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By

Thomas James Larkin

A DISSERTATION

Submitted to
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ABSTRACT

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This dissertation will examine some aspects of the relationship between language and knowledge. Central to the dissertation will be the argument that it is through our language that we come to make sense of our world.

The dissertation will suggest that knowledge claims are primarily an attempt to take events from the "real" or experienced world and capture them in symbolic expression. The problem here rests in the fact that while our symbol systems are a product of mankind, the experienced world of reality is not. And it is due to this divergence (between a humanly constructed language and an independently existing world) that we can never be certain of the extent to which our knowledge is an accurate representation of a "real" world event. It seems that we cannot extract from our knowledge those parts which are primarily an artifact of the language system which houses it.

The above argument, however, does not lead to a position of skepticism or relativism. Instead, the dissertation suggests that the test of a knowledge claim is not dependent on its correspondence with a "real" world

event, but rather is assessed by the impact or effect it has on its audience.

To Dr. David C. Ralph, who has given so much of himself to those who work around him. I am very grateful to have been a recipient.

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INTRODUCTION

This dissertation will attempt to examine some aspects of the relationships between language and knowledge. It will be suggested that in order for something to be known, it must be capable of symbolic expression. In this view, people come to know about their world by capturing their experiences in symbols. Those parts or aspects of the world which escape symbolic expression can never become objects of human knowledge. The dissertation suggests that in order for something to become an object of our knowledge, it must become an object of our communication.

The world, that we experience through our senses, comes at us in the form of a constant flow. Every experience which we have of the world is rooted in a particular time, and yet time itself is in a state of continued movement. Time is forever coming at us from the future, and forever leaving us toward the past. As long as our experiences of the world are rooted in the ever flowing nature of time, they are incapable of investigation by human thought and reflection. However, mankind has been given the power to name, and it is through the act of naming that we are able to extract an event or experience from the flow of time and capture it in the form of a symbolic expression.

We do not have to live in the constant flow of experiencing; by giving a name to an experience we can, in some sense, step out of the flow of experience. We can "get a hold" of an experience, we can direct critical thought and reflection

toward an experience, because we can isolate and capture an experience in symbols.

It is the gift of language and the power to name which make human knowledge possible. However, these abilities carry with them a price for the recipients. In the act of symbolization, characteristics of the human condition are fused into the object of representation. In capturing the experience in symbols, we color the experience with our human qualities. Every event of experience which is symbolized owes its existence both to the "real" world event which it represents, and to the nature of the particular symbol system which houses it. In the end, it becomes impossible for us to separate out that part of our knowledge which is an accurate reflection of a real world event, and that part which is an artifact of the symbol system which represents it.

It is a theme of this dissertation that all knowledge must be capable of symbolic representation; all things which are known must be capable of being said. However, the symbol systems which hold our knowledge are not found or discovered in the world; instead, symbols are created, designed and used by humans, and wherever symbols are used they leave traces of our human quality. It is a theme of this dissertation that all knowledge is human knowledge, and that those things which we claim to know say as much about the object they represent as they do about the people who do the representing.

When we study what the ancient Greeks had to say about physics in the third or fourth century B.C., we do so not

because we think Greek speculation about the physical universe to be far superior to current scientific work. Frequently when we study ancient Greek physics, it is not to learn about the world, but instead to learn about the Greeks. We realize that the Greeks will expose themselves and their culture in what they say about the world. The Greek view toward the existence of an external reality, the appropriate method for coming to know this reality, the proper function of logic and rhetoric, and the role of reason and religion, will all be fused into the Greek speculation about the physical universe.

In a similar manner, it is likely the day will come when people read twentieth century physics, not because they think our physicists are particularly profound or accurate; instead these readers will see that we have exposed ourselves and our culture in our symbols. These future readers will care little about our crude speculation on the constitution of primitive particles in matter; instead they will be interested in reading from our work our beliefs about: the existence of an external reality, the appropriate method for coming to know this reality, the proper function of logic and rhetoric, and the role of reason and religion.

There are some Eastern Religions which argue that the truth can only be arrived at by going beyond language and symbols. These religions suggest that humans must go beyond the artificial boundaries of logic, reason and language, and that the truth will be forthcoming only when the world is experienced directly, without the distorting influences of these

other human artifacts. In many respects, the dissertation agrees with this Eastern viewpoint; it will be an implication of this dissertation that the truth could only be experienced, and never known. In order for the truth to be known, it would have to be symbolized; and once symbolized, it would be impossible to separate that part of the truth which was due to its truthful quality (its accurate representation of some experience or event) and that part of the truth which was an artifact of the people who do the symbolizing.

Going out into the world and putting your hand into a fire carries with it a powerful kind of truth. However, in order to know this truth (and not merely experience it) it becomes necessary to develop a theory of matter, energy release, heat, conduction, sensation, pain, etc. In the end, it becomes impossible for us to know what part of our symbolic description of the painful effects of fire really captures what goes on during this event, and what part of our symbolic description is merely an artifact of our cultural beliefs about the proper method for investigating physical, physiological and psychological phenomena. Since perhaps the Peking man some 500,000 years ago, until today, putting your hand into a flame produces a replicable, uniform, lasting truth. However, what we claim to know about this experience has undergone constant and dramatic alteration. It is in this sense that the dissertation suggests that the truth (like the external world) could only be experienced and never known.

The view that all knowledge is human knowledge, and that in the act of symbolizing we inherently color our experiences with our human quality, does not necessarily lead to the position that all knowledge is relative, and that all ideas are equally meaningful or valid. It is the suggestion of this dissertation that in order to call something knowledge it must admit of existence in symbolic form. However, it is a characteristic of symbols that they can be spoken and communicated to others, and it is in this communication to others--and not in their authenticity to some real event--that ideas become meaningful or valid.

Some ideas are spoken and then immediately die; other ideas are spoken and suddenly what we can do or think becomes dramatically changed. After some ideas have been spoken, we find ourselves better able to control the frequency of human conception; after some ideas have been spoken we find we can immunize ourselves against diseases, or reduce infections from incisions or operations; after some ideas have been spoken we find that we can interpret our lives as constant economic exploitation by those who own and control the means of production; after some ideas have been spoken we find that we can interpret our own behavior as resulting from subconscious desires or wishes.

It will be a theme of this dissertation that what makes a particular idea knowledge is not its accurate correspondence with some event or process in this real world (as if this were something we could know anyway) but rather the effect this idea has on the people who hear it. It will be suggested here that knowledge is simply saying something important to another person.

CHAPTER I

A RELATIONSHIP BETWEEN LANGUAGE AND KNOWLEDGE

This portion of the dissertation will try to suggest that in order for something to become an object of our knowledge, it must become an object of our communication. To know something, and to represent that thing in symbols are one and the same process. Those things which are beyond our symbols are, in turn, beyond our knowledge. To be unable to express something in symbolic form is not to know the thing in question.[1]

It may well be the case that there are things which exist in the world which are beyond our language, occurrences which evade our capture in words. But it makes no sense to say we have knowledge of these things. Things may well exist which are indescribable in words; we may feel their presence, but it does not make sense to say we <u>know</u> them.

To know something is to express that thing in symbols. If this were not the case, I could claim tomorrow that I had discovered a cure for cancer, and when the press and scientific community gathered to learn of this new cure, I could explain that while I knew the cure, and while I had the idea in my head, I had not yet found the

appropriate symbols for it and therefore it was incapable of public expression. My audience would surely think I was a fraud, and, of course they would be right. The claim to found a cure for cancer necessarily entails its symbolic expression.

To claim that one has discovered an idea but has not yet expressed it in symbolic form, is like saying that one has built a house, but has not yet expressed it in material form. To build a house is necessarily to work with lumber and nails. The claim to have built a house carries with it the assumption that one can show this house in its material form. It would make no sense to say one built a house but did not work with any materials. The claim to have some knowledge carries with it the assumption that one can express this idea in its symbolic form. It would make no sense to say one had some knowledge, but did not yet have the symbols for it. The symbols are the very material out of which the knowledge is made. The claim to have made the product but not to have any of the materials is senseless.

If the limits of our knowledge are determined by what we are able to say, if what we are able to know is what we can symbolically express, then communication holds a central place in the process of obtaining knowledge. Viewed in this light, communication is not merely "the symbolic transfer of information between people"; communication is not then merely a vehicle upon which ideas are

transferred back and forth; but communication is a requirement or prerequisite for the claim to have an idea. A claim to knowledge is a claim to be able to communicate an idea to an audience of others.[2]

Viewed in this light, ideas are not invented, refined and processed, and then at the end, as a final touch, expressed in symbols chosen to represent the idea accurately. Instead, symbols are present at the very beginning of thought, symbols are the material out of which thoughts are made. Symbols are to knowledge what lumber and nails are to a house. The lumber and nails are not "added on" to the house after the house is built. The lumber and nails are there at the beginning, they are necessary for the very construction of a house. And while a house may be something more than just lumber and nails, so our knowledge may be something more than just symbols, but to speak of knowledge in the absence of symbols is to speak of an object which is made up of nothing.

What we can claim to know is determined by what we are able to say. Our communication determines the boundaries of our knowledge. That communication determines the boundaries of our knowledge is most clearly seen when man feels the need to express something which is beyond his symbolic capabilities. Wittgenstein expresses this thought as follows:

> Man has the impulse to run up against the limits of language.[3]

Some early Greek thinkers (Pythagoreans for example) did not possess a developed vocabulary for speaking about abstract phenomena. For the Pythagoreans, if something was real it must be enclosed in a material body. Thus when asked what is "one" or a "two," the Pythagoreans responded:

> 1 is a point (·), 2 is a line (·——·), 3 is a surface (), and 4 is a solid ().[4]

A contemporary mathematician would probably respond by saying that a number was an abstract symbol which could be assigned to anything in order to fix its place in a series. If I were to stop a person on the street and ask this individual to point to a car or a house, the person could probably do so. Suppose, however, I were to ask this person to point out to me the number "two." Not two houses, or two cars, but "two" in itself. Surely this individual would think I was insane. It is perfectly reasonable, however, to ask a Pythagorean to point to "two" in itself. This is true because it is a requirement of the early Greek language that whatever exists is located in material form. It was not sayable for a Pythagorean that a number was an abstract entity which could be applied to any material object, but had no material form of its own. It is not

that the Pythagoreans rejected our modern notion of a number, it was never thinkable to them in the first place, it was beyond the bounds of their language. When the Pythagoreans began theorizing about numbers, they were brought right to the limit of their language. What they needed to say was just beyond the bounds of their language.[5]

When Werner Heisenberg describes the entrance of quantum theory and the theory of special relativity into classical physics, many of the fundamental controversies are explained as difficulties in language. Words which have clear and distinct meanings to traditional physicists, like "real" and "apparent," become meaningless distinctions to Einstein and Heisenberg. Concepts which were thought to be independent, like the location of an object in space and the time of its occurrence, are now seen as being inherently dependent upon each other. Heisenberg explains,

> The ordinary language was based upon the old concepts of space and time and this language offered the only unambiguous means of communication about the setting up and the results of the measurements. Yet the experiments showed that the old concepts could not be applied everywhere. . . . The real problem behind these many controversies was the fact that no language existed in which one could speak consistently about the new situation.[6]

The ancient Greeks were not the only ones who (as Wittgenstein says) ended up with bumps on the head from running up against the limits of language.[7] Modern physics

has itself come up against the limits of our language. Modern physics has abandoned the common meaning for words like "simultaneous" and has invented new terms such as, "at a space-like distance."[8] They have tried to squeeze the new discoveries into the old language, in order to address the audience of traditional physicists.

It is at the boundaries of our language where the activity of discovering knowledge takes place. To add to the knowledge of humanity is to take an experience from the world, or from the mind, and to make it sayable. To find knowledge is to express experiences in symbols.[9] Long before Newton, people were aware that unsupported objects fell to the earth. When Newton discovered the idea of universal gravitation in 1666, it did not come as a shock to the English population to learn that heavy objects fall to the ground. This was an experience that was before them (and us) all the time. Newton advanced knowledge, however, by making this common experience sayable. That is, Newton enunciated in symbols the principle by which heavy objects attract each other. When Newton explained that objects attract each other reciprocally as the squares of their distances from the centers about which they revolve, he took a common, everyday experience and expressed its principle in symbols.[10]

Prior to Newton, men experienced heavy objects falling, and they acted on the belief that heavy objects would

fall; but we want to say that they lacked knowledge of gravitation. To claim to know gravitation is to be able to express the principle under which it occurs. Newton advanced our knowledge by saying what was previously unsaid; he took an experience, of which we were all aware, and expressed its principle in symbols.

Long before Freud, the subconscious was a motivating force in the behavior of humans. Prior to Marx, false consciousness was used by a powerful class to remain dominant over a weaker one. Before 1897 and J. J. Thompson the electron was a part of the atom. And in advance of Watson, Hull and Skinner, individuals responded to operant conditioning. What each of these individuals did was to take what was already directly before us and express its "being" or its "principle" in symbols. To make advances in knowledge is to take those experiences which exist right before us and to bring them within the bounds of our language.[11] Until the principle underlying these phenomena was expressed in symbols they could not be known to mankind as knowledge.

We tend to see our world through our language, and as a result we frequently mistake the structure of our language for the structure of the world. The Pythagoreans gave no place to non-material phenomena in the world; what this shows, however, is not so much a limitation on the world, but rather a limitation on the type of symbolic capabilities available to the Pythagoreans. As Wittgenstein

says,

> We predicate of the thing what lies in the method of representing it.[12]

Knowledge does not come directly to us from the world but is mediated to us through our language. Those parts of the world which we are unable to symbolically express cannot become knowledge for us. With all the Greek speculation concerning the nature of the physical universe, why is it they never come to write about systems theory or cybernetics? Why is it that the Greeks seem not to speak of non-Euclidean geometrics? Why, when living in the midst of 125,000 slaves did the Athenians not write of "surplus value" or "alienation"?[13]

These ideas, "systems theory," "non-Euclidean geometry," and "surplus value," can be easily taught to a college student. What might account for their absence in the literature of the ancient Greeks? The Greek world must have contained numerous examples of these ideas, the world must have suggested these ideas at every turn. It is not the Greek world, but the Greek language which accounts for the absence of these ideas. Those things in the world which do not conform to our symbolic expression do not become knowledge for us. These ideas are "in" the Greek world but are not "in" the limits of the Greek language. These ideas are not things which a Greek can say, and because they cannot be expressed in symbols they cannot be known.

What is being said here is similar to Kant. Unless the world so structures itself to conform to our symbolic representation it cannot be known. The difference, however, is that for Kant, the transcendental structures of our perception and understanding are fixed or determined by our very nature as human beings, while the limits of our language are the product of human thought and can be expanded or contracted. Knowledge, in fact, consists in expanding the limits of our language, so that experiences which were previously outside our language are now capable of being said.

The Greeks seem not to have expanded their language to include notions of "systems theory" or "non-Euclidean geometry," but they did expand their language to include ideas like "symbolic logic," "scientific method," and "rhetoric." It is perhaps one of the distinguishing characteristics of the Greeks that they brought so much of the world within the scope or domain of language. So much of the world (both physical and social) was forced to give up its secrets because the Greeks both explored and uncovered the world through their discourse.

What is being said here is that in order for something to become an object of our knowledge, it must become an object of our communication. A claim to knowledge is a claim that an idea can be communicated to an audience of others. And that the very act of knowledge is to take

experiences from the world (or the mind) and to express them in symbols. Of course, this should not be interpreted as everything which can be said is knowledge (racoons migrate to Florida for the winter!). Instead, that the objects of our thought must be expressed in symbolic form is a necessary but not sufficient condition of our knowledge. To know something, we must be able to say it, but not everything that is said is knowledge.

Some might choose to argue that what we know has nothing to do with what we can "say," but is rather determined by what we can "do." This view would suggest that a claim to knowledge is a claim to be able to do something, that if we can willfully produce a certain result, it can be inferred that we have some knowledge.[14] To use an earlier example, my claim to have found a cure for cancer does not depend on my ability to enunciate the principle of this cure in symbols, but instead, depends on my ability to eliminate the disease.

Certainly, action, that is, what we are able to do, is intimately related to what we are able to know. But unless we can express the principle behind our behavior in symbols, it does not make sense to say we have knowledge of our action. Suppose my cure for cancer consists of spinning yourself around in a circle at three times during the day. In addition, suppose I am completely unable to explain the process whereby this spinning results in the

arrest of the disease. Even if this cure is proven to be 100% effective, do we really want to say we have increased our knowledge of cancer? Doesn't this behavior seem more grounded in magic than it does knowledge?[15]

Suppose an individual develops a skin rash and goes to seek some advice from a mystic and a medical doctor. The mystic explains that the rash is a warning from the gods that danger is imminent and that the individual should leave this part of the country immediately; the medical doctor explains that the rash is an allergy and that the individual should begin to locate specific elements in his diet and environment which may be related to the illness. Following the advice of the mystic, the cure may be immediate; following the advice of the doctor, the cure may take years. Do we want to say that the mystic possesses a great deal of knowledge and the doctor hardly any?

We may frequently act in situations without being able to express the principle of this action in words; such action may, in turn, be useful or efficacious, but we hesitate to call it knowledge. An action grounded in knowledge is an action whose principle can be expressed in symbols. When the reason for acting can be related to some field of knowledge, when the action can be explained as an implementation of some larger principle or theory, that is, when the act can be explained in symbols, we have some right to speak of knowledge.

In conclusion, the first part of the first chapter of this dissertation is trying to suggest the following: communication is not merely a cart into which knowledge is put, and then pushed back and forth between people. Rather, communication is intimately tied up with the very process by which we obtain knowledge. Viewed in this light, knowledge consists in expanding the limits of our communication so that experiences and phenomena in the world can become knowable (that is, sayable) to mankind. Symbols are not merely the clothing or dressing into which knowledge is put, symbols are the very instruments out of which knowledge is made. And just as the products we can make are determined by the tools we have access to so our knowledge is determined by the limits of our symbolic capabilities. Certain symbolic resources could only yield certain kinds of knowledge.

Communication is to social and mental man what breathing is to biological man. At first you may think it easy to imagine a human being who does not breathe, but shortly you realize that the circulatory system would have to be drastically changed, as would the digestive system, and the skeletal frame; soon what you have no longer resembles a human being at all. A human being who does not have the ability to communicate is not an individual filled up with thoughts and ideas who simply cannot communicate these to others. An individual who lacked symbolic

capabilities would have a mental life so different from ours that we would not want to call such a person human.[16] Here, we are reminded of a thought of Heidegger's:

> For man is man only because he is granted the promise of language.[17]

The Function of "Naming" in a Theory of Knowledge

Time is continually coming at us, and continually passing away from us. We live in a stream or constant flow of time. The moment you try to fix your attention on one discrete segment of time, which you are presently experiencing, it slips away from you, and goes into the past.

The future, which is coming at us, and the past, which is slipping away from us, intersect in each one of us to create the "now," or the present moment. We live not in the future or in the past, but in the present. The present, however, is in a continued stream, it is a never ending series of new moments.[18] As Alfred Schutz explains,

> For I experience my direction as a unidirectional, irreversible stream and find that between a moment ago and just now I have grown older.[19]

In order for us to have knowledge of some particular phenomenon, we must be able to extract this phenomenon from the flow of consciousness, to pull it out of the stream of experience, so that it may be examined by our mental facilities.

Suppose one was interested in studying the white lines which divide the lanes of a highway. If, when driving down the highway, you looked directly below you, very little could be learned about the lines. No sooner would you fix your attention on one line, than it would be gone, and be replaced by another line. It would be extremely difficult to learn of the length, width, or texture of the lines because you would be in the continual process of experiencing the lines, and therefore any analysis of them would be almost impossible. To obtain any valid knowledge about the lines, it would be necessary to either stop the car (which in this example is paramount to stopping time) or to extract a line from the continual flow of lines so that it could be analyzed. A line must be, so to speak, pulled out of the constant stream of lines, and brought into the car with you, so that it can become a constant and stable object of your attention. Alfred Schutz explains,

> The limits of recall coincide exactly with the limits of rationalizability. . . . Recoverability to memory is, in fact, the first prerequisite of all rational construction. That which is irrecoverable--and this is in principle always something ineffable--can only be lived but never thought.[20]

How is it then, that we are able to extract phenomena from our continually living, moving experience and make these phenomena an object of thought and attention? It is by giving a name to a phenomenon, designating that phenomenon

with a symbol, that we are able to hold the phenomenon and subject it to reflective and critical thought. Without the power to name or symbolize, a human would be in the constant process of experiencing what was directly before him. Without the power to symbolize, when an individual went to study at his desk, this person would be in the continual process of experiencing the desk, the books, the light from the window, the pen, etc. For a person to obtain knowledge, one must be able to direct one's attention away from this ever present flow of experience; one must be able to symbolically create the object of the study, in one's mind, and then subject this symbolic object to critical thought and reflection.

The battle of Gettysburg is gone. It occurred in the first days of July, 1863; anyone who may have been present at the battle is dead. The actions and the people involved in the battle have moved away from us into the past, no one living now has any direct experience of this battle and therefore it should no longer exist as a real event in our modern world. But, of course this is not the case. The battle of Gettysburg was named, and in so doing, it was extracted from the flow of time; the symbolic representation of the battle of Gettysburg continues to exist in numerous successions of the present, while the real battle of Gettysburg slips away from us in time. It is important to notice that the battle of Gettysburg can no longer be

lived by anyone: to live the battle of Gettysburg, one would have to be present at its occurrence. The battle of Gettysburg can, however, be thought. The battle of Gettysburg can be symbolically recreated in the mind, by calling up the symbols which describe this event, the battle of Gettysburg can become an object of our thought and reflection.[21]

Perhaps in history there were some very important moments which did not receive names, moments where the participants decided not to record the event in symbols. When the people present at this historic event died, so did the event. Unless an event is pulled from the flow of time and given a symbolic existence, then it would be forever rooted in the time of its actual occurrence, and as this time moved further and further away from the present that we are currently experiencing, it would be as if the event never happened.

The fact that we are able to extract a phenomenon from the flow of time not only permits the phenomenon to endure past the time of its actual occurrence, but permits us also to manipulate the symbolic reconstruction of an event in a manner different from the way the event was actually experienced in the world. The battle of Gettysburg could be symbolically recreated in the mind, so that the Confederates have an additional two divisions, and certain supply lines remain open throughout the course of the battle.

We could then, so to speak, re-run the battle in our mind and deduce what different effects may have come about under these revised circumstances.

The world which Galileo directly experienced in 1632 was a world where the earth was still, the sun moved across the sky, and the earth was the center of the universe. At the same time, the world Galileo symbolically created was one where the earth revolved, the sun was still, and the sun was the center of the universe.

During every day of our life, our direct experience confirms that the earth is still and that the sun moves across the sky. In this case, however, we do not attribute greatest validity to the experienced world, but rather to the symbolic world. The earth and the sun do not offer themselves up to be manipulated by man. But the earth and sun are named, and in their naming, they are extracted from the flow of experience. Symbols are products of man and can be manipulated by humans, the symbolic universe can be modified and altered in ways which are different from the directly experienced universe. To feel the heat of the sun or the firmness of the earth, one must go out and directly experience these bodies. However, to make the earth and the sun objects of our thought we must name them, and in naming them we make them susceptible to manipulation by man, and potential objects of our knowledge.[22]

If humans did not have the ability to name and symbolize, they would constantly be experiencing what was directly before them. I do not have to spend my entire day experiencing my room, my car, my office at Michigan State and so on. Instead, I can decide to direct my attention to the French Revolution or the thoughts of Einstein. I can do so because these events have been extracted from the flow of time and saved in symbols. Because these events have been symbolized they can become possible objects of thought and domains of knowledge.

It was said earlier in the dissertation that ideas are not invented, refined and processed, and then, as a final touch, expressed in symbols. Instead it suggested that symbols were present at the very beginning, that symbols were the material out of which knowledge is made. Hopefully what is written above will help to clarify this statement. Without the ability to symbolize, humans could perhaps directly experience the world before them, but in what way could we imagine them being capable of reflective thought about subjects of their own choice?

Our knowledge is not a reflection of the world, but a reflection of our symbolic recreation of the world. A historian tries to develop a symbolic recreation of the world which exists in close correspondence to the actual experienced world. A contemporary scientist is under little constraint to do the same. The physics of Einstein and the

mathematics of Bolyai and Lobachevski, or Riemann (early developers of non-Euclidean geometry) seem to create phenomena in symbolic worlds which are never experienced in the real world.[23] It is interesting that we so frequently refer to our era as the "atomic age," when the atom is something that no one ever directly experiences, and is instead only a symbolic model of the structure of the most fundamental unit in our universe. It would seem to be the case that we come to live more and more in the symbolic world, and less in the directly experienced world.

In any case, it should be noted that the sun and the earth remained the same before and after Galileo; what changed is what we are able to say.

The Dependence of Knowledge on Communication

Frequently, the dissertation has suggested that in order for something to become knowledge it must be capable of expression in symbols. However, something more specific than this is actually meant. In order for something to become an object of our knowledge, it must become an object of our communication. It is not enough just to symbolize our thoughts or experiences; the symbols which express our knowledge must be drawn from a language which is spoken by a community of others.

It has been said previously that in order for us to have knowledge of an event, it must be extracted from the flow of time and captured in a symbol. The symbol chosen,

however, must have a common meaning to a group of speakers, it must be drawn from a language which is spoken by a community. It is in this sense that all knowledge claims in physics, history, sociology, etc., presuppose communication. If humans were not united by a system of symbols, it would be impossible to make any claim to knowledge.[24]

In this brief section the dissertation will try to discredit the argument that an individual could symbolize one's experience in a private language, (that is, a language whose symbols have meaning for only one individual, and all others would find these symbols nonsense); and that these private symbols could be added up to form some sort of knowledge for the individual. This analysis will rely almost totally on Wittgenstein's argument against a private language.[25]

It is not that a language could not be private and specific to one individual, but rather that such a private language could not yield knowledge. Wittgenstein's argument against a private language could be explicated in the following manner.

Suppose a social scientist proposes the following hypothesis about leadership styles in small groups. The scientist suggests that a small group will maintain an authoritarian leader as long as the rewards from the group activity remain above a certain expectation or comparison level; when rewards fall consistently below this level,

leadership style will change from authoritarian to democratic.[26] The point to keep in mind, however, is that this theory is expressed only in a private language, that is, the symbols have meaning only to the speaker (i.e., the scientist).

Within his private language, the scientist has decided that everytime he observes a group move from authoritarian to democratic leadership, he will designate this change with the symbol, "M."[27] Wittgenstein's argument against a private language would seem to run as follows. After several successive observations, how does the scientist know he is using the symbol "M" appropriately? That is, how does he know that "M" is the symbol which means a change in leadership style from authoritarian to democratic? The answer seems simple enough: the scientist needs to remember what "M" means and to use it consistently each time a group shifts from authoritarian to democratic leadership.[28] One wants to say that the scientist must have a good memory, he must firmly impress it on himself what the meaning of "M" is. Wittgenstein answers,

> But, 'I impress it on myself' can only mean: this process brings it about that I remember the connection <u>right</u> in the future. But in the present case I have no criterion of correctness. One would like to say: whatever is going to seem right to me is right. And that only means that here we can't talk about 'right.'[29]

Suppose after using the symbol "M" several times correctly, the scientist observes a change from authoritarian to democratic leadership and labels it "R." How is this error to be corrected? (Remember, that this is a private language and only the scientist, and no one else, speaks it.) In this case there seems to be no difference between "using a symbol correctly" and "thinking you are using a symbol correctly." Wittgenstein is suggesting that if there is absolutely no difference between doing something correctly, and merely thinking you are doing it correctly, then we are not speaking about knowledge. In his explanation of Wittgenstein's argument, Norman Malcolm explains:

> My impression that I follow a rule does not confirm that I follow the rule, unless there can be something which will prove my impression correct.[30]

Perhaps a proponent of private language argument would suggest that the scientist write down the definition for his symbols, so that he would not have to rely on his memory, but could refer to a written table. One must remember, however, that this is a private language, and the definitions are as private as the symbols themselves. That is, the definition for "M" might look like: M = Lo, Blo. In the end the speaker of a private language must remember the definitions for symbols, and there is no way of checking whether the speaker has used his symbols correctly.

Knowledge is something which can be checked, which has a criterion for being right or wrong. Symbols can only yield knowledge when we know the symbols have been used correctly. It is not just that claims made in a private language are not knowledge for us, but rather, they are not knowledge for anyone, not even the speaker of the language.

We can only know that symbols are being used correctly when they are drawn from a public language. If the language that you speak has a community of users, then we have some way of determining whether you have used a symbol correctly, that is, we can ask the other speakers. If we have doubts whether "M" is the symbol which designates a change in leadership style from authoritarian to democratic, we can ask others.

Much space has been devoted to Wittgenstein's argument against a private language. The argument, however, is central to the thesis. Many writers have suggested that man's conceptual and cognitive abilities are dependent upon his symbolic capabilities: this dissertation, however, suggests that the ability to produce knowledge is dependent on the ability to communicate. Man is a knowing animal because man is a communicating animal. Symbols are necessary for knowledge, but not just any old symbols will do; the symbols must be chosen from a language spoken by a community. It is for this reason that the dissertation is about communication and not psycholinguistics or philosophy of

language. It is for this reason that the dissertation begins, "in order for something to become an object of our knowledge, it must become an object of our communication." Knowledge is possible because man can capture his experiences in symbols, but the symbols chosen must be selected from a community of speakers. Man is capable of knowing because he is symbolically tied to a community of others.

FOOTNOTES

[1]An attempt here is being made to perform a Kantian interpretation of communication where the transcendental structures of our perception and understanding are replaced by the structures of our language.

This analysis is primarily inspired by two sources:

Mandel, R. Heidegger and Wittgenstein, A Second Kantian Revolution. In M. Murray (Ed.), Heidegger and Modern Philosophy. New Haven, Conn.: Yale University Press, 1978, p. 259.

Cavell, S. Availability of Wittgenstein's Later Philosophy. In Must We Mean What We Say. Cambridge, England: Cambridge University Press, 1976, p. 44.

[2]The dissertation is not trying to make a temporal claim, for example, that symbols are prior to thought. Neither will the dissertation attempt to explicate the process by which we name or give symbols to thoughts. Instead, the dissertation has a more modest claim, namely that in order to call something knowledge, it must exist in symbolic form. Those things which do not exist on symbolic form cannot become candidates for human knowledge.

[3]Wittgenstein, L. On Heidegger on Being and Dread. In M. Murrey (Ed.), Heidegger and Modern Philosophy. New Haven, Conn.: Yale University Press, 1978, p. 80.

[4]Guthrie, W.K.C. The Greek Philosophers from Thales to Aristotle. New York: Harper & Row Publishers, 1975, p. 14.

[5]Ibid., pp. 49-50.

[6]Heisenberg, W. Physics and Philosophy. London: George Allen and Unwin LTD, 1971, p. 150.

Russell, B. ABC of Relativity. London: George Allen and Unwin LTD, 1971, p. 49.

[7]Wittgenstein, L. Philosophical Investigations. Translated by G.E.M. Anscombe. New York: Macmillan Company, 1978, #119, p. 48[e].

[8]Heisenberg, op. cit., p. 151.

[9]Once again, the dissertation is not arguing that we cannot have any thoughts without symbols. There are perhaps certain forms of Eastern mediation where a specific attempt is made to think in non-symbolic forms. The claim being made here is rather that in order for a thought or experience to exist as a knowledge claim it must have a symbolic existence.

[10]The Newton example is suggested by Heidegger.

Heidegger, M. Being and Time. Translated by Macquarrie and Robinson. New York: 1962, p. 227.

> To say that before Newton his laws were neither true nor false cannot signify that before him there were no such entities as have been uncovered and pointed out by these laws. Through Newton the laws became true; and with them, entities became accessible in themselves to Dasein. Once entities have been uncovered, they show themselves precisely as entities which beforehand already were. Such uncovering is the kind of being which belongs to 'truth.'"

[11]This analysis is suggested by Heidegger and Wittgenstein.

Wittenstein, L. Philosophical Investigations, #129, p. 50e.

> One is unable to notice something-- because it is always before one's eyes.

Heidegger, M. On the Way to Language. Translated by P.D. Hertz. New York: Harper and Row, 1971, p. 93.

> It was said that it [thinking] leads us only to where we already are.

[12]Wittgenstein, L. Philosophical Investigations, #104.

[13]Kitto, H.D.F. The Greeks. Baltimore, Md.: Penguin Books, 1967, p. 132.

[14]See especially vonWright's description of scientific knowledge of causal relationships.

vonWright, G.H. Explanation and Understanding. Ithaca, N.Y.: Cornell University Press, 1971, p. 73.

[15]It will be suggested later in the dissertation that a thought becomes knowledge when it is communicated to an audience of others with some effect on their thought or behavior (see Chapter III). What is being argued here is that a behavior is a "knowing act" not simply because it works, but rather when the principle underlying the behavior can be expressed symbols.

[16]Physical injuries to the brain can severely alter an individual's ability to verbalize, conceptualize and behave in numerous situations. For a discussion see,

Cassierer, E. The Philosophy of Symbolic Forms, Vol. 3: The Phenomenology of Knowledge. New Haven, Conn.: Yale University Press, 1973, esp. Part II, Chapter 6, "Toward A Pathology of the Symbolic Consciousness," pp. 205-261.

[17]Heidegger, M. On the Way to Language, p. 90.

[18]This analysis rests heavily on H. Bergson as discussed in,

Schutz, A. The Phenomenology of the Social World. London: Heinemann Educational Books, 1967, p. 47.

[19]Schutz, A. The Phenomenology of the Social World, p. 47.

[20]Schutz, A. The Phenomenology of the Social World, p. 53

[21]For a discussion of the relationship between action and the passage of time see,

Arendt, H. The Human Condition. Chicago, Ill.: University of Chicago Press, 1958, pp. 175-243.

[22]Mandel, R. Heidegger and Wittgenstein, A Second Kantian Revolution. In Heidegger and Modern Philosophy, p. 265.

> A theory begins by seeing the familar in other terms; the human body is seen as a machine, an object is seen as the synthesis of mere data, the meaning of a word is seen as a picture or an atmosphere. In order for salt to be seen as a crystal-line atomic structure, or for the earth to be seen as moving about the sun, men must change their perspective, perform certain actions, and imagine things in certain ways. It is through the establishment of a procedure and a language that the world appears in a definite manner.

[23]Reichenbach, H. The Philosophy of Space and Time. New York: Dover Publications, 1958, pp. 1-10.

(see also)

Cassirer, E. The Problem of Knowledge. New Haven, Conn.: Yale University Press, 1970, pp. 21-37.

[24]It is not that a hermit living on a deserted island could not make claims to knowledge, but only that there would be no independent means of verifying the claim. And where there is no method of independent verification we do not usually speak of knowledge. We could give the same validity to the knowledge claims of a hermit as we would to a scientist whose experiments could be replicated by no one except him or herself.

(see also)

Arendt, H. The Human Condition, p. 262,

> . . . it is as if Galileo's discovery proved in demonstrable fact that both the worst fear and most presumptuous hope of human speculation, the ancient fear that our senses, our very organs for the reception of reality, might betray us, and the Archimedian wish for a point outside the earth from which to unhinge the world, could only come true together, as though the wish would be granted only provided that we lost reality--and the fear would be compensated by the acquisition of supramundane powers.

[25]Wittgenstein's argument against a private language, in Philosophical Investigations, #s 243-363.

[26]This example borrows social scientific concepts from the work of Anthony Heath, Kurt Lewin, and, Thibaut and Kelley.

Heath, A. Rational Choice and Social Exchange. New York: Cambridge University Press, 1976.

Thibaut, J.W. and Kelley, H.H. The Social Psychology of Groups. New York: John Wiley & Sons, 1959.

(for Kurt Lewin see)

Cartwright, D. and Zanders, A. Group Dynamics: Research and Theory. New York: Row Peterson, 1953, pp. 287-301.

[27]Wittgenstein. Philosophical Investigations, #s 260, 261-265 and 270.

[28]Kenny, A. Wittgenstein. Baltimore, Md.: Penguin Books, 1973, p. 192.

> Wittgenstein is not arguing 'When next I call something 'S' how will I know it really is S? He is arguing 'When next I call something "S" how will I know what I mean by "S"?' Even to think falsely that something is S, I must know the meaning of 'S'; and this is what Wittgenstein argues is impossible in the private language.

[29]Wittgenstein. Philosophical Investigations, #258.

[30]Malcolm, N. Wittgenstein's Philosophical Investigations. In V. C. Chappell (Ed.), The Philosophy of Mind. Englewood Cliffs, N.J.: Prentice-Hall, 1962, p. 76.

CHAPTER II

THE IMPLICATIONS OF A LANGUAGE ORIENTED VIEW OF KNOWLEDGE

Chapter I of this dissertation has suggested that in order for something to become an object of our knowledge, it must become an object of our communication. What we are able to know is, therefore, bounded by what we are able to say. Chapter II will investigate the practical consequences of this communication based view of knowledge. Specifically, this chapter will suggest that if knowledge is a function of our symbolic capabilities, then all claims to knowledge must be: imperfect, insecure, and admitting of multiple interpretations.

The Imperfect Fit

One does not need language in order to experience the world. To take a walk in the forest, to feel the heat of the sun, to hear waves on the shore does not require symbols. It is only when one begins to make claims about the world, that symbols become essential. To have an experience of the world does not require that one live in a symbol system shared by others--to make knowledge claims about that experience does.

The earth is about two to three billion years old; humans, in their present form, are a little over a million years old. The world that we experience has been here a long time before us, and will be here a long time after we are gone. The existence of the world does not depend on our speaking about it. It is this gap, therefore, (the gap between an objective, independent world and a subjective, dependent symbol system) which may account for the inherent imperfection in human knowledge.

The world never fits quite right into what we say about it. Symbol systems are human constructions, the world is not; and while some descriptions of the world will fit better than others, none of them are likely to totally capture its essence.

That language is a human construction is both its greatest strength and weakness. It is a strength in the sense that each description of the world stands as living evidence of mankind's desire and ability to come to some understanding of the events which surround him. The written works of Athens are not only useful pedagogical devices, they stand as a living tribute to the humanity and spirit of a civilization which otherwise would have disappeared over two thousand years ago. That Homo sapiens are thoughtful and inquiring animals is evidenced by their attempt to describe and explain the world in which they live.

That language is a human construction could also be interpreted as a weakness. Every claim that is made about the world reveals something about the world, but also reveals something about the speaker.[1] When we examine our knowledge, it becomes impossible to separate exactly the part of our knowledge which is an actual characteristic of the world, and the part of our knowledge which is more characteristic of the person who did the describing. When an intellectual historian examines the study of physics in the 18th century, he does so not because 18th century scientists were much smarter than present ones, and knew a great deal more about the world; instead the historian is aware that the 18th century scientist will reveal a great deal about himself and his society in the claims he makes about reality.

The fact that today we believe that the sun is only one star in a galaxy of about 100,000 million stars; and that an appropriate method of preventing pregnancy is by the injection of hormones into a woman's body--will reveal to future generations a little bit of information about the world, and a great deal of information about us.

Viewed in this light, knowledge is always an interaction of the object being described, and the person describing it; and the knowledge claim is as much about the one, as it is about the other. It is this characteristic of knowledge which makes it possible for us to demonstrate

our human qualities and impossible for us to get an uncontaminated picture of the world.[2]

At times the symbols we have at our disposal are not adequate for describing or explaining the kind of experiences we are having. Specifically, in the field of subatomic physics, we have been brought face to face with phenomena in the world which evade unambiguous description in words. It is not simply a difficulty of finding the right word, as it is not having any word which accurately captures these events. The lack of fit between our symbol system and the world, and the resulting ambiguity is evidenced by this quotation from Robert Oppenheimer,

> If we ask, for instance, whether the position of an electron remains the same, we must say 'no'; if we ask whether the electron's position changes with time, we must say 'no'; if we ask whether the electron is at rest, we must say 'no'; if we ask whether it is in motion, we must say 'no.'[3]

Many of the concepts in our language which we have inherited from the Greeks are "essentialist" in nature.[4] That is, the words are intended to capture the "essence" of the thing. Our language instructs us to cut through the accidental qualities, or the characteristics which vary, in order to arrive at the inward nature or true substance of a thing.

Aristotle explains that there are four kinds of questions we can ask of any phenomena, "and it is in the answers to these questions that our knowledge exists."[5] Aristotle's four questions are: "is it?," "what is it?," "what are its attributes?" and "what is the cause?"[6] These questions are intended as a useful aid in arriving at the "essence" of a thing or occurrence. If, however, we ask these "essentialist" questions of subatomic particles, the gap between an essentialist language and perhaps a non-essentialist phenomenon produces ambiguity and confusion.

Aristotle meant the first question, "is it?," to be a question which is asked "without further qualification." Either a thing is, or it isn't. In the world of subatomic particles, however, this question is not capable of a definitive answer.

Physicists can study subatomic particles by accelerating them and causing them to collide with one another inside a bubble chamber.[7] The collision of these subatomic particles, protons or neutrons, leaves tracks inside the chamber and these tracks can be photographed and studied.

The question of whether something is a proton or not leads to a very ambiguous answer, full of qualifications. The proton is not so much a massive particle as it is a bundle of energy. At any single instant, the proton is not so much a "thing" as it is a "series of interconnections between things." A proton is a bundle of energy which is

constantly in the process of rearranging itself, and as it rearranges, it becomes different particles.[8]

The following diagram is an interpretation of a proton track photographed in a bubble chamber.[9]

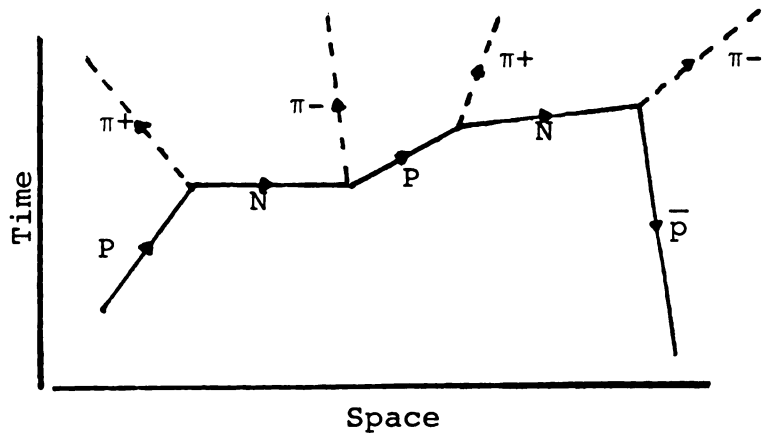

Figure 1. Feynman Diagram.

In this diagram, the verticle axis is time, and the horizontal axis is space. Starting from left to right the diagram could be spacially read as follows: a proton (P) moving through the bubble chamber emits a pion (π+) and becomes a neutron (N); in turn, the neutron emits the pion antiparticle (π-) and becomes a proton again; the proton once again emits a pion and becomes a neutron; and the neutron once again emits a pion antiparticle and a proton antiparticle ($\bar{p}$).

A temporal reading of this diagram would show that the proton-neutron-pronton-neutron alternation occurred

consecutively over time; however, the first pion and pion antiparticle are emitted at the same time, and the proton and proton antiparticle are both in existence during the same time.[10]

When one realizes that these particles are moving at speeds of 600 miles a second and the photographs cover a time period of less than a millionth of a second, then it becomes clear that the proton is not a discrete thing but rather a transitory form that the flow of energy sometimes appears in.

If a book which was located on your desk suddenly became a lamp, and then a phone, and then a clock, and then disappeared totally, and then reappeared as a book again, and then as a pen, eventually you would stop speaking about a book at all, and instead would become interested in the sequences of events. Your attention would focus on questions of the sort, "what are the chances of the book appearing again after the sequence of a phone and a clock?" A book would be described not by its essentialistic qualities, but rather by its probability of occurrence.[11]

It is in this sense that quantum theory would answer the question, is this a proton or not?, with the response, the thing we call a proton has a 30% chance of occurrence in this kind of a situation. Quantum theory has replaced the essentialistic Aristotelian question of "is it?" with a probabilistic question, "how much of a tendency is there

for this to occur?"

The reader may be a bit confused by the last couple of paragraphs, and this is exactly how things should be. The entire point of this section is that subatomic particles seem to demonstrate a reality which is probabilistic, continuous and dynamic, while the language being used to describe them is essentialistic, discrete and static. The fit between the symbol system and the world is imperfect, and the attempt to force one into the other results in distortion and confusion.[12]

The second question Aristotle tells us we can ask of all phenomena is "what is it?" If we ask the question "what is it?" of subatomic particles, then once more confusion and ambiguity come to the surface.

A particle and a wave are two separate and distinct entities. A particle is a material body, condensed into a small area, and having some mass; a wave, on the other hand, is an immaterial disturbance spread out over a relatively large area of space.[13]

A particle A wave

A wave and a particle, in the language of the logicians, are mutually distinct categories. A wave is not a particle and a particle is not a wave. However, scientists answer the question "what is it?" of subatomic

elements, e.g., electrons, by responding, an electron exhibits the qualities of a particle, and the qualities of a wave. A subatomic unit, therefore, like an electron, is both an "A" and a "not A," a "B" and a "not B." In this case, the logic of language is not accurately fitting the nature of the thing to be described.

In certain respects, the electron acts like a wave, that is, it is capable of diffraction; and in certain respects, the electron acts like a particle, that is, radiation, or the release of subatomic particles, seems to come in chunks or "quanta" pockets.[14] Neils Bohr responded to this apparent contradiction by introducing a new word and concept, "complementary," into the vocabulary of physics. Heisenberg explains as follows:

> Bohr advocated the use of both pictures, which he called 'complementary' to each other. The two pictures are, of course, mutually exclusive, because a certain thing cannot at the same time be a particle (i.e., substance confined to a very small volume) and a wave (i.e., a field spread over a large space), but the two complement each other. By playing with both pictures, by going from one picture to the other and back again, we finally get the right impression of the strange kind of reality behind our atomic experiments.[15]

We then arrive at a position where the answer to Aristotle's first question (is it?) is answered by, "a certain probability of existence"; and the answer to Aristotle's second question (what is it?) is answered by, "it's

two different and distinct things at the same time." It is not until attention is directed at Aristotle's third question (what are its characteristics?) that we can begin to answer in a clear manner. In fact, what can be summarized from this analysis is that there is no definitive answer for Aristotle's first and second question, and we must begin with the third question. That is, we can only inquire about a thing's characteristics and not what the thing is, or even, whether it is.

It is important to note that the answers to Aristotle's first two questions will not arrive with the breakthrough of some new technology. The physicists, quoted here in this text, argue that in principle subatomic particles do not admit of essentialistic definitions. It is not that the first two questions are presently without answers, it is instead, that they are inappropriate questions to ask in the first place. If you explained to a friend that you had a very sad day yesterday, and he responded by asking you, "How many miles per hour was your sorrow?" you would probably find this a very strange question. Except in a metaphorical sense, one does not usually ask the velocity of emotions; this is an inappropriate question within this domain. And except in a metaphorical sense, one does not ask whether an electron "is" or not; this is an inappropriate question to ask of subatomic particles.[16]

The example above shows that the reality of subatomic particles does not lend itself to unambiguous descriptions in language. That there is a gap, however, between our language and the world, that symbols and events may be two different types of reality, need not lead to skepticism, or a doubting of all knowledge. In fact, it is at exactly these junctures where knowledge is advanced. Subatomic physics will need to expand the boundaries of language and invent new ways of speaking and different forms of symbolic description.

Physics stands in need of a method for attributing identity to a phenomenon in constant flux.[17] The logical law of contradiction, that a thing cannot be "A" and "not A" at the same time, needs to be transformed so that a single entity can be defined as the intersection of mutually exclusive sets. A method of speaking needs to be formulated so that we do not have to posit an object and set of characteristics attached to the object; but that the thing itself is nothing more than a manifestation of characteristics. The model of an object behaving must be replaced with the "behavior" being the object. Knowledge in this field will be advanced by the development of new ways of speaking.

In the Identity of Man, Bronowski writes:

> Science is not so much a model of nature as a living language for describing her.[18]

And in Magic, Science and Civilization, Bronowski goes on to characterize science as a process "of enlarging a language."[19] Bronowski, a mathematician and biologist, frequently expressed the intimate relationship between scientific knowledge and language:

> What we do in our pedantic, pedestrian, but essentially human way is constantly to refine our inner language in a communicable form so that we are able to utter more and more sentences which make sense about nature and describe her in a lawful way. And then science tests these imaginative predictions, and so on.[20]

Advances in knowledge are advances in our language. We invent new symbols and give new meanings to old symbols, in order to better describe and interpret the experiences that are before us.[21] But symbols are man-made and the world is not. Our symbols are constrained by the biological, psychological and sociological conditions of man, the world is not. Our knowledge of the world is limited to what is "sayable" for a human, and it is for this reason that we cannot have total confidence in the truth of knowledge. It is possible to expand our language, advance our knowledge, and come to a better description of the world. But this description will never capture the world; language operates under a constraining set of parameters, which there is no reason to believe exist in the world. Language must conform to the human condition, the world need not, and due to this fact, our knowledge must always

be considered imperfect.[22]

What has been written above suggests that there is a gap between the symbolic constructions of our language and the objective world which it refers to. It is this gap between our symbols and the world which makes knowledge imperfect.

The same kind of a gap can be illustrated in the methodology of the social sciences. What we work with in the social sciences is a sample; however, what our knowledge refers to is a population. The real object of our study--the population--is the very thing that we never actually manipulate, control or investigate.

Even a correlation coefficient of .99 or an F-ratio significant at .001 level does not leave the social scientist convinced of a certain relationship between variables. The social scientist is aware that these findings have been derived from the sample; and that an element of crucial importance--the extent to which this sample is an accurate representation of the population--is assumed and not proven in the study.[23] In other words, our knowledge is grounded in something other than what it refers to.

What we study is the sample, what we manipulate or question is the sample, and in the end, what we know is the sample. The object of the investigation is knowledge of the population; the population, however, never really enters the study as a variable. The link between the sample

and the population (and the various assumptions that go with it--normality, homoscedasticity, etc.) are assumed and not proven in the course of the investigation.

The analogy, I believe, holds for knowledge in general.[24] What we study are symbols, what we manipulate are symbols, but what we hope they apply to, is the world. It is this world, however, which never really enters the investigation, and the link between the symbols and the world is assumed and not proven.

Galileo did not manipulate the sun and the planets, Freud did not manipulate the id and the super ego, Marx did not manipulate the dominant class, and even Newton did not manipulate mass, force or acceleration. What Newton manipulated were material bodies, and mass, force and acceleration were symbolic constructions which he employed to describe the behavior of these objects. Others, before and after Newton, have used totally different symbolic constuctions to describe the exact same events (e.g., Aristotle and Heisenberg). What undergoes constant transformation and alteration is not the world, but our symbolic descriptions of it.

The physical scientist cannot get his hands on acceleration, the scientist cannot get pure acceleration and analyze it as a thing-in-itself. What the scientist actually investigates is not the "acceleration" itself, but its indicator--a change in velocity. And, in turn, velocity

cannot be measured as a thing-in-itself, but is only known through its indicator--a change in position over time.[25] And the numerical measurement of position is entirely dependent on the coordinate system used, and this decision of coordinate systems is a purely human one and not, in any way, prescribed by the nature of reality.[26]

It is as if we want to get outside of ourselves and investigate the world--as it "really" is. But this is impossible. The world that we actually study, the world that we investigate, is a humanly constructed and humanly prepared world; and it bears our mark all over it. What we end up knowing is our symbolic interpretation of the world and not the world itself; just as what we end up knowing in the social sciences is the sample and not the population. Despite the fact that our knowledge is nothing more than symbols, we want it to apply to something beyond symbols--we want it to apply to the world. It is exactly this link, however, between the symbolic description of the world, and the world as it "really is," which is not studied and could not be proven. Our knowledge refers to the world, it is about the world, and it should help us act in the world; but this knowledge cannot be traced back to the world itself, but instead has its origin and construction in human symbols.

FOOTNOTES

[1]This analysis is inspired by Kant. Kant, I believe, argues that only those parts of the world which conform to our categories of observation and thought can be seen or known by man (Critique of Pure Reason, preface to the second edition, p. 22). Therefore, what we are able to know is predetermined by the human characteristics of the mind.

[2]Langer explains,

> Human intelligence begins with conception, the prime mental activity; the process of conception always culminates in symbolic expression. A conception is fixed and held only when it is embodied in a symbol. So the study of symbolic forms offers a key to the forms of human conception. The genesis of symbolic forms--verbal, religious, artistic, mathematical, or whatever modes of expression there be--is the Odyssey of the mind.

Langer, S. K. Translator's Preface. In E. Cassirer (Ed.), Language and Myth. New York: Dover Publications, 1953, p. ix.

[3]Oppenheimer, J.R. Science and the Common Understanding. Quoted in F. Capra, The Tao of Physics. New York: Bantam Books, 1975, p. 139.

[4]For a description of an "essentialist" logic, see:

McKeon, R. Philosophical Semantics and Philosophic Inquiry. (Mimeographed), Chicago, Ill.: University of Chicago, 1966, p. 11.

[5]Aristotle. Posterior Analytics, Book II, Chapter 1 896.25 and 896.35, R. McKeon, The Basic Works of Aristotle. New York: Random House, 1941, p. 158-159.

[6]I have not used the same ordering of questions that Aristotle does, instead I have used the ordering suggested by McKeon, in:

McKeon, R. Discourse, Demonstration, Verification, and Justification. Entretiens de l'Institut International de Philosophic, Liege, Septembre 1967, (Lauvain Nauwelgests, 1968), pp. 37-55.

[7]Capra, F. The Tao of Physics. New York: Bantam Books, 1975, p. 68.

For a more complete description of how a bubble chamber works see:

Caldor, N. The Key to the Universe. Baltimore, Md.: Penguin Books, 1977, pp. 39-45.

[8]Capra, The Tao of Physics, p. 69,

> All particules can be transmitted into other particles; they can be created from energy and can vanish into energy. In this world, classical concepts like 'elementary particle,' 'material substance,' or 'isolated object' have lost their meaning; the whole universe appears as a dynamic web of inseparable energy patterns.

[9]This illustration is a "Feynman Diagram" taken from Capra, The Tao of Physics, p. 226.

[10]The reader should be aware that the author is not a physicist, and that his accounts of subatomic events comes from secondary popular sources and not the original scientific works.

[11]The probability of a subatomic particle moving from one particular state to the next can be described in matrix form. In "S Matrix theory," physicists lay out the probabilities of a type of subatomic particle (specifically the hadrons) moving from one form to another. A similar parallel can be found to "S Matrix theory" in communication research involving Markov processes.

[12]Due to the fact that the language of mathematics can be probabilistic, continuous and dynamic, it is not surprising that physicists prefer to use this language system to describe subatomic events.

[13]Capra, The Tao of Physics, p. 55.

[14]Heisenberg, W. Physics and Philosophy. London: Unwin University Books, 1958, p. 35.

[15]Heisenberg, Physics and Philosophy, p. 50.

[16]It is interesting to note that in the paper, "Discourse, Demonstration, Verification, and Justification," Richard McKeon analyzes the different use of Aristotle's four questions from ancient times to the present and writes:

> The transformation may even seem to be a substantive philosophic innovation for the questions are no longer questions of essence or cause but questions of process and structure in which essence and cause survive as anachronisms or figures of speech (pp. 46-47).

[17]The impression should not be given that the changes subatomic particles undergo are random in nature. Instead there are certain regularities, "all particles of a given kind are completely identical; they have exactly the same mass, electric charge, and other characteristic properties; . . . all charged particles carry electric charges exactly equal (or opposite) to that of the electron, or charges of exactly twice that amount.

Capra, The Tao of Physics, p. 235.

[18]Bronowski, J. The Identity of Man. Garden City, N.J.: Doubleday, 1971, p. 42.

[19]Bronowski, J. Magic, Science and Civilization. New York: Columbia University Press, 1978, p. 55.

[20]Bronowski, Magic, Science and Civilization, p. 51.

[21]Capra, in The Tao of Physics, argues that physicists could better explain subatomic events with the use of concepts from oriental religion and philosophy, e.g., the Koan, yen and yang, the tao, etc.

[22]Part of what has been argued is that from the Greeks we inherited concepts which are distinct from each other and static in nature. A notable exception to this is Heraditus (about 500 B.C.). See Guthrie, W.K.C. The Greek Philosophers. New York: Harper and Row, 1975, p. 43.

[23]Campbell, D.T. and Stanley, J.C. Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally, 1973. (See particularly, external validity) p. 5.

[24]The analogy between symbols and the world, and the sample and the population, breaks down on the following point. At least, in principle, the population could be investigated (e.g., the census); while the world could never be examined independent of a humanly constructed symbolic representation of it.

[25]Young, A.M. The Geometry of Meaning. San Francisco, Ca.: Delacorte, 1976, p. 14.

[26]Russell, B. An ABC of Relativity, p. 74.

CHAPTER III

THE ROLE OF COMMUNICATION IN THE VERIFICATION OF KNOWLEDGE

In the first chapter, the view was expressed that in order for something to become an object of our knowledge, it must become an object of our communication. Expressed was the belief that knowledge is a human construction; that people model their thoughts and experiences in symbols; and that these symbols reflect not only the nature of the world, but also the nature of the builder.

Earlier (in Chapter II) it has been suggested that the symbols at our disposal are sometimes inadequate for describing our experiences in the world. Specifically, in the world of subatomic particles it was suggested that constraints on our symbol system are not necessarily constraints on the world. That is, our symbol system obeys certain laws of logic (e.g., the law of contradiction) and is "essentialistic" in nature, while subatomic particles were shown not to exist under the same constraints. Advances in knowledge in the area of subatomic physics are not dependent on our "getting the behavior of an electron down right" because Heisenberg has explained that, by definition, the behavior of an electron can never be

observed or recorded exactly.[1] Instead, advances will occur when physicists expand the boundaries of their language so that the behavior of an electron can be communicated about among a community of people.[2]

Heisenberg, in his Uncertainty Principle, showed that the very act of observing an electron so alters its behavior that it is impossible to tell which effects are really due to the electron and which effects are merely due to the observational process. What we don't know (and what Heisenberg says we never will know) is how the electron behaves in the absence of our observing it.[3]

It is interesting to note that physical scientists are encountering some of the same difficulties that social scientists have always faced. That is, the attempt to study some subject has the effect of altering that subject's behavior. Heisenberg's Uncertainty Principle, Campbell and Stanley's Testing Effects, and Miller's Demand Characteristics all have at least one point in common: the data which we receive is some combination of "real" behavior and also the disturbing influence of the observational process.[4]

Physicists are not going to get the electron "down right" and social scientists are not going to get human behavior "down right"; and it is probably not even very accurate to say we are getting closer and closer to getting our knowledge "down right." It is perhaps only with some

arrogance that humans who are about a million years old with a language which is perhaps two thousand years old (Latin), have claimed to locate some pivotal truths in a universe which is over 10,000 million years old.[5] Why should we expect a very young and highly constrained language to accurately capture a very old and sophisticated world? Wouldn't it be more reasonable to describe knowledge as what we humans say to each other in order to explain or describe our experiences in the world?

Aristotle's physics, viewed in a contemporary light, would seem to be wrong. In Aristotle's opinion the earth was made up of four basic elements, earth, air, fire and water. These four elements possessed a natural kind of movement, up for fire and air, and down for earth and water. The movement of these elements was rectilinear and discontinuous. The heavens, on the other hand, were composed of a fifth material, "aither," which was not found on earth and whose natural movement was circular.[6]

We want to say that the scientific views of Aristotle seem to be wrong; this simply is not the way the world is. Aristotle's symbolic model of the world is not a very accurate picture of the way the world really is. Do we want to contend that because of this lack of fit, between the model and the real world, that Aristotle's physics is a clear example of a bad or worthless theory?

These few paragraphs written on Aristotle lead to the following point: the value of a theory is not determined by its correspondence with the "real" world, but instead, by the influence it has on the people who hear it. Worth is attributed to Aristotle's theory not because he did, or did not, get the world right, but because of the tremendous impact his thought had on the Greeks, during the Middle Ages, and on modern atomic science. Werner Heisenberg's chapter on "Quantum Theory and the Roots of Atomic Science" is a chapter about early Greek metaphysics and scientific explanations of the world, and it seems unlikely that the title of this chapter is an oversight.[7] Aristotle's theory is an important one because it enabled many generations of people to describe their world, it permitted people to act, based on reasoned conclusions (even if we now think these conclusions to be wrong), and it influenced later symbolic constructions of the world. The value of a theory is not determined by whether it gets the world "down right"--as if this were something we could know anyway--the value of a theory is determined by the effect it has on the people who hear it.

The dissertation is suggesting, in this chapter, that knowledge achieves its validity in the same way (according to George Herbert Mead) that an "act" achieves meaning. Mead explains that an act requires one person to put it forward, and a second person to "react" to the act. The act

receives meaning according to the reaction or response of the person it is directed toward. As Mead says, "The act of adjustive response of the second organism gives to the gesture of the first organism the meaning which it has."

> Meaning is thus not to be conceived, fundamentally, as a state of consciousness or a set of organized relations existing or subsisting mentally outside the field of experience into which they enter; on the contrary it should be conceived objectively, as having its existence entirely within this field itself. The response of one organism to the gesture of another in any given social act is the meaning of that gesture. . . .[8]

Mead suggests that an act is given meaning according to the response of the person the act is directed toward. A similar argument is being made here about knowledge.

Knowledge, according to this view, does not grow "out there" on the earth; knowledge is not objectively out there waiting to be gathered up by a scientist. At best, what is out there is data or information, and this does not become knowledge until it is communicated to another person with some effect or influence on that person. Knowledge emerges from interaction, but not interaction between a scientist and "the way the world really is," but an interaction between two people. When an idea is communicated from one person to another, with some impact or influence on the other's thoughts or behaviors, then knowledge has occurred.

It was suggested in the first chapter that knowledge is a human construction. People take experiences from the mind (geometry, for example), or experience from the world (physics or sociology) and try to capture these experiences in symbols. What is being suggested here is that the value of this knowledge is determined in its communication. Knowledge does not consist of getting the world down right; knowledge occurs in the context of one person speaking to another. When the idea or thought expressed enables the listeners to perform some behavior which previously they were unable to perform; to explain some event previously unexplained; or to think some thought previously unavailable to them; then knowledge has been achieved.

Perhaps there are some people in the social sciences who would choose to argue that before we accept anything as knowledge there must be empirical evidence in support of it. According to this view, knowledge in the social sciences comes in the form of theories which express relationships between variables which can be operationalized and measured on some scale. When the relationships expressed in the theory (to some degree) can also be located in some data (gathered by either experimental or survey designs), then knowledge has been achieved. This dissertation is suggesting that the procedure described above could only be a preliminary activity to the attainment of knowledge. The theoretical relationship which has been supported by some

empirical data does not become knowledge until it is communicated to some other individual who endows it with meaning or significance. Unless knowledge is viewed as meaningful communication between people, then we would be forced to say that findings like the number of episodes of Kojak one watches a year is inversely related to family size, are knowledge. Such relationships will not count as knowledge until they are spoken to a community of others and have some impact on their thought or behavior. Locating relationships in data is a useless activity unless it leads to some meaningful idea which can be communicated.

In the mid-eighteen hundreds, Karl Marx expressed his thoughts about the development of society in words. Today over one billion people in the world profess to be Marxist.[9] Countless people have died, institutions have been changed, national boundaries have been redrawn, perhaps the very future of human existence depends on the peaceful coexistence of those who support and those who oppose these social and political views.

Only a contemporary social scientist could look at Marxism and say, "we are not yet sure if this is a valuable theory or not; however, there are some studies coming in next month on dialectical materialism and we'll send you the final verdict." Marxism is a powerful and important theory not because it can or cannot be verified in some data, but because it speaks to people, it says something to

them about their lives, and directs them to act in a particular manner.

Aristotelian physics became knowledge when people began to redescribe their world in Aristotelian terms and to act on premises consistent with the theory. Regardless of the fact that we currently believe the world does not operate according to Aristotle's theory, it still remains knowledge today. Its correspondence with the world is not the central issue; the central issue is the influence it still exerts on contemporary scientists. And as long as this influence persists, Aristotelian physics will remain knowledge.

Human knowledge is the meaningful communication of ideas between people. When these ideas exert some influence on another, when they suggest a reasoned course of action, when they permit a new or different way of looking at the world, then they are knowledge. Whether this idea is an accurate picture of the way "things really are" may be an interesting question; but it is not the final judge of the idea. Aristotelian physics may not give a very accurate picture of the "real" world; few, however, would deny its influence or place as an example of human knowledge. Whether a factor analysis shows that numerous S.E.S. variables really can be described by high loadings on two factors (which we could name "bourgeoisie" and "proletariat") is an interesting and important question, but the

validity of Marxism does not await its answer. Marxism became an example of human knowledge when people began to change the face of the world based on its suggestions and conclusions. Scientists do not give theories validity by proving them empirically; people give theories validity by deeming them relevant and important to their lives.

Perhaps the criticism could be made that the social sciences have been a failure. Such a criticism might suggest that we have failed to locate laws of human behavior, (in other words, the sociological and psychological equivalents to Newton's F=MA). If one's criteria of knowledge is the specification of theoretical relationships unequivocally validated across numerous samples in a variety of situations, then perhaps this criticism is an accurate one. However, if one views knowledge as an interchange of important and inspiring ideas between people, then the criticism is very poorly grounded. History provides numerous examples of social theorists directly influencing the lives of people: Max Weber's influence on the structure and form of contemporary organizations, John Dewey's influence on our present educational institutions, Watson and Skinner's influence on correcting deviant behavior, Marx's influence on world politics, the influence of Adam Smith, Keynes and Galbraith on economic policy, the influence of Freud on various forms of counseling and therapy, the influence of Herbert A. Simons on organizational decision making, the influence of

the Surgeon General's Report on Violence in the Media, etc., etc., (someone more qualified than the author could certainly extend this much further).

Going to the moon was a very spectacular and colorful event and certainly a tribute to mathematics, physics and engineering. But after all, in the end, very few of us went. In comparison, think of the number of people who go to school, work for an organization, undergo some form of counseling or therapy, are influenced by government or business economic decisions, or are exposed to the influence of the mass media.

What has been written above is both polemical and academic. It is polemical in that it tries to show the influence of psychology, sociology, communication, political science and economics on social institutions and practices. It is academic in that the dissertation is trying to suggest that these examples of human knowledge draw their importance and validity not from verification by empirical studies, but by the fact that these theories speak to people about themselves and the world around them. Empirical testing can be a very useful and important device in persuading people about the importance of an idea, but it is not the final judge of knowledge. The final judge of knowledge is the impact attributed to an idea by an audience of others. Mead's notion of a "generalized other," Freud's theory of "sublimation," Marx's discussion of "false

consciousness" will not lend themselves easily to empirical verification.[10] Does this mean that we withhold the title of knowledge from them, and describe them as mere hypotheses which stand in need of some validity check? Instead, it seems that these examples have already passed the test of knowledge; they have given to us a set of constructs for explaining our behavior and the behavior of others around us; and they have suggested a reasoned course of action for us to follow in order to attain some goal.

It is not being argued here that knowledge should be put to a vote. I'm O.K. You're O.K. may have more readers than Explorations in Interpersonal Communication, and Julius Fast may have a larger audience than Randall Harrison, and this does not make the former any more a source of knowledge than the latter. Instead it is being argued that knowledge has a particular quality; the quality is not that knowledge is a symbolic representation of some event in the "real" world, but that knowledge is an attempt by one person to say something meaningful and important to another.[11]

The dissertation wishes to go as far as to suggest that something could be completely wrong (that is, inconsistent with present interpretations of the facts) and still be knowledge. Aristotle's physics seems to be wrong. However, Aristotle's idea that by reason and observation mankind could formulate a set of principles explaining the

behavior of terrestrial and heavenly bodies, has had a profound impact on human thought. The fact that Aristotle's idea lead him to a seemingly erroneous set of conclusions about the physical world is of little or no importance. Aristotle's contribution to knowledge rests on the influence and impact he had on his listeners.

In the Ascent of Man, Bronowski briefly mentions the work of a Johann Friedrich Blumenbock.[12] During the early 1800's, Blumenbock collected numerous human skulls from various parts of Europe. In 1840, Blumenbock died, but his collection was added to by other contributors. Anatomical measurements from this collection of skulls were eventually used by Hitler's National Scocialist Party to prove the innate superiority of the Aryan race. This theory appeared to have a very powerful influence on parts of the German population who read it. Do we want to call this knowledge also? I think the answer is yes. It is a shameful and degrading example of knowledge, but knowledge nevertheless.

It was suggested earlier that in our claims to knowledge we reveal both our thoughts about the world, and about ourselves. The racist theory based on the skulls of Blumenbock tells us nothing about the world, and an enormous amount about man. The theory was knowledge for the 1930's Germans because it provided a construct for explaining their current social conditions, and because it justified

to them a frightening course of behavior. The theory is still knowledge to us today; it conveys a very important message. It is knowledge of the egoism and paranoia which can emerge from human interaction; and the extent to which we can hate and hurt the people who live around us. This is perhaps knowledge of a most powerful kind.

This dissertation is trying to suggest that knowledge is a human activity. Knowledge is constructed by humans; knowledge is inherently marked or colored by human traits exposed in its construction; and, in the end, the test of something being knowledge is whether it is relevant and speaks to a community of people. Some would perhaps argue that knowledge should be like a "snapshot" of the world; it should be a straightforward representation of the way things really are. However, a little reflection will show that the color of the world--as portrayed in the snapshot--may depend on the speed of the film used by the photographer, and the sharpness of detail on the shutter speed selected, and the appearance of depth on the particular lens used; and in the end, the snapshot is a two dimensional representation of a three dimensional world and thus greatly distorts the world "as it really is." The point is that there seems to be no way of getting at the world independent of the people engaged in the knowledge gathering activity. We leave our mark on our knowledge, we color our knowledge with our human qualities. Some might

suggest that we should stand up and compare our human constructed model of the world with the real world, and then save those parts of knowledge which accurately correspond and jettison those parts which are different. This, of course, assumes that we could get our hands on the real world, independent of the distorting and coloring effects which occur in the getting. Instead, what we actually do is compare one humanly constructed model against another. Knowledge is a human activity; it is the exchange of ideas (in the form of messages) between people.

Aristotle believed that the planets and stars were fixed on a series of crystalline spheres. As each sphere revolved it took certain stars and planets with it.[13] By positioning several different spheres, revolving at different speeds, on different axes, Aristotle could account for numerous astronomical events. In retrospect, however, we now see that the Greeks did not capture the world as it really is, but only constructed a symbolic model which allowed them to give some explanation for astronomical events which they observed. This is not an accurate picture of the world, but only an inspiring and creative idea transferred from one person to another.

Ptolemy (AD 150) described the motion of the sun, moon and planets as each revolving about the earth forming perfect circles with the earth at the center.[14] Copernicus (1543) realized, however, that Ptolemy had not described

the way the world really is, but had only described the motion of the planets from his perspective (that is, from the perspective of someone on the earth). Copernicus placed the sun at the center, and had each of the planets, (with the earth being the third) revolving in circular motion about the sun.[15]

Looking back we can easily see that each of these individuals created a symbolic model of the world. None of these models seems to us as correct representations of the world, but that does not really detract from their importance because it enabled a community of people to make some sense of their world; it gave them a set of principles for explaining the motion of heavenly bodies. If we evaluate these models according to their correspondence with the "real" world we may want to say that they are all a failure. However, this is not how we evaluate knowledge--we evaluate knowledge according to whether it helps people or not--that is, whether it makes a contribution to other people. Had any of these theorists kept these models secret, then they truly would be worthless bits of information. Because, on the one hand, they would not, according to present scientific opinion, be considered correct, and on the other, they would not have made any contribution to human understanding. It is in this sense that knowledge is a communicative event; it is one person inspiring or touching another with an idea.

We want to feel that we have somehow escaped the errors of the past. We want to breathe a sigh of relief as we realize that we are living in the 20th century and can therefore enjoy the benefits of an "exacting" empirical science. We realize that Aristotle, Ptolemy and Copernicus all lived under erroneous beliefs about the movements of stars and planets. We see that they did not capture the world "the way it really is," but only created symbolic models based on their own personal thoughts and ideas. However, we want to feel that we have emerged from this darkness, we are tempted to say that we know that the earth is round or elliptical, that it revolves about the sun, the sun is the center of the solar system, and that the solar system is a member of the Milky Way galaxy of stars, and the Milky Way is one galaxy of many.[16] We want to say that science, through observation, has compared this model against the "real world," and it has proven to be true (as if Aristotle, Ptolemy and Copernicus did not do the exact same thing)![17]

We are left supporting the following kind of argument: that for about 5,000 years (assuming astronomy to have begun about 3,000 BC in Babylon) people have been speculating about the motion of stars and planets and have constantly been in error--now, however, in 1978, we believe we have finally got things right.[18] Wouldn't it perhaps be more prudent to argue that what we really have is an "idea" about

the world? It is a valuable idea because it is useful, that is, it helps us to explain and make sense of our world; but in the end, only an idea, and one which experience suggests is probably not a very accurate picture of what is "really" out there.

What is written above will not be seen as a pedantic sidetrip into the history of science; what is meant is to suggest something directly relevant to the social sciences.

It is possible to take the position in the social sciences that in order for any idea to achieve validity it must be supported by empirical evidence. That is, variables related in a theory must be found in the same relationship in some empirical data. This position rests on the assumption that the only way to know if a theory is valuable is to see if it really exists this way in the "real" world. The only test conceivable, in this view, is whether the theory is proven by the data.

There is, however, another kind of test. Perhaps the best test of an idea or theory is to give it to other people and let them live with it. Let them take your theory into their lives and see if it helps them to make sense of the world around them. Let them take your theory into their actual interpersonal relationships, encounters with the mass media, or experiences in organizations, and see if it suggests valuable courses of action to them in real life situations. The dissertation is arguing that a good theory

will speak to people, it will provide them with constructs which enable them to explain and interpret their world; and in problematic situations it will suggest to them a possible course of action. The suggestion is being made that we, in the social sciences, should try and teach our ideas to people, and that the test of our ideas should rest in their utility and validity to an audience of others. The final test of an idea is not whether it corresponds to data which is produced by numerous experiments and surveys, but whether it speaks to any other people.

Isn't this what has happened with the theories of such people as Freud and Marx? We, in the social sciences, are waiting to see if Marxism is knowledge; that is, we are analyzing the data which tests the Marxist theory. Especially in Britain, numerous studies are underway to see if modern industrial society is really a two class structure; to see if there is "exchange mobility" across social strata; to see if classes divide according to the means of production; to see if expropriation of "surplus value" still provides the substances for the dominant class, etc. These studies are exceedingly interesting and important, but they are not the <u>most</u> important tests of Marxism. The real test of Marxism is whether it speaks to people, whether it enables them to explain and interpret events or occurrences in their lives, and whether it suggests to them potential courses of action. These are the only "real

life" tests and they are the ones which determine the importance of an idea.[19]

Instead of allowing real people to judge our theories in their own real life situations, we have frequently selected a different kind of test. We sneak around behind people and surreptitiously record their behavior; we spy on them through two-way mirrors; we deceive people into thinking they are performing some civic duty when it is really a contrived situation full of actors; we ask people to show on a one to five scale their feelings about violence, sex, war, etc.; we ask people to play games with chips and to pretend it's money; we ask people how much a light in a perfectly dark room is moving; we lead them to believe someone is a stranger when he is really part of the experiment; we ask people to pretend that they are a president of a large corporation, a member of a jury, or a poverty stricken person with a large family in an underdeveloped country; we alter the mechanism of a clock to make the time seem to go faster; we lie about the effects of a drug injected into their bodies. Is this really the arena where knowledge is proven?

What is written above is not meant to defame these empirical studies. Several of the studies implicitly referred to above are more important (and will continue to have a more profound impact on their readers) than the work that you currently hold in your hands. Instead, what

is suggested above is that the real test of a theory does not occur in a contrived laboratory experiment or paper and pencil measures on a questionnaire. The real test of a theory occurs when people take your ideas into their own personal lives. Validity is attached to a theory when it enables people to explain and interpret events which occur in real life situations. Theories should help people make sense of their world, to advocate ways of looking at problems, and to suggest a path to possible solutions. To the extent that a theory is able to bring about these kind of results, then we can feel confident in attributing validity to it.

What is written above is, in no way, meant as an appeal to abandon empirical research.[20] Empirical studies using factor analysis, for example, can be useful in suggesting new ideas, or directing our attention to relationships of which we were previously unaware. By use of mathematical modeling, it may be possible to explore the implications of the relationships expressed in the theory. Path analysis could perhaps tell us if we have selected variables in our theory which have high applicability to a particular audience on a particular topic, that is, whether these variables expressed in this relationship are central to the topic at hand. Analysis of variance could suggest various places to look in order to find useful or suggestive categorizations of human behavior. Viewed in this

light, empirical studies are a preliminary activity to the attainment of knowledge. Empirical studies are useful in the preparation and refinement of ideas, and can assist in discarding ideas which are likely to be irrelevant to a particular audience about a particular topic. We employ empirical tools in order to help us say something important; but the "test" of whether we accomplish this goal depends on the people we end up speaking to.

The National Science Foundation in Washington, D.C., does not have office after office loaded up to the ceiling with stockpiles of human knowledge. The National Science Foundation in Washington, D.C. has office after office loaded up to the ceiling with information; it does not become knowledge until it has been communicated to some other person with some effect on his or her social or mental life.

Given this view, the social scientist is a teacher. The social scientist is an individual who has some idea about the social world, and who tries to teach this idea to a group of others. Empirical methods can be used to help the teacher prepare the idea or as a persuasive device to enlist the belief of others in the idea. But, in the end, an idea is tested in the lives of the students who hear it. The social scientist is not a neutral investigator who wears a white coat and impartially carries theories in and out of a laboratory proving whether they are true or not. Instead, the social scientist is an inspired individual, who

has noticed something important about the social world, and who wants to teach this idea to a group of others.

Everyone in the social sciences is a student of Aristotle's. It was Aristotle who formulated the scientific method and taught us how to make inductions from observational data.[21] Every time an empirical study is initiated in the social sciences, we prove ourselves to be students of Aristotle, and to give new life and force to an idea that was initially his.

It is unlikely that many of us would claim to have the genius of an Aristotle. It is unlikely that many of us would have been able to invent the scientific method on our own. The reason that the social sciences exist today, in 1978, is because a group of people, who came before us, have taught us this method of investigation. The reason that the social sciences presently exist is because earlier social scientists were teachers. That is, they had an idea about the social world and the most effective means for investigating it; and we, the present generation of social scientists, were inspired by the teaching and began to see the world and act on the principles it suggested.

If scientists were not teachers, the entire methodology would last one generation, and then be lost forever, or at least until the birth of another Aristotle.

What is being suggested throughout this dissertation is that knowledge is a symbolic activity, that our

knowledge is really a symbolic construction of the way we believe the world to be. In addition it has been suggested that the test of our symbolic models is not whether they correspond to the real world. This could never be the test of knowledge because (1) this comparison is not a possible human activity and (2) if this were the test of knowledge, then the entire history of mankind would be one of persistent and incorrigible ignorance.

Perhaps knowledge occurs when one individual communicates an idea to another, and the idea permits the other to see something which was previously unseen. Viewed in this light, knowledge is a communicative activity; it is the exchange of ideas between people; and the test of the idea lies in the response of the listener. Those ideas which enable the listener to make sense of his world and to explain the events around him; those ideas which suggest to the listener potential solutions to problems; those ideas which enable the listeners to think some thought which was previously beyond him; can be entered into the domain of knowledge.

FOOTNOTES

[1]Heisenberg, W. Physics and Philosophy. London: Unwin University Books, 1958, p. 141.

[2]Bronowski, J. Magic, Science and Civilization. New York: Columbia University Press, 1978, p. 51.

[3]Capra, F. The Tao of Physics. New York: Bantam Books, 1975, p. 143.

[4]Campbell, D.T. and Stanley, J.C. Experimental and Quasi-Experimental Designs for Research. Chicago, Ill.: Rand McNally, 1973, p. 9.

(see also)

Miller, A.G. The Social Psychology of Psychological Research. New York: Free Press, 1972, especially "On the Social Psychology of the Psychological Experiment: With Particular Reference to Demand Characteristics and Their Implication" by M.T. Orne.

[5]Lovell, Sir Bernard. In the Center of Immensities. Presidential address to the 137th annual meeting of the British Association for the Advancement of Science. Delivered in Guildford Cathedral, August 1975. Also printed in Zahavy, Zev, Whence and Wherefore, The Cosmological Destiny of Man Scientifically and Philosophically Considered. Cranbury, N.J.: A. S. Barnes and Co., 1978, pp. 19-39.

[6]Lloyd, G.E.R. Aristotle: The Growth and Structure of His Thought. Cambridge, England: Cambridge University Press, 1968, pp. 134-139.

[7]Heisenberg, Physics and Philosophy, pp. 58-70.

[8]Mead, G.H. On Social Psychology. Chicago, Ill.: University of Chicago Press, 1964, p. 165.

[9]This dissertation is not trying to make an ethical evaluation on the theories of Marx. It is not trying to say that the political prescriptions of Marx are either good or bad; instead the point is that Marx is an example of a social theorist who seems to have said something very meaningful to a particular audience of people. For a philosophical criticism of Marxism see:

Popper, K.R. The Open Society and Its Enemies. London: Routledge, 1974, Vol. 2, pp. 81-211.

For a more quantitative discussion of the extent to which the Soviet Union is, or is not, a classless society see:

Parkin, F. Class Inequality and Political Order. St. Albans, England: Paladin, 1975, pp. 137-159.

[10]The extent to which Marx and Freud can count as explanations of human behavior is discussed by:

Ryan, A. The Philosophy of the Social Sciences. New York: Macmillan Press, 1970, p. 163.

[11]It is very difficult to imagine an empirical verification of the works of Wittgenstein. And, in turn, they have never been popular works in the sense of the "best sellers list." What, however, makes these works a powerful example of human knowledge is what they tell us about ourselves and our interactions with others; and the influence of this thought on others (e.g., Malcolm, Anscombe, Toulmin, vonWright, etc.). See especially:

Malcolm, N. Ludwig Wittgenstein, A Memoir. Oxford, England: Oxford University Press, 1975.

[12]Bronowski, J. The Ascent of Man. Boston, Mass.: Little Brown and Co., 1973, p. 367.

[13]Guthrie, W.K.C. The Greek Philosophers. New York: Harper and Row, 1975, p. 137.

[14]Bronowski, The Ascent of Man, p. 164.

[15]Bronowski, The Ascent of Man, p. 196.

[16]Lovell, B. Man's Relation to the Universe. San Francisco, Calif., 1975, p. 74.

[17]Cavell, S. Availability of Wittgenstein's Later Philosophy. Published in Must We Mean What We Say. New York: Cambridge University Press, 1976, p. 2.

> Both of them (Freud and Wittgenstein) are intent upon unmasking the defeat of our real need in the face of self-impositions which we have assessed (108), or fantasies ("pictures") which we cannot escape (115). In both such misfortune is betrayed in the incongruence between what is said and what is meant or expressed; for both the self is concealed in assertion and action and revealed in temptation and wish.
>
> (Numbers in parentheses refer to paragraph numbers in Part I of Wittgenstein's Philosophical Investigations.)

[18]This date, 3,000 B.C., for the beginning of astronomy in Babylon, is taken from Bronowski, The Ascent of Man, p. 165.

[19]For a theoretical discussion of the relationship between Marxism and modern society see:

Giddens, A. The Class Structure of the Advanced Societies. London, England: Hutchinson of London, 1973.

For a more quantitative analysis of the relationship between Marxism and modern Britain see:

Westergaard, J. and Resler, H. Class in a Capitalist Society: A Study of Contemporary Britain. Middlesex, England: Harmondsworth (Penguin), 1975.

[20]The social scientists which this dissertation refers to earlier, Freud and Marx, specifically state that they engaged in empirical study. In other words, the dissertation is, in no way, suggesting that good social science requires the abandonment of quantitative techniques. For a discussion of the relationship between an "exact science" and "speculation" in Freud see:

Hughes, H. S. Consciousness and Society. St. Albans, England: Paladin, 1974, p. 128.

For a discussion of Marx as a scientist, see:

Marx, K. In T.B. Bottsmore and N. Rubel (Eds.), Selected Writings in Sociology and Social Philosophy. Middlesex, England: Harmondworth (Penguin), 1974, p. 30.

[21]For a discussion of the method of science and philosophy in Aristotle see:

McKeon, R. The Basic Works of Aristotle. Introduction by McKeon. New York: Random House, 1941, p. xvi.

CHAPTER IV

THE IMPLICATIONS OF A COMMUNICATION BASED VIEW OF KNOWLEDGE TO THE SOCIAL SCIENCES

It has been a central theme of this dissertation that knowledge is a human construction. It has been suggested that knowledge is not passively "out there" in the real world waiting to be gathered up by people. Instead, knowledge is here viewed as a human activity; both its birth and verification are the result of action performed by people. The birth of knowledge is a result of the symbol-making capabilities of humans, and the verification of knowledge depends on the communication of ideas among people with some consequential effect on their behavior or thought.

It is being suggested that empirical analyses of concepts in the social sciences are useful to the extent that they serve a human idea. When an empirical technique is able to clarify or reform an idea, is able to make an idea more plausible or persuasive to an audience, is able to make an idea more relevant or practical for its users, then it is an undertaking that is worth while. In this view quantitative techniques are a tool and not a final judge of human ideas. There are, perhaps, ideas in the social sciences which we want to call knowledge but do not

lend themselves to unambiguous confirmation by empirical techniques (e.g. Marx, Freud and Mead). In turn, there may be items which are supported in empirical investigation which we do not want to call knowledge (e.g. the number of episodes of Kojak one watches is inversely related to family size).

A 500 variable by 500 variable correlation matrix is not a vast stockpile of knowledge; it is only a vast stockpile of data. Whether any of this data is important will depend on the human idea with which it is incorporated. And the final test of validity will depend on the effect this idea has on its listeners.

One could, of course, reject the thesis being presented here and argue that the test of an idea in the social sciences rests on a comparison of the idea and what is "really happening out there." This view might suggest that we compare our "idea" of how people behave with the "real" way people behave in the social world. The problem here is that there is no way of getting at the way people "really" behave in the social world. Every datum which is gathered from the social world is heavily marked or colored by the ideas of the investigator. Data gathering is a human activity and human ideas greatly affect both the data that are collected, and the conclusions drawn from the investigation. As a result, what is done in the process of a social scientific experiment or survey is to compare one

humanly stated idea about social behavior with yet another humanly stated idea about social behavior. All knowledge is human knowledge, and the process of knowledge is one of comparing and communicating ideas which have been invented and certified by humans. What is being abandoned here is the view that knowledge is a process of checking ideas against the way things "really" are in the world. What we have access to are our humanly stated ideas about the world, what we do not have access to is the way the world "really" is. What we will never know is what the social or physical world is "really" like, independent of our process of investigating it.[1] It would seem imprudent to give a definition of knowledge which left us without any. As Bronowski explains in The Ascent of Man,

> One aim of the physical sciences has been to give an exact picture of the material world. One achievement of physics in the twentieth century has been to prove that that aim is unattainable.[2]

Just as physics has found it impossible to arrive at an exact picture of the material formation of matter, communication researchers have found it impossible to arrive at an exact picture of the movement of transfer of messages between people than go to network analysis in a social event. Network analysis is a social science technique for specifying the flow of information with an organization or group.[3] Respondents can be asked with whom they speak

about particular organizational topics (e.g. production, maintenance, innovation). These communication contacts can be represented in matrix form or graphically pictured on a network map.

Suppose a social scientist performs a network analysis on an organization and finds: 6 groups, 8 liaisons, and 4 isolates. Upon taking these findings to the individual who commissioned the study, this individual may ask, "Are these groups 'really' in my organization?" This question is, of course, completely beyond the bounds of social scientific investigation. The investigator does not know what groups are "really" in the organization; the findings, for example, that there are 6 groups, 8 liaisons, and 4 isolates, is not a picture of the way the organization "really" is, but instead is a human interpretation of the data. The conclusions from a network analysis are an inextricable mixture of the data reported by respondents and numerous judgments made by the investigator. What we do not know is what the group composition or communication networks would be independent of the human interpretation involved in the analysis.

Within the context of network analysis, numerous decisions and judgments must be made by the investigator, and the results. A decision must be made as to whether to include or drop out unreciprocated links in the analysis; in other words, for a contact to be included, must A report talking to B, and B also report talking to A? A decision

must be made as to the maximum path length of any two group members; in other words, if the maximum path length is 6, then if A and B are in the same group, they must be able to get messages to each other without passing the message through more than 6 other people. A decision must be made about the number of groups an individual could simultaneously belong to; that is, if the percent of in-group communication- compared to total communication- is set at 51% then each individual could belong to only one group. If, on the other hand, the percent of in-group communication is set at 30%, then an individual could belong to as many as 3 groups, at 20% an individual could belong to 5 different groups, at 10% an individual could simultaneously belong to 10 different groups.[4]

The meaning of what is written above is that at each of these decisions points the intervention of human judgment is necessary, and these judgments will eventually determine what the data are able to show.[5] The conclusions of a network analysis will directly depend on human ideas expressed by the investigator, or by the consensus of investigators in a particular field. Different human judgments at these decision points will result in totally different conclusions regarding group formation, number of liaisons, number of isolates, etc.[6] The data may confine and restrict the speculation of the investigator, but the speculation of the investigator also confines and restricts the data.

Within network analysis the criteria of what constitutes a group or a liaison are not found in the data, but are imposed on the data. No empirical study of groups could determine what attributes characterize a group, because this investigation would have to assume the very thing it was meant to discover, i.e., by what criteria do we identify a group. The conclusions of a network analysis are the product of the communication contacts reported by the respondents and the product of the idea which the investigator has about what constitutes a communication link, and what constitutes a group. Like all human knowledge, network analysis may reveal a great deal about the world, but it also reveals a great deal about the investigator. And, in the end, what we do not know is what the organization is really like independent of the human act of investigating it.

Empirical investigations of Marx, Freud or Mead may either support or contradict portions of their theories, and social scientists should probably take this evidence into account when evaluating the meaningfulness of these theories. It should, however, be noted that what is being done here is to compare one set of human ideas (those of Karl Marx, for example) with yet another set of human ideas (those used by the investigator in the process of conducting the study). There is no final court of appeals which we can send our ideas to in order to ascertain their truthfulness.

Our humanly stated and reasoned ideas are evaluated by recourse to yet another set of humanly stated and reasoned ideas, and this is not to deny that evaluations can and must occur, but only to insist that human ideas are certified in reference to other human ideas and not according to their correspondence in the real world.

Suppose a social scientist is interested in the different rates of violent crimes committed in urban areas in different parts of the country. The cities investigated could be New York, Detroit and Dallas, the areas of the country they represent could be the east, midwest and southwest, and violent crimes could be defined as, murder, forcible rape, robbery and aggravated assault.[7] The violent crime rates for these cities for the years 1970, 1972, 1974 and 1976 are depicted in the table below.

Table 1. Crime Rates for Violent Crimes in Selected Cities (Offences known to police per 100,000 population)

	New York	Detroit	Dallas
1970	1,381	1,934	966
1972	1,525	1,650	905
1974	1,615	2,004	866
1976	1,781	2,226	815
Sums	6,302	7,814	3,552
Means	1,575.5	1,953.5	888

An attempt is being made here to investigate a very standard and basic approach to the quantitative examination of social phenomena. This example is inspired by the work of Emile Durkheim, who perhaps began the modern empirical study of sociological variables in his book Suicide.[8] In Suicide, Durkheim investigated the rate of suicides for different European countries, and also the rates of suicide for different segments of the same country (e.g., along such dimensions as religious orientation: Catholic, Protestant and Jewish).[9]

When a one-way analysis of variance is performed on the "Crime Rates" table, then the conclusions can be presented as below.[10]

Table 2. Results from Anova on Crime Rate Table

	Sum of Squares	Degrees of Freedom	Estimate of Variance	F
Total	849,257	11		
Between	583,603	2	291,801	9.88
Within	265,654	9	29,517	

(critical F at .01 significance level is 8.02)[11]

From this analysis, we may then want to conclude that there is a significant difference (at the .01 level) in rates of violent crimes for the geographical areas (east, midwest and southwest) which these cities (New York, Detroit and Dallas) represent. It is analyses such as the

one conducted above that give the impression of getting at the "real" world; it is not immediately apparent that human ideas permeate the entire analysis and determine the nature of the data and conclusions.

In Suicide, Durkheim felt that he had taken an idea (e.g. anomic suicide) and established it as a "social fact" by showing its correspondence in the real world.[12] However, in 1967 Jack D. Douglas published a critical analysis of Durkeim's work entitled The Social Meaning of Suicide.[13] In this book, Douglas suggests that what Durkheim investigated were not the suicides that "really" occurred, but instead investigated the various ideas about what constitutes a suicide as held by numerous individuals (e.g. doctors, coroners, police, clergy, etc.). Douglas shows that suicide rates collected from the same populations differ dramatically according to who collects the data (e.g. the clergy, government agency, or sociologist). It becomes apparent in Douglas's book that suicides do not stand up by themselves and ask to be counted, but instead that the declaration of suicide involves a human judgment and rests on a human set of criteria.

Different coroners were shown to have totally different ideas about what constitutes a suicide (e.g., one corner explained that he would only label a death a suicide when a suicide note was present). Doctors expressed great difficulty in determining whether an event is an

accidental drug overdose or a purposive case of barbiturate poisoning; whether something is an accidental fall or a jump. By what criteria does one know an accidental drowning from a suicide by drowning? Douglas discusses the difference in suicide determination that could result from different police investigation practices. That is, a very intensive investigation could reveal a motive for suicide in the victim's financial records, marital relationship, mental health, etc. A less extensive investigation may not uncover a motive and thus a suicide will pass for an accidental death.

Douglas discusses a case study in California where a soldier kills himself at a party while playing Russian Roulette with a rifle. Is this a suicide? If this is a suicide, is an automobile accident at a professional race track also a suicide?

The point of what is written above is that the opinions, values, and judgments surrounding the idea of suicide are inherently and inextricably fused with the "real" incidents of suicide. In the case of network analysis, it was suggested that the investigator forms an opinion about what constitutes a group and then imposes this idea on the data. In this example, people form opinions about what a suicide is, and then they impose these ideas on numerous incidents of death. In this view, the conclusions from a network analysis are an informed and

intelligent idea (constrained by the data) about the composition of communication groups within an organization; and the conclusions from Durkheim's Suicide are informed and intelligent ideas (constrained by the data) about the social causes of suicide.

The conclusions from network analysis and Suicide are not proven by their empirical correspondence in the real world. It has already been suggested that the investigator imposes the idea of what constitutes a group on the network data; and in the case of Suicide, Durkheim does not prove his ideas by showing their existence in the real world, but in the end, only compares his ideas about suicide with yet another set of ideas about suicide held by doctors, coroners, police, etc.

What is being suggested here is that empirical techniques are useful tools in the birth, preparation and presentation of ideas; but that empirical techniques do not certify our ideas by showing their existence in the real world. Knowledge, it is being suggested here, consists of taking an experience from the world, or a thought from the mind, and constructing this experience or thought in symbols. And that the verification of knowledge comes in the meaningful communication of these symbols to an audience of others. In its simplest terms, knowledge is saying something important to another person.

In the author's example above, an analysis of variance has shown a significant difference in crime rates for three different large regional cities, New York, Detroit and Dallas. It is tempting to say that the idea that urban crime rates tend to be different for respective areas of the country (east, midwest and southwest), has been proven. It is tempting to say that this idea has been validated by its existence in the observable world. However, if one wants to argue that the only way to establish the truth of a humanly stated idea is to show its existence in an objective real world; then one must show that the objective real world can be analyzed independent of humanly stated ideas.

The violent crimes reported in the "Crime Rates" table, are made up of murder, forcible rape, robbery and aggravated assault. It would be convenient if one could go out into the world, find these crimes and count them, but unfortunately this is not the case. Murder, for example, is not a phenomenon existing in the world, but instead is a word or a concept. It is up to the people in the legislature to determine what criteria must be met for the designation of the word, "murder"; and it is up to the courts and judges to determine if a particular sequence of events fulfills these criteria. A knife being plunged through the ribs is an event in the real world; a murder is a symbolic denotation which may or may not be applied to

the event depending on numerous human judgments (premeditation, passion, sanity, self-defense, fair and proper investigation and trial procedure, age of suspect, etc.). The exact same act, in the exact same situation, with the exact same intentions may one day be a kind of murder, and the next day be perfectly legal (e.g., immediately before and after an abortion ruling and immediately before and after a declaration of war).

A decision must be made as to whether we want to call deaths from inhalation of industrial pollutants a murder. A decision must be made as to whether we want to call deaths resulting from known defects in automobile gas tanks a murder or not. When increases in productivity are not returned to workers in higher wages, has a robbery occurred? When companies raise their profits and still keep to voluntary price constraints by practicing product deterioration, has a robbery occurred?

The communication consultant imposes his criteria of a group on the data; Durkheim's corners impose their definitions of suicides on deaths; and numerous people impose their beliefs about violent crimes on sequences of behavior. In this view, what an entry in the "Crimes Rate" table really says, for example, is that in 1976, for every 100,000 people; individuals in Detroit made 2,226 decisions about what sequences of behavior can be called a violent crime. How many violent crimes are really "out there,"

independent of these thousands of decisions, cannot be known.[14]

Science, in this view, is the comparison of one idea against a different set of ideas; and it is impossible to get outside of the human condition and validate ideas in an objective world. Perhaps some would choose to argue that too many theories in the area of social thought are mere ideas and have not been empirically supported. Some of these unsupported ideas may include: Weber's notion of an ideal type, Durkheim's collective representations, Merton's structural functionalism, Bitzer's rhetorical situation, Burke's notion of perspective by incongruity. Of course, the argument is correct, these theories are mere human ideas; the problem however is, what do we humans have access to other than mere human ideas? After all, the scientific method itself is a mere human idea; invented by humans, conducted by humans, and limited by the human constraints of information gathering. If the theoretical ideas listed above are insufficiently verified to be considered knowledge; then what are we to say about the mere human ideas which propel the scientific method?

In the analysis of variance test conducted above, an F value of 9.88 was obtained ($F_{2,9} = 9.88$). Perhaps the most important question in the analysis now enters the investigation; "is this relationship a significant one?". This question, however, does not admit of an unambiguous

answer. An obtained F value of 9.88, at 2 and 9 degrees of freedom, is significant at the .05 level, at the .025 level, at the .01 level, but is not significant at the .001 level.[15] The problem, however, is that the study itself nowhere dictates the appropriate significance level to use. In the example above a significant difference has been found for violent crime rates in the three cities at the .01 level. In other words, we would expect this much of a difference (between the variance estimates (mean squares between and mean squares within) to occur one time in a hundred completely by chance. We, of course, do not want to attribute this difference to chance, but want to hypothesize that some unstudied variable (e.g. unemployment rate, poverty level, average education level) is exerting a real, but differential, force in various parts of the country. That is, we want to attribute this difference to the influence of a real force and not to random chance. Are however, the odds one in a hundred good enough? Should perhaps the odds be one in a thousand?

Statistics will tell us at what level a particular F value will become significant (assuming that all F values will become significant at some level, e.g. .80 or .90 etc.). Whether this particular significance level is good enough, that is, whether these odds are sufficiently high for us to think that this difference is a "real" difference and not merely a chance one, is a completely human decision.

When working with statistics, there is a temptation to feel that one is testing an idea or hypothesis against a firm and fixed standard. In some senses, this is the case; however, it will be suggested here that even in the statistical determination of significance, one human idea is tested in reference to yet another idea.

In the example above, an F value of 9.88 was obtained with 2 and 9 degrees of freedom. It was also shown that this F value was statistically significant at the .01 level. Statistical significance, however, is really a determination of area, and more specifically a determination of the area under a curve. The "normal distribution," for example, is a bell shaped curve which is symmetrical, and has its mean, median and mode all at the same value. More specifically, the normal distribution is a mathematical function which can be defined by an equation.[16] The normal distribution is constructed in such a manner that a constant area can be said to exist within specific regions of the means. For example, regardless of the particular mean or standard deviation of any respective normal distribution, 68.26% of the area under the curve will be contained within one standard deviation of either side of the mean. In turn, 95.46% of the area under the curve will be contained within two standard deviations either side of the mean. Therefore, when we standardize a value (subtract it from its mean and divide it by its standard deviation) and arrive at a Z

score, we can determine what area of the normal distribution this Z score falls in. A Z score of 1.0, for example, would have 84% of the area of a normal distribution to the left of it; and would be located in the remaining 16% of the normal distribution area toward the tail.

In reference to the analysis of variance performed above, the distribution of possible F values is also an area under a curve, and this distribution can similarly be thought of as a function defined by an equation.[17] If we assume the distribution of F values to begin at one, then we know that an F of 9.88 with 2 and 9 degrees of freedom does not fall within the F value of 1 and 95% of the area of this distribution to the right. We also know that an obtained F on 9.88 does not fall between and F of 1 and 99% of the area to the right. However an F of 9.88 is not located infinitely far away from an F of 1, because if we include 99.9% of the area to the right, then an F of 9.88 falls within this domain. Thus we know that an F of 9.88 is located out in the tail of the F distribution, but not as far out as the last .1% of the area.

It can be seen from what has been written above that a determination of significance will depend on our ability to compute an area under a curve. Significance levels, viewed in this light, are measurements of area; and a significance test is a test of whether an obtained value falls within a particular area under the respective curve (the

curve may be that defined by the distribution of F points, x^2, Z scores, t distribution, etc.).

Let us then briefly mention a method for determining the area under a curve (as this process has already been shown to be necessary for a determination of significance). Suppose one were interested in determining the area of the shaded portion under the curve between Q and R.[18]

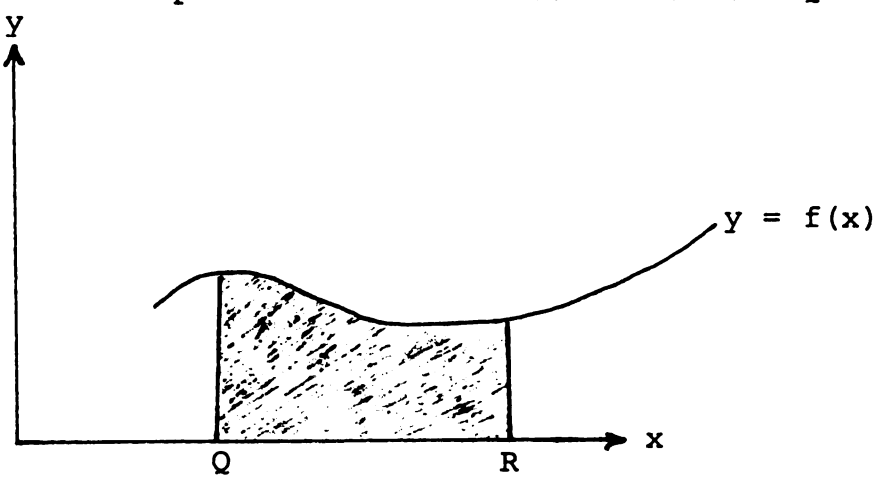

Figure 2. Area Under A Curve.

While we do not presently know the area under the curve between Q and R, we do have formulas for computing the area of rectangles, and rectangles could be used to approximately fill this area.

Each of these rectangles has a unit width of 1x and a height determined by its projection on the y axis. Therefore, the area of each of these rectangles can be determined, and the sum of the areas would be an approximate measure of the area under the curve. It is also the case (and can be visualized by imagining the above area filled

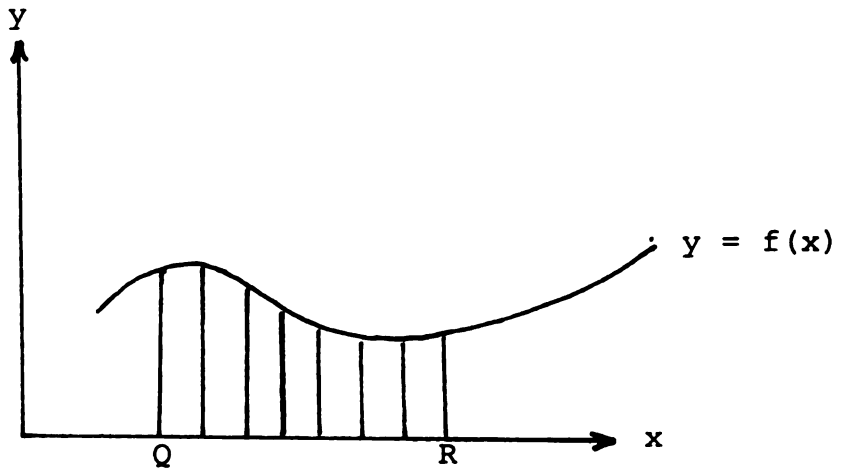

Figure 3. Rectangular Approximation of An Area Under A Curve.

in with smaller rectangles) that as the width of the rectangle areas will become more accurate measures of the real area under the curve. The limiting value (which is the area under the curve) obtained by this process is referred to as the definite integral, and is represented as follows:

$$\int_{Q}^{R} f(x)\,dx$$

At this point it can be explained that the determination of statistical significance rests on our ability to find the area under a curve. This process is completed by the use of the definite integral which, in turn, rests on our ability to determine the area of a rectangle.

The determination of the area of a rectangle can then be seen as a straightforward process derived from Euclidean geometry. However, the determination of the area of a rectangle is only straightforward as long as one accepts the axioms of Euclid. And the axioms of Euclid are nothing more than a set of ideas which Euclid had in 300 B.C. and wrote down in his Book 1 of the Elements.[19]

During the course of time different men (e.g. Gauss, Riemann, Lobachevski and Bolyai) have thought up different starting points and ideas about space; and these ideas have brought forth different kinds of geometry.[20] Within these different geometries different relationships are seen to hold. For example, in Lobachevski's geometry several lines can be drawn through a single point which do not intersect a given straight line. Within Riemannian geometry, the ratio of the circumference and diameter of a circle is a number smaller than π (3.14.....).[21]

In the end, our statistical determination of significance rests on the idea of a human being. Euclid's geometry is a useful and valuable tool, but it too is born in human thought. And that this is the case is evidenced by still different geometries (non-Euclidean geometries) conceived by different men.

It is the theme of this chapter that all knowledge is human knowledge. That there is no place for us to go to, in order to validate our ideas, outside of human thought

and action. It is probably with some discomfort that we realize that all our knowledge is merely humanly stated ideas. It is perhaps natural that we should want to ground our knowledge in something other than the ever changing nature of human thought. We want to give our knowledge a kind of certainty. We want to think that our knowledge is something more than an idea communicated among people. And it is perhaps these desires and temptations which are in some part responsible for the growth of empirical studies in the social sciences. In science, it is possible to get the impression that we are testing ideas in something other than the realm of human ideas. In science, it is possible to feel that we have found an independent methodology (that is, independent of human judgment) which can bestow a final verdict on the validity of our ideas. It seems not to be as evident in science--as it is in philosophy--that human ideas are present at every step in the analysis. The decision as to what is going to "count" as evidence, and how much of it must be present in order to support a hypothesis, is a completely human decision and not one prescribed in the methodology. What the scientist is able to perceive, through the senses, is completely determined by the information gathering processes of the human mind. We do not know the real world, as a thing-in-itself, but only that part of the world which conforms to our categories of thought and perception. A

scientific experiment does not tell us what is really out there, but instead reveals to us the kind and range phenomena that we are capable of knowing.

To want knowledge which is beyond the status of a mere human idea is (as Bronowski says) to aspire to the knowledge of gods. Only a god could have knowledge which was void of the influence of the human information gathering activity. The way the world really is--independent of mere human opinions about it--is not a topic which is susceptible to human investigation. We may add to, subtract from, extend and modify our ideas, but in the end all we have access to are human ideas. This however, does not mean that all knowledge is therefore relative, and all ideas are equally important; for mankind possesses the ability to communicate, and while some ideas are spoken and then immediately die, others are spoken and go on to significantly affect our lives. All ideas are not equal because some ideas speak to people and convey a certain force and meaning. It is these latter ideas which are knowledge, and they become knowledge not through the process of their verification in the external world, but in their communication to others. As Bronowski explains,

> We cannot know what the world is like in itself, we can only compare what it looks like to each of us, by the practical procedure of exchanging messages.[22]

Conclusion

It has been a theme of this dissertation that knowledge is saying something important to another person. To advance the boundaries of knowledge is to communicate an idea to another person and, in some way, affect that person's thought or behavior. The dissertation is similarly arguing against a definition of knowledge which claims that knowledge is advanced as we develop theoretical relationships which are an accurate reflection of the real relationships as they exist in the world. This view would be a very acceptable definition of knowledge except for the fact that it posits something which is impossible.

The world does not easily offer itself up for investigation; in the end, what we know is not the world, but only what we say about the world. There is perhaps a temptation among many of us to say that we know some things for certain. We are tempted to say that we possess some knowledge which is an accurate representation of real events in the external world. Surely, for example, one would have to be insane to live in the twentieth century and deny that the earth is round (or elliptical) and revolves around the sun. We want to say that we have accurately captured this aspect of the universe in our symbols; after all, scientists have proven it, and astronauts have even seen it.

There is however a problem with what has been written above. Those people who lived in the tenth or eleventh century (A.D.) believed the earth to be still and the sun to revolve around the earth. Their religion deemed this to be a truth, their scientists proved it, and not even having to rely on the testimony of some astronauts, these people could experience this truth, first-hand, every-day for themselves. During the tenth or eleventh century, even a peasant could prove to him or herself, anytime of the day or night, that the earth was still, and that the stars or sun were in motion. Surely these people thought this to be true beyond the shadow of a doubt; surely they thought they had accurately captured this aspect of the world in their symbols. To think that this symbolic representation of the world was in error could only be evidence of your insanity.

From the twentieth century, we can look back nine or ten centuries and clearly see what these people did. We now can easily see that these individuals did not know the world as it really is; we see that what they actually did was to develop a conceptual scheme, or to express a theory in symbols, which gave them some explanation for the appearances which were before them. From the twentieth century, we now see that these individuals did not know the world as it actually exists; but instead, merely <u>applied</u> a humanly designed and created interpretation <u>to</u> the world. We

see now that they, perhaps unknowingly, fused many of their metaphysical epistemological and even political beliefs right into their theory about the world. Why is it that we see so clearly what they did, and yet so reluctantly admit to doing exactly the same thing? Why is it that we so easily see the error in their judgment, and yet so forcefully deny error in ours?

The dissertation, however, does not accept a position of skepticism or even relativism. Some ideas are, in fact, better than other ideas. Was Freud right? Do we really have psychic entities such as an "id" and "super ego" which influence our behavior through subconscious suggestion? These are questions which are beyond the human sphere of investigation; these are questions to which humans are in no position to answer. Suppose, however, we ask a different kind of question; did Freud's work have a profound or serious impact on many of the people who were exposed to it? Even more fundamentally, does Freud's work speak to us, about our own lives and about the behavior of others around us? It is in the answer to these latter questions that Freud's work becomes an example of knowledge in the study of humanity.

The dissertation is not saying that knowledge should be put to a vote, or that only the famous or well known writers possessed wisdom. The claim is simply that the distinguishing characteristic of knowledge is not that it

gets the world down right, but instead that it speaks to people about their lives and the world they experience.

It is perhaps a necessary implication of this view of knowledge that social theorists are first and foremost teachers. According to this view, knowledge in the social sciences will not be furthered by developing theoretical relationships which are supposedly an accurate representation of real relationships in social life. We could, for a hypothetical example, find that there are four general types of greeting behavior and three general types of leave-taking behavior. Despite the degree and extent to which these findings might be supported by empirical endeavor, they would not constitute knowledge. Until these findings are incorporated in some message which says something important to us about our social life, then they will not be examples of knowledge. Until these findings can be communicated to others, allowing them to alter their behavior in some significant way, or causing them to realize some meaningful or important idea, then they have no claim to the title of knowledge.

Human knowledge does not arise out of a laboratory experiment or from a survey questionnaire; knowledge arises out of a communicative interaction among people. When you can express an idea to another person with some important effect on his or her thought or behavior, then knowledge has come into being. In this view, knowledge is simply saying something important to another person.

FOOTNOTES

[1]In Kantian terminology, what we do not know is the thing-in-itself. The world which we know is only that part which conforms to the human categories of perception (e.g., space and time) and understanding (e.g., causality). To know something beyond this (e.g., the way the world "really" is independent of human qualities) would require a being other than man.

Kant, J. Critique of Pure Reason. New York: St. Martin's Press, 1965, p. 287 (A278, B334).

> For what is demanded is that we should be able to know things, and therefore to intuit them, without senses, and therefore that we should have a faculty of knowledge altogether different from the human . . . , that we should be not men but beings of whom we are unable to say whether they are even possible, much less how they are constituted.

[2]Bronowski, J. The Ascent of Man. Boston: Little, Brown and Company, 1973, p. 353.

[3]Jacobson, E., and Seashore, S. Communication Practice in Complex Organizations. Journal of Social Issues, 1951, Vol. 7, #3, pp. 28-40.

[4]Within "Network Analysis Program Version 4.0" Sept. 1974, Copyright 1974. W.D. Richards Jr., these decision points are designated as: Parameter No. 3 (reciprocation), Parameter No. 15 (maximum path length), and Parameter No. 36 (percent within group communication).

[5]Different network analysis programs may apply different tests of "groupness" than those specified above; however it is being suggested that all network analysis programs apply some humanly reasoned criteria of groupness upon the data.

[6]The same data will reveal totally different group composition when different values are set for the above parameters (e.g. reciprocation, maximum path length, percent within group communication). For an empirical example of this see,

Larkin, T.J. Network Analysis As An Investigature Tool for Organizational Communication. M.A. Thesis, Michigan State University, 1978.

[7]This data is taken from the 1978 The U.S. Fact Book the American Almanac, a statistical abstract of the U.S. as prepared by the Bureau of the Census, Department of Commerce, issued October 1977 and current to October 1978, 98th edition.

[8]Durkheim, E. Suicide. Translated by J.A. Spaulding and G. Simpson (Eds.). London: Routledge and Kegan Paul, L.T.D., 1975.

[9]Durkheim, Suicide, p. 50 and p. 154.

[10]It is being assumed in this one-way analysis of variance that the years in which the crimes were committed do not have a differential effect on the regional cities chosen. In order to test the influence of years and region of the country on the incidents of violent crimes, a two-way analysis of variance would be necessary.

[11]Critical values of the F-distribution are taken from:

Lindley, D.V., Miller, J.C.P. Cambridge Elementary Statistical Tables. (Table 7-C 1 Percent Points of the F-Distribution) Cambridge, England: Cambridge University Press, 1952, p. 10.

[12]See, Suicide, p. 241 and

Durkheim, E. The Rules of Sociological Method. New York: Free Press, 1966, p. 29.

[13]Douglas, J.D. The Social Meaning of Suicide. Princeton, N.J.: Princeton University Press, 1967, see especially Part III, p. 163.

[14]Glaser, D. Social Deviance. Chicago: Markham, 1971,p. 7.

The first sign of an improved police system is often what is most embarrassing to police administrators--a sharp increase in crime rates. Thus Kansas City between 1959 and 1961 trippled its rate of index offenses; Buffalo between 1961 and 1963 doubled its rates; Chicago in 1959 and 1960

had a 72% increase. These upsurges reflect more complete recording by the police, and perhaps more complete reporting of crimes to the police as the public gains confidence in law enforcement.

It seems that not only are the ideas of legislators, judges and juries fused with the violent crime statistics; but the statistics are also determined by the ideas the public hold about the police.

[15]It would seem that any F value greater than unity with constant degrees of freedom would eventually become significant at some level (e.g., .80 or .90). In turn, it would also seem that any obtained F value greater than unity could obtain significance at any determined level (for example .05) by increasing the degrees of freedom toward infinity. An obtained F value less than one would not so much indicate an insignificant relationship, as it would a poorly designed study. In this example an F value less than unity may have suggested that the years are a more powerful determinant on the number of violent crimes committed than the cities.

[16]The equation for the normal distribution is:

$$Y = \frac{1}{s\sqrt{2\pi}} \frac{1}{2.72^{(x-\bar{x})^2/2s^2}}$$

where Y is the height of the curve for any given value of X, see:

Blalock, H.M. Social Statistics. New York: McGraw Hill, 1972, p. 96.

[17]The function for the F distribution can be found in the Cambridge Elementary Statistical Tables, p. 8.

[18]This interpretation is largely borrowed from:

Durbin, J.R. Mathematics, Its Spirit and Evolution. Rockleigh, NJ.: Allyn and Bacon, 1973, p. 246.

[19]Durbin, Mathematics, Its Spirit and Evolution, p. 40.

[20]Gassirer, E. The Problem of Knowledge. New Haven, Conn.: Yale University Press, 1970, pp. 21-54.

[21]Reichenbach, The Philosophy of Space and Time, Dover Publications, 1958, pp. 7 and 48.

[22]Bronowski, The Ascent of Man, p. 249.

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