment to introspection and linguistic analysis and its theoretical disregard for observation and the collection of empirical data, it is not surprising that structuralist theories fail to meet the requirements of scientific testability.

> The only means by which a structuralist statement can be tested is by finding similar (or disimilar!) 'structures' in the same or some other culture, and it is a foregone conclusion that with a modicum of ingenuity, corroborating analyses can be carried out in great profusion, (Harris, 1980: 168).

Essentially, then, structuralist theories are untestable because they can be made to explain everything.

A case in point is the structuralist theory of the origins of the Judaic taboo on eating pork developed by Mary Douglas. Douglas's analysis is based on the Hebrew zoological taxanomy and the concepts of pollution, dirt, purity and anomaly. Dirt, Douglas writes, is essentially disorder,

i.e., it is matter out of place and it offends against our sense of order (Douglas, 1984: 2, 35). Association with dirt or dirty (unclean) things results in pollution or impurity. This impurity can take many different forms, ritual, bodily, sexual, and so on. Something that is anomalous is also something out of place. It defies classification and hence does not fit into an accepted, ordered view of the universe. Anomalousness is, therefore, associated with what is dirty.

The Hebrew zoological taxonomy classified proper livestock as animals that have cloven hooves and chew their cud, such as cattle, sheep, goats and gazelle. The pig, however, does not fit into this classificatory schema since while it has cloven hooves it does not chew its cud. Because the pig is anomalous it is unclean, and its consumption results in defilement. But zoological anomalousness is not the only polluting aspect of the pig.

> [T]he pig . . . carries the odium of multiple pollution. First it pollutes because it defies the classification of ungulates. Second it pollutes because it eats carrion. Third it pollutes because it is reared (and presumably as prime pork) by non-Israelites (Douglas, 1972: 79).

Douglas's account of the pig taboo, then, is based on the structuralist formula,

pig:livestock :: disorder:order :: dirty:clean ::

carrion:grass :: non-Israelite:Israelite ::

nature:culture,

in which the first term in each pair is opposed to the second term, but associated with the first term in every other pair, and similarly for the second term.

This theory avoids entirely any consideration of environment, ecology, subsistence patterns, cost versus benefit of different food sources in its account of the taboo on eating pork. It relies solely on oppositions drawn from the ancient Hebrew classification system as the primary reasons for emergence of the taboo. In short, it disregards all of the elements that would render it testable as account of the taboo's origin.

The cultural materialist theory, in contrast, presents us with a system of interrelated hypotheses each of which makes a claim that can be subjected to empirical testing and confirmation. This confirmation is both direct, on the basis of archaeological evidence, and indirect, employing what ancient writings that have survived from that time.

The characteristic untestability of structuralist theories is common to all idealist strategies that disregard empirical evidence in the formulation of their theories, or that argue that socio-cultural phenomena are inherently unamenable to scientific analysis. Among these are obscurantist and eclectic strategies and some versions of functionalism (including Malinowski's), psychological anthropology,

structural-functionalism, symbolic anthropology and cognitive anthropology.

It is in fact considerations of the kind I have been detailing that lead Kaplan and Manners to write that,

> technoeconomic theories lend themselves more easily to substantiation or refutation than others. We believe this is why Marvin Harris can argue that the 'cultural-materialist strategy' has been far more fecund than alternative strategies in anthropology . . . (Kaplan & Manners, 1972: 99).

Despite its obvious importance, the criterion of testability serves primarily to distinguish cultural materialist theories from the theories of rival research strategies which either ignore or deny the applicability of the canons of scientific reasoning and analysis to the study of sociocultural phenomena. To evaluate and compare cultural materialist theories and the theories of rival research strategies which are also committed to the scientific study of culture we must invoke a different criterion--the criterion of adequacy.

The criteria of testability and adequacy are, of course, connected. We would hardly consider adequate, e.g., a theory that was untestable. Nor would there be much interest in a theory which, even though testable, solved few if any empirical problems in relation to its rivals. For the purposes of evaluation, however, it is important to

distinguish between these criteria since they illustrate different, albeit interconnected, strengths and weaknesses in the theories being compared.

The adequacy of cultural materialist theories. The adequacy of a scientific theory is determined by two factors: the comprehensiveness of its explanations and the parsimony of the assumptions required to formulate these explanations. That is, the adequacy of a theory is a function of:

1. the number of significant empirical problems that it solves, which number is then balanced against the number of conceptual problems the theory generates (Laudan, 1977: 119);

2. the paucity and simplicity of its assumptions.

The most adequate theory, then, is one that solves the most empirical problems within the domain under investigation, while generating the fewest conceptual problems, and which requires the fewest and simplest assumptions to accomplish this.

The superiority of cultural materialist theories with regard to the criterion of adequacy is effectively illustrated, I think, by the selection of theories presented above. Consider, yet again, the origins of incest taboos. There have been many attempts in the sociological and anthropological literature to account for the origins of incest regulations as a (virtually) universal characteristic

of socio-cultural systems. Let us look briefly at three such attempts.

In Ancient Society the anthropologist Lewis Henry Morgan offered an account of the origins of incest taboos that was premised on the alleged biologically deleterious results of close inbreeding (Harris, 1966: 197). That is, according to Morgan, the members of ancient societies somehow came to realize, presumably through experimentation, that inbreeding was biologically unsound. Such inbreeding resulted in the perpetuation of undesirable traits that would have been selected against had the gene pool been larger. A case in point is the high incidence of hemophilia that resulted from the close inbreeding among the European aristocracy in former centuries.

A somewhat different explanation was offered by Morgan's contemporary Edward Westermarck in The History of Human Marriage. Westermarck argued that the universal dread of incest is based upon

> an instinctual human disgust for sexual relations with individuals who have been reared together at close quarters. This instinctual repulsion in turn was established within the species as a result of natural selection conferring adaptive advantages on outbreeding families (Harris, 1966: 198).

This line of explanation has been taken up in more recent times by E.O. Wilson and the sociobiologists who argue that

incest avoidance is a genetically programmed trait of higher primates (see Wilson, 1977).

In contrast to both Morgan's and Westermarck's accounts the sociologist Emile Durkheim argued that incest taboos derive from the more primitive prohibitions on group endogamy. Rules of exogamy in turn are grounded in the religious beliefs of lower societies. "Durkheim argued that the totemic beliefs underlying exogamy imparted a 'sentiment of religious horror' to blood, which was closely related to the totem, itself immanent in the clan" (Lukes, 1977: 187). For Durkheim, then, the religious sanctions existed prior to the deed and are not, as the cultural materialists argue, instituted as a means of enforcing compliance after the fact.

These three theories undeniably point out important aspects about the nature of incest taboos. From the perspective of the cultural materialist strategy, however, they all fail in one essential respect. Neither of these theories is capable of adequately explaining why, in at least four historically documented cases, we find the positive encouragement of incestuous brother-sister alliances. In more logical terms, the accounts offered by Morgan, Westermarck (and Wilson) and Durkheim, while illustrating neccessary components of the prohibition of incest, are not sufficient to explain this prohibition in all its ramifications.

The cultural materialist theory of the origins of incest taboos, on the other hand, not only accounted for the

how and why of the emergence of incest taboos, it also predicted the conditions under which it might realistically be expected that these taboos would be relaxed. The superiority of the cultural materialist theory goes beyond just this fact, however. The theory of incest regulation is itself a part of an even larger, more comprehensive theory that explains not only incest taboos, but also the origins of warfare and male dominance, as well as many other aspects of past and present socio-cultural systems that constraints of time and space have not allowed us to explore.

The cultural materialist account of the origins of the Hindu interdiction on the slaughter and consumption of cattle also serves to illustrate the greater adequacy and explanatory power of cultural materialist theories. This prohibition emerges originally as an adaptive response to productive and reproductive pressures that were being placed on the infrastructure of the Ganges Valley civilization as the result of an increasing population and the radical deforestation of the area. According to cultural materialist analysis the necessity to protect cattle eventually acquires a strong religious sanction to insure compliance with the interdiction. This sanction in the form of the doctrine of ahimsa (respect for life) which Hinduism absorbed from Buddhism surrounds the idea of slaughtering cattle and eating beef with a sense of horror, sacrilege and guilt.

Yet fieldwork among modern Indian agriculturalists has revealed a curious fact that seems, at least initially, inconsistent with this doctrine. All things being equal, in a sufficiently large animal population the ratio of male births to female births is consistently around fifty-fifty. For human beings, e.g., the actual ratio is 1.05 males to 1 female (Coale, 1975: 461). Observations by Harris, K.N. Raj and others, however, have shown that the ratio of male to female cattle in modern India varies systematically from region to region (Harris, 1971: 201).

How can this be? The cultural materialist analysis of the origins of the taboo on the consumption of beef assured us that cattle were indispensable to the Indian subsistence economy and that religious prohibitions on their slaughter arose as a supernatural means of insuring their survival. Thus a disparity in sex ratios would seem to be contraindicated since its obvious implication is that some cattle are being killed.

In fact cultural materialism can account for the disparity in sex ratios quite easily. Environmental and ecological pressures on the infrastructure of a socio-cultural system, while they effect the system as a whole, can nonetheless be felt differentially in different geographical areas encompassed by the system. This requires local deviations from, and amplifications of, traditional culture-wide

practices, but usually without directly violating existing social, political and religious ideologies.

In the case of the differential sex ratios among cattle then the cultural materialist explanation is that disparity reflects adaptation to local differences in environmental and ecological conditions. In the wet croplands of Kerala, for instance, where male buffaloes are more efficient that male bullocks Raj found 167 cows for every 100 bullocks and 54 female buffaloes for every 100 male buffaloes. Thus, while male buffaloes were bred for traction and cows for milk, bullocks and female buffaloes were systematically culled from herds (Harris, 1971: 201). "The close correspondence between the sex ratios and local ecological conditions proves," Harris concludes, "that the main features of the cattle complex are shaped by techno-economic and techno-environmental forces" (Harris, 1971: 201). The principle of infrastructural determinism, therefore, can explain not only the emergence of the prohibition on the slaughter and consumption of cattle, but can also predict the conditions under which this prohibition will be modified.

The ecological conditions that requires Indian farmers to cull unwanted male or female cattle from their livestock, however, does not obviate the strong religious conviction that all cattle have the right to life. Consquently, and predictably, Hindu farmers do not kill their cattle by slaughtering them directly. Instead they cull their stock

by starving and neglecting unwanted animals. In this manner unwanted animals die rather rapidly, since they are usually fed only enough to keep them alive anyway. The farmer, therefore, achieves the necessary end of eliminating excess cattle while not directly violating the doctrine of ahimsa. Indeed, if asked to explain the disparity in sex ratios the farmer would emphatically deny that it is the result of his having "killed" any cattle (Harris, 1966; Harris, 1971; Harris, 1974).

While cultural materialism finds the systematic variation in sex ratios among cattle a predictable consequence of its theory of the origins of the taboo on cattle slaughter and consumption, other anthropological research strategies do not fare so well. Clearly this variation cannot be explained by the traditional appeal to the doctrine of ahimsa as the historical source of the taboo. This doctrine makes no allowances for differences in environmental and ecological conditions. Cattle are sacred period. The only possible explanation would be that the farmers in question are not good Hindus, or Hindus at all. Yet the farmers themselves would surely, and perhaps justifiably, take issue with this conclusion.

Neither can the disparity in sex ratios be explained by structuralism and other admittedly emic strategies. Since they depend upon native informants as the primary source of evidence in formulating their theories, emic strategies

would never get beyond the Hindu farmer's emphatic denial that he is responsible for killing excess cattle. This is a classic case where the difference between what native informants are supposed to do, what they say they are doing and what they are observed to be doing presents an insurmountable obstacle to any adequate account of the phenomena under investigation.

Although constraints of time and space have prevented the detailed and thorough examination of the corpus of cultural materialist theories, I would suggest that the superiority of theories that have been examined with regard to their testability and adequacy is a function of cultural materialist theories in general. At the very least our analysis should have demonstrated that, as the result its theoretical and methodological commitments, cultural materialism holds out the promise of generating the most complete, comprehensive and explanatorily powerful theories, theories, moreover, that do not stand as isolated explanations of particular socio-cultural phenomena, but interconnected, parsimonious theories that provide us with a powerful theoretical account of the nature and origins of socio-cultural systems and behavior.

Conclusions.

In the second and third chapters of this thesis two lines of argument were developed and explored. In Chapter

II the concept of culture was introduced in the context of its historical development. Culture, it was argued, is more than just the sum total of its individual members; i.e., a complete inventory of the members of a socio-cultural system (even if it includes their relationships with one another) will not provide an exhaustive and complete description of that system.

This is not to deny that culture is ultimately a human phenomenon, created and perpetuated by human beings. Undeniably it is. Once created, however, the reality of culture is independent of its human creators. Anthropologists and historians still speak of Aztec culture and Tasmanian culture though the Aztec empire collapsed centuries ago and the last Tasmanian died on May 8, 1876 (Fagan, 1984: 135).

Culture, then, is a phenomenon sui generis. More precisely it is an empirical phenomenon. By this I do not mean that cultures can be "seen" in the manner that an apple can be seen directly and all at once, or that all its elements can be "seen" at all. The internal representations that each individual possesses of their socio-cultural system is obviously not available to direct perception. Rather, I mean that knowledge of socio-cultural systems can be acquired by means of empirical methods, just as knowledge of a government or a corporation can be acquired through empirical methods though it cannot literally be "seen."

In Chapter III a new line of argument was developed. The focus in this chapter shifted from the concept of culture to culture theory, i.e., the systematic study of the nature and structure of socio-cultural systems. Culture theory is an integral part of the discipline of anthropology, which takes as its object of study human beings in general. Culture theory provides in fact the foundation upon which each of the sub-disciplines within anthropology subsequently build; it establishes, in Malinowski's words, the meeting ground of the different branches of anthropology.

The importance of culture theory to the study of human beings renders it imperative that culture be studied according to the most exacting and productive procedures. Because of the empirical nature of culture this can only be accomplished through the scientific study of socio-cultural systems. As regards its procedural integrity and explanatory power the track record of science as an epistemological tool speaks largely for itself. This is true despite the fact that no general agreement exists among philosophers of science as to the exact nature of science. This elusiveness has not stopped the progress of science and scientific knowledge, however. Nor does it mean that there are not general characteristics that can be isolated and pointed to as elements of sound scientific investigation.

The two lines of argument developed in Chapters II and III converge in the final chapters of the thesis with the analysis of the scientific credentials of two anthropological research strategies. The first of these strategies is functionalism, in particular the functionalism of Bronislaw Malinowski. Malinowski was one of the first anthropologists to recognize the necessity of bringing the methods and procedures of scientific investigation to bear on the study of culture. He argued in fact that not only can socio-cultural sytsems be studied scientifically, but that there is a positive need to do so.

Despite its aspirations, however, Malinowski's functionalism fell far short of the desired science of culture. This failure, I have argued, is due primarily to two factors. First, Malinowski's scientific aspirations remained just that, aspirations. There is little or no discussion in his work of the nature of science itself, nor is there any detailed analysis of the application of scientific methods and procedures to anthropological fieldwork. Malinowski's work thoroughout exhibits a kind of scientific naivete. Though much impressed with the power of science, Malinowski seems to have concerned himself little with the details. Second, although Malinowski recognized the importance of understanding and taking into account structural and infrastructural factors, he remained convinced that the prime movers in socio-cultural development and change were ideas.

Functionalism's methodological commitment, therefore, was ultimately to an emic analysis that sought to discover the world as the natives' understood it, to see it through their eyes.

These two factors, as well as functionalism's other theoretical and methodological commitments, result in the formulation of theories and hypotheses that from the perspective of science are neither adequate as accounts of the socio-cultural phenomena they seek to describe, nor testable. They are at best, as Jarvie argued, fruitful heuristics.

In light of its scientific shortcomings the lengthy analysis of functionalism was not undertaken out of any interest in the functionalist research strategy for its own sake. Rather, it was undertaken because functionalism was, historically, one of the first claimants to the status of scientific theory of culture and because it provides an important counterpoint to the analysis of cultural materialism which follows it.

It has been my purpose in Chapter V to argue that not only is cultural materialism worthy of being considered a scientific research strategy, but that it is in fact, in contrast to its rivals, the most powerful and promising strategy available to the cultural anthropologist for the investigation of socio-cultural systems.

The scientific status of cultural materialism as an anthropological research strategy is effectively demonstrated by its general scientific characteristics. There is, first and foremost, its commitment to an aim-oriented empiricist interpretation of science. According to this interpretation the goal of science is the search for the order and intelligibility that underlie the universe of natural phenomena. Without this metaphysical commitment, in conjunction with cultural materialism's other metaphysical assumptions, cross-cultural anthropology would not even be possible. In addition, aim-oriented empiricism also provides cultural materialism, and anthropology in general, with criteria for the evaluation of competing research strategies not only in terms of the metaphyical blueprints that underlie them, but also in terms of the success and adequacy of the strategies themselves.

Second, there is cultural materialism's commitment to theoretical principles which establish a powerful research programme for the anthropologist. The advantage of this programme lies in the fact that, while it takes account of all relevant factors, it assigns a definite causal priority to certain factors over others depending on their distance from the natural environment. The hierarchy of causal factors that results allows the anthropologist to focus research efforts on the area most likely to hold the key to explaining the phenomenon being investigating. If that area

fails to produce an acceptable explanation, however, then the programme stipulates the next area most likely to yield the desire information.

Finally, the scientific status of cultural materialism is illustrated by its commitment to units of investigation--actones--that are observable pan-culturally by all anthropologists. On the basis of these fundamental units all subsequent cultural phenomena can be constructed and described. Just as important, however, is the manner in which cultural materialism studies these units. That is, through etic behavioral analysis. This analysis attempts to account for socio-cultural phenomena in terms of categories that are established by the community of anthropologists, instead of relying on the frequently problematic accounts of native informants as emic analysis does.

The scientific status of the theories generated by cultural materialism is also demonstrated by their general scientific characteristics. In answer to the four questions asked above (see page 201) regarding the nature of cultural materialist theories, therefore:

1. yes, there exists a methodology for theory choice;
2. yes, cultural materialist theories conform to the structure of scientific theories in general;
3. yes, cultural materialist theories are testable;
4. yes, cultural materialist theories are adequate.

These answers, as I suggested, build a strong prima facie case for the scientific status of cultural materialist theories. At the very least they indicate a strong scientific tendency and potential.

There is no doubt that in many respects cultural materialism, and anthropology in general, fail to live up to the scientific ideals that have been established by the more exact sciences of physics and chemistry. In particular cultural materialism cannot claim the impressive knowledge bases like those physics and chemistry have generated. Weighed purely in terms of content cultural materialism cannot help but be judged as lacking. Such an assessment would be an injustice, however. For the lack of an established knowledge base underlying anthropology is not the result of any scientific failure or inadequacy, but simply due to the fact that physics and chemistry are much older "sciences." It is not the content that is important, therefore, but the commitment to the methods of scientific investigation. Without these the content would never have been acquired.

If my analysis of cultural materialism in this chapter has revealed nothing else it is that cultural materialism is committed to the methods of scientific investigation and the canons of scientific reasoning no less than other more established sciences. Whether it will ultimately produce a science of culture to rival these sciences is a question only time can answer. If its initial successes are any

indication, however, the foundations for such a science have undeniably been established.

Finally, it should understood that the search for a science of culture such as cultural materialism exemplifies is not motivated solely by intellectual curiosity, just as Jonas Salk's search for a polio vaccine was not motivated by mere curiosity as to the disease's etiology. This scientific quest, like others, was motivated just as much by the important uses to which the knowledge could be put. It is one of the distinct advantages of science, however, that it can satisfy not only humankind's desire for knowledge for its own sake, but also the desire to changes things for the better.

The quest of cultural materialism to produce a science of culture is no different. The power of culture to assure human survival is virtually without limit. Times and conditions change, however, and it is often the case that a socio-cultural system finds itself burdened with the vestiges of institutions or patterns of behavior that, while originally adaptive, have outlived their usefulness. What greater power could we have then if the nature of socio-cultural systems--how they evolve, are maintained and change--was understood. With this understanding would come the knowledge to change those aspects of our cultural systems which are socially, politically, economically unjust and exploitative. And it is not only naive, it is dangerous

to assume that such institutions and behavior patterns do not exist.

This knowledge will only come, however, with recognition that socio-cultural systems are not acausal and governed by mysterious rules and relationships. Socio-cultural systems, like all natural systems, are subject to definite laws governing their evolution, maintenance and change. It is the task of science, and one that only science can perform, to isolate and describe these laws. As Harris writes, the study of culture is not something that should be lightly surrendered to the thought processes of individuals who equate their own imaginations with the

> thoughts, feelings and activities of the rest of us. History shows that to treat as heros people who abominate empirical reality is to risk destruction. 'What does this matter?' If you do not wish to be held accountable for what you do in someone else's nightmare, you know what it matters (Harris, 1980: 170).

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