

UDU

The Personal and Philosophical Origins of ODODU

PREFACE

When this work was first copyrighted in 1988 it was called BION, and it was a companion work to a preliminary evolving artificial language called OITH. By 2002 OITH had evolved into ODODU, and BION was reprinted in a second edition called UDU. The second edition differed from the original BION only in terms of a few revisions and additions. However, to be consistent with the language ODODU, in UDU the word bion is replaced with the word udu and its plural form of udo. The word bionism is also replaced with the word ududu.

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THE LAKE

Once again I am back on the lake. The water cold, dark, and flat as it glides past the canoe with a motion only noticeable because of the faint bloom on the surface. The white birch standing from the waters edge on the eastern shore slowly pass, as do their perfect reflections sharp against the dark green of the mirrored hill that reaches out past me.

Another stroke and another, and soon I will pass the island to where I can see the northwest cove and the approaching sunset. I will drift then and watch the mist form as the cool and dark grow, watching the lake, the shore, and the sky slowly change around me.

It is always the same. Every time I return here it seems like I never left, that I have always been a part of this place. I was here yesterday and I will be here tomorrow. Only this time it has been three years since I last sat in this canoe and watched the sun sink into the spires of balsam fir and white spruce.

Still the actual changes of the last three years are very minor. The trees obscure a little more of the granite cliff that shields most of the southwestern edge of the lake. There are fewer white birch along the shore, the beaver have a new house and seem to be more numerous.

But this time I have changed. Changed in a way which makes the timelessness and inviolability of this place even more mystical and awesome than it ever was before. Now I have begun to verbalize and understand many of the things which happened here. A set of experiences which at first challenged the very foundations of the science by which I lived and worked, the science which I had implicitly believed because it was so powerful and so successful. Eventually these experiences forced me to abandon that science and try to build a new formal discipline to replace it.

I knew then that it was an absurd task, that it was too much to attempt and that the odds were too long against it, but I could never leave it alone. It became an obsession and even when I tried to do something

else I always ended up working on the same basic problem. Why wasn't natural science able to speak to my own experiences and perceptions. Why was a theoretical system which was so impressive in dealing with nonliving phenomena so ridiculous when it was applied to life. And why didn't anyone else try to cope with what to me was such an obvious and devastating paradox.

After all, science simply cannot deal with love, humor, singing, sexual desire, responsibility, etc. Yet these are very tangible facets of my experience. I feel and do these things. They exist. They are real. In fact they are much more real to me than are quarks or black holes, or even charge or electricity.

So why doesn't science deal with them? Why can't science tell me when a joke is funny or what makes an orgasm feel wonderful? If we can go to the moon then why can't we deal with the fundamental problems of war, discrimination and human understanding. Why can't we usefully study and analyze these things?

Now I know. At least I believe I have found what I was looking for. I am sure that it works .

So I am back watching the sunset, again. And once again I can feel the hills and the trees and the lake and the sky. They are there and they are alive. They know that I am here, that I have come back, that I know.

I can feel the hills and the trees and the lake and the sky. They are there and they are alive. They know that I am here, that I have come back, that I know.

However, this feeling only lasts momentarily. I shift my paddle and realize that I have reached one of my favorite places on the lake, a long narrow point of lily pads which reaches out some two hundred feet into the lake from the island. The spot is unique for while there are many stretches of shore where lily pads grow, here they suddenly shoot out like a tall flame from the northernmost point of the island.

I am approaching this spot as if I were fishing, maintaining the proper distance from the pads and using a slow silent paddle. A solitary Loon sits across the lake, aware of my arrival but seemingly unconcerned.

The Loon is always there, always has been there, watching as we come into its world to briefly fish and then leave. A minor moment in its life.

When I was growing up we always spent part of our summers here and one of the major things that we did was fish. The lake is full of smallmouth bass but they always seemed to be extremely well fed and even without any significant fishing pressure they were reasonably difficult to catch. Nonetheless we spent many hours in the pursuit and grew to know our quarry and the lake quite well. Our favorite method was to fish from the canoe, casting small wooden plugs towards the lily pads or snags of a shaded shore.

It became sort of an evening ritual. When the shadows of the island first touched the eastern shore we would load our rods and assorted tackle into the canoe and set out. We then would have enough time to fish the island's northeast shore, which was already in shadow, and two passes around this point of lily pads and accompanying shore before it got dark.

As I look at the pads now I realize that they still have the same shape that they had many years ago. I can see the spot where the last cast might have landed. I have the canoe moving so that once this retrieve is completed the next cast can reach a small cove in the pads up ahead, a choice spot. If a fish should strike I would be able to quickly move the canoe away from the weeds so that the fish wouldn't get tangled and lost.

All of this was, and still is, second nature. I can sense it, feel it, do it, but I don't specifically think about it. There are no words or descriptions in my mind for what I am doing. Instead I watch the sun set across the pads, the water, and the spires on the far shore. Like so many other suns I've watched set there.

Somehow it still feels like it did when I was fishing. The expectation, the uncertainty, something about fishing is very similar to what I feel now.

You never know when a fish will strike. It could be the instant the plug hits the water, before the small splash and the two or three concentric ripples cross the golden water into the closest pads. It could be the

moment the plug begins to move on the return, the first clear indication that the plug is "alive." It could be during the middle of the return when the plug is swimming furiously at its maximum depth down in the water. Occasionally a fish will even strike right at the end of the return, when the plug is only a few feet away from the rod tip, when you have already given up on this one and are looking for the target for the next cast.

All strikes surprise me. No matter how much I anticipate, no matter how much I prepare, the actual strike is a jolt. The routine suddenly changes and I'm scrambling to catch up, to play the fish or move the canoe. The uncertainty of when or if the strike will occur is replaced by the uncertainty of the fight. Will the fish stay on, can we land it, how big is it, will we have bass or pancakes for breakfast tomorrow.

I believe that these uncertainties are crucial for fishing. They are the source of the fun, the excitement, the anticipation and surprise, and the sense of peace and relaxation which endures whether the trip was successful or not. If fishing were deterministic, if I were to know in advance that on the tenth cast I would hook a three pound bass, that this bass would fight for thirty seconds and jump in a shower of jeweled water and throw the plug, that on the twenty fifth and twenty eighth casts I would hook and land one pound bass, dinner fish, and that on the thirty fourth cast I would catch a four pound plus monster, then I would not fish. Even though this would be a successful evening by my standards, it would not be fishing, and I don't believe it would be enjoyable. The uncertainty, and the creativity which generates this uncertainty, would be gone.

Uncertainty and creativity are, of course, of fundamental importance to much more than just fishing. It seems to me that they are of foundational relevance to all of life, but in fishing their role is well defined and easy to see and appreciate. The pleasure comes from not knowing what you will catch or how or when you will catch it.

I don't fish as much lately as I used to. Not that I've become so good at it or that I don't enjoy it, but I think I appreciate the uncertainty in a slightly different way than before. After all the fishing was really only an excuse, a means to other things. It provided a reason to go out on the

lake, and a goal which had a natural uncertainty built into it. At first I approached both the reason and the goal rationally. I always attempted to maximize the probability I would catch something, maximize the anticipation and uncertainty of a strike. But then I began to enjoy the process and interaction with this environment on larger terms. The rational interaction of catching fish to eat was supplanted by a creative appreciation of a time and place of breathtaking peace and beauty. Gradually an experience of ecological aesthetics, a union of soul and nature, became the reason and the goal, the why I am here.

The sun is setting now. Already it has dropped behind the balsam and spruce. A thin trace of cloud far to the west is slowly fading from a glowing yellow orange to a muted pastel red and gray. The mist across the lake is growing out from the shoreline, combining with its reflection to send touches of white into the purplish green black walls that the forest and lake have become.

My awareness of the Loon increases, another watcher, another tangible presence on the lake. A Hermit thrush voices a last song. A clear liquid flute whose phrasing, harmony, and melody transcend the other bird calls. It is a voice which sings with Bach and Beethoven, a voice of harmony of water and wood.

This is why I came back, to sit in a lake of wonder and watch the sky and lake and woods darken and rush in on me. I sense that they are alive and that they are aware of me. That they know. There is no threat, no help, no judgment, but an awareness. The world closes in on me and I become part of it as it becomes part of me. Once again I understand.

At these times I feel that my mind takes on a singular clarity. The fogs of confusion and partial memories seem to fade away and I enter a realm of thought that is altogether different. It is not a verbal or analytical process but more of an emotional sight, a complete realization and peaceful understanding of something which I normally can't quite believe even exists. Only now I know that it does.

I know that I am still in the canoe. I am aware of my body and my clothes, that I am physically comfortable. I am aware of the lake, the

water, the sky, the forest, the sunset. That they are beautiful and peaceful, as still a part of my being as I will ever know.

Yet something is growing, changing. I sense an empathy with all that surrounds me that goes beyond my normal perception of what is real. Somewhere out there I am losing touch with a world whose nature and existence I have always known to be independent of myself. Now the only thing which is real is life and everything around me is alive as I am alive.

The thrush sings again. Close now. I don't turn but I know he is part way up a balsam spire on the edge of the island behind me. The song swells through me and beyond me, merging with the light of the sunset. It carries me with it and I blend into the song.

It is only a bird, only a bird, but a bird that knows music. A clear flute like note moves into an intricate descending progression of harmonic chords. A pause. Another clear note - different from and lower than the first but compatible with it - then a new series of chords neither rising nor falling. Another pause. A third high note is followed by an even higher trill.

The song continues and as it does I feel drawn up to a great height. Suddenly I am able to see everything, know everything. I understand. I am alive. The world is alive. The lake and sky and sun are alive. The thrush's song is life and it encompasses everything as part of the song.

At this point I emotionally experience a great synthesis where religion and physics are combined into one. A universe totally alive which sings and dances and talks, where creation is continuous and death does not exist. I am a part of this universe. I help to form its shape, create its changes, make its meaning. And I know that everything else does all this too.

The understanding gives me an absolutely euphoric feeling. There is energy and laughter, mystery and wonder. But overriding everything is the awareness of life, communication and understanding. The physical universe that I always have believed to be is swallowed up in this

universe of life. Time becomes a creation, and space and size don't seem to matter.

I have seen and felt this synthesis many times before. Sometimes with less intensity and depth, sometimes with more energy or joy, but the basic nature of the vision, or mystical - religious experience, or whatever, stays the same. I always know what it is. I always know who I am, and I always believe it. The synthesis stays the same.

Now I look again at the sunset. The thin strip of cloud is a deep purple with only a faint blue behind and above it in the west. The thrush has stopped singing and I can't see the Loon. But the impact of the synthesis is still with me. The wonder and power and peace continue to hold me even while my understanding fades with the light.

So I sit in the canoe and watch where the sun fell into the forest, and I remember who I am and why I am here. The clarity returned once more. Silently, non verbally, I have regained an understanding of my life, of what I must do and why I must do it, and that it may not matter.

But a small breeze stirs and I realize that I am both stiff and cold. I have a long paddle back to the cabin where I will build a small fire in the wood stove. Sitting in its warmth and the candle light I will later think of what happened here and how I can remember it. Then I will try to write a metaphor for non verbal understanding; to formalize again the foundations which will be needed to unify science and humanities, to write what I can see and feel.

THE CABIN

I enter the cabin and close the door. Striking a match on the stove I light the candles on the table. The cabin is only one room with two sets of double bunks built into the back, and a wood stove, woodbox, table and benches in the front. A wooden rocker sits between the two bunks and looks straight out between the stove and table to the door. The rest of the furnishings consist of an old icebox next to the door, a rod cabinet, and various shelves and hooks which hold an assortment of dishes, pots, pans, and miscellaneous tools and utensils which time collects in such places.

To me it is a supremely comfortable and familiar place. As I busy myself building a small fire in the stove I find the basic down to earth reality of a friendly cabin very relaxing. The mythopoeic encounters and cosmological ebb and flow which I had experienced, or thought I had experienced, out on the lake have had the decency to stay outside. The only spirits here are tightly secured in the whiskey bottle stowed behind the woodbox. The basic questions raised by those earlier events have still remained, of course, but they should be more amenable to careful analysis in this sort of environment.

And so I sit down to write, to try and communicate what I understand and have seen many times before in experiences similar to the one I just had, to create a description of the universe I see with my heart.

I have collected a small array of candles beside and in front of my papers on the table. I have everything I need, pencils, papers, notes. In my head are all the experiences of a lifetime, all the ideas of others which have seemed to be in tune with what I feel. I have carried these things around with me for years. collecting a piece here, a piece there, from widely differing disciplines. Hoping that someday they would all fit together, that somehow this information can help me understand my own experience. Maybe now it will.

I find that as I begin my senses become intensely aware. Everything around me becomes magnified, sharpened, so that it seems that each individual object or sound is being studied separately and in great detail. Yet I am aware of all of them at once. This awareness seems to

intensify the basic question which I ask and the paradox which I wish to precisely formalize. The sensations by which I perceive are in and of themselves an eloquent challenge to the procedure of symbolic representation with which I must communicate.

So let me state the problem. I am a biologist, one who studies life, and I am now convinced that the impressive and successful body of knowledge which constitutes modern science is inherently incapable of explaining life as I observe and experience it. This is not to imply any criticism of the physical sciences because the success of these fields in explaining and controlling non living phenomena is overwhelming. Perhaps too overwhelming, for biological scientists have unquestioningly and usually unknowingly accepted the same foundations, formalisms, and methodologies which the physical scientists have used. The result is that modern biology, including the social sciences, is little more than taxonomy and a fancy form of mechanistic description.

Thus the scientific world view is incomplete. It cannot speak to my emotional understanding nor to my creativity, and so it must be left behind. Something new must be created to resolve the problems which lie beyond the scope of the physical paradigm and its resulting world view.

There is a gentle sadness in my realization that I must leave the scientific fold. I have always been fond of the careful and reflective nature of scientific research, and I hold great respect and admiration for those who spend their lives in this detailed and experiential search for understanding. I have known the excitement and elation which such study can bring and so it is with great difficulty and reluctance that I try to move beyond its bounds. Yet I know it must be done.

The question now is how can I create a description of my understanding, my experiences of times when I see the whole universe with a beautiful but non verbal clarity. It is obvious to me now that I must use language but that I cannot use only the language and mathematical tools of science for these can only describe a small part of the whole. I can creatively describe science and mathematics but I can't mathematically or scientifically describe creativity. Therefore, what I

must do is to employ languages which can speak about the essence and soul of my life. This means I must write. Write not only with mathematical equations and formal proofs but with prose and poetry. Yet my argument must be rigorous and it must retain the consistency and utility which I would demand of any scientific work.

To deal with this type of situation I believe that the most useful procedure is to follow Descartes's example, deny everything I think I know and start all over again. Once you believe the problem is foundational it is the only way. Even so I know it is impossible. There are too many memories. No matter how hard I try a sequence of ideas and thoughts persist in my consciousness. But perhaps this does not represent a problem.

What if I sit here and, using only words and memories, try to create a useful communication of my understanding of the world. It seems like the place to start and what I should start with. If I feel that I have to go back to the most fundamental of beginnings, where I must even posit my own existence then I have to posit the existence of my language, and my ability to create and remember it, as well. If not, then how can I assume that I exist or even question my existence without having a language available to me with which to do the assuming or the questioning? To say "I exist." must imply that "I, a language rememberer, user and creator exist." And if such a connotation is there implicitly it might as well be made explicit.

Therefore, my most foundational belief is that I, a conscious memory and creator and user of language, exist. Furthermore, in this belief I and my language are inseparable, we don't exist independently of each other but only together.

There are some substantial advantages in starting here. First of all I never have to define consciousness, memory, creativity or language. They are primary constructs and hence precede definition, just like the concepts of point and line are undefined in geometry. However, I do have to describe what I mean by these words and how I intend to use them.

My consciousness is my awareness, a non verbal, continuous, understanding of my own existence. It includes my emotions, feelings, and intuitions. My consciousness is quantized only to the level of my own existence as a living entity, and therefore my understanding at the conscious level is wholistic, it cannot be subdivided.

In contrast my language is a discrete representation of my continuous conscious understanding. Language is quantized. It is information that may be subdivided to specific levels of complexity. Language can exist as words, notes, bits, colors, numbers, pictures, ideas, or any number of other quantized units. Furthermore language exists as memory. I have an access to more language than I can concentrate on at any one moment. This language appears to be ordered so that I have an understanding of a sequence, some things are before or after other things.

The creation of language is therefore the discrete representation of some aspect of my continuous understanding. It is a capability and a characteristic which is fundamental to the very essence of my being.

The inclusion of language, and my ability to create language, as an integral and essential part of myself and my existence leads to a basic methodology for this whole undertaking. I will require that I be able to express in my language anything which I claim to know. This may mean write it in simple English so that I can read and examine and study this "what I know" in detail. The process of the creation and formulation of language to discretely represent the continuous and non verbal understanding which constitutes my consciousness is my most essential activity. It is precisely understanding this activity through doing this activity which will comprise my attempt to build a system of knowledge relevant to my own experience.

I should note here that while I identify this procedure with the English language it is of course true that I could have other languages as well. For example I might include French, Russian, mathematics, symbolic logic, or even the "languages" of music, painting, sculpture, dance, athletics, love, etc. However, I believe that anything I know in one of these languages I could in principle translate into English with arbitrary accuracy, although I don't normally do this and might require

substantial, and perhaps even prohibitive, amounts of time for a proper translation of some things. In principle this translation capability means that all of my languages are in fact just one language, and I will continue to speak of language in this broad sense.

But while I like being a creator and user of language I know that it is not enough. The presumption of self and language alone does not allow the construction of a useful world view to explain my experience.

A mosquito whines past my ear and I suddenly look up. Lazily she drifts out into the candle light and then settles on my left hand. My attention leaves my writing and concentrates on this new and relatively minor but still real threat to my future comfort. Carefully I set my pencil down and slowly raise my right hand while gently turning my left to optimally position the mosquito, now busily attending to her dinner, for a killing blow. A quick slap and I brush the squashed remains to the floor, another speck of dust to be swept out in the morning.

No, I am clearly more than just consciousness and language. I am aware of many things other than myself. I can sense them and I can act to influence how they can affect me. Quite possibly these other things sense and act towards me in a manner similar to how I sense and act towards them. But the interaction is very real and so is my ability to consciously participate in it. Whatever these other things may be and whatever sort of interaction there is which takes place between us, it is impossible for me to ignore or escape it. I must pay attention to the information I receive and I must actively respond to it. If I don't I find that my existence becomes increasingly less desirable or fun. Worse, my existence may even cease to be in the terms of how I now experience it.

So somehow the capabilities of sensation and action must be included in my foundations if I am to develop an effective working theory. Since I am beginning with a view of myself primarily as a language creating and using existence I will therefore define sensation and action in terms of my use of language. Thus sensation I will consider as an influence on my informational composition and action will be the result of my influencing the linguistic universe beyond myself. The only means of

interaction which this will then let me consider between myself and anything else will be in terms of changes and flow of information and the sending and receiving of messages. Language and linguistic effects will remain as the primary constructs, the only reality external to me or to other conscious entities like me. Everything else will exist as language or relative to language. This is not to suggest that I cannot therefore feel pain or pleasure but simply that all things, including pain and pleasure, must be formulated as relating to linguistic constructs which impact on my own conscious composition.

The question now becomes how I use language to deal with sensations like pain and pleasure and how this is related to my perceived ability to act. When I consider the mosquito again it seems like this interrelation of sensation and action is an instinctive property of my consciousness. I can deliberately control and consciously use it sometimes, but in many instances it appears to exist as a natural part of my composition whether I am consciously aware of it or not.

This interrelation of sensation and action I shall arbitrarily define as reason. It will be a process whereby language, and ideas embodied in language, will exist in a natural interrelationship. When sensations or memories or newly created ideas impact on my existing language there will be a redefinition of this relationship. Often this redefinition is what I perceive as a decision and will lead to an initiation of action by my consciousness.

In those cases where our understanding can be represented with a precisely defined set of inferences and hypotheses there is an exact description of this reasoning process. It is called the maximum entropy principle. Basically, this principle states that the best choice of a decision which is to be made on a given system of information, will be the one which maximizes the entropy of that system of information.

It is my contention that this maximum entropy principle is a metaphorical linguistic and mathematical representation of the way I and all other living systems rationally choose our actions. But the maximum entropy principle is a rather laborious procedure to follow mathematically, requiring precisely defined states and statements and

sometimes lengthy numerical calculations, and this restricts the range of questions to which it can properly and rigorously be applied.

I feel that all living systems instinctively and instantaneously do something which is analogous to the maximum entropy principle, only it is applied to all forms of linguistic understanding. When I consciously make a decision without verbally or mathematically analyzing the situation, I employ a continuous intuitive form of the maximum entropy principle. Thus the natural way I consciously understand and perceive information will be one which maximizes the uncertainty of that information. All of my actions and decisions stem from such an optimal perception of information within my consciousness. This perception does not have to be logical or mathematical. Thus I make a decision automatically as a function of how I understand. I can do this without recourse to any form of mathematical or numerical computation and without any linguistic verbalization or other type of discrete representation of my understanding.

For any given knowledge which a living system contains in its language there exists a perception of this knowledge in its conscious non linguistic understanding which maximizes the uncertainty associated with it. We can approximate this perception by using language and the maximum entropy principle, but all living systems will know this perception exactly and without any numerical calculation. Thus entropy is a function of our consciousness and our language. Maximizing our entropy therefore becomes the essence of how living systems make all choices of actions. Since decisions are in fact only choices of actions this provides the basic description of how all decisions are made in living systems.

Of course a decision can only be as good as the understanding and hence the available information upon which it is based. If relevant information is omitted or forgotten, or if some information is wrong, or distorted or changed, then the resulting decision will reflect this. However, the decision itself, the choice of action, is always made in accordance with maximizing the uncertainty of our understanding subject to the information actually available. Thus decisions made by living systems are always rational from their own perspective and appearances of irrationality are only reflections of inadequate, distorted,

or ignored information which was used in generating the understanding upon which the decision was based.

This contrasts sharply with the creative process, for here words and descriptions simply fail to represent what goes on in the conscious understanding. Creativity is inherently unpredictable. It cannot be analyzed nor can it be expressed in mathematical form. Creativity is the essence of all life, the ultimate source of uncertainty and the origin of both information and language.

What creativity does to the rational decision making process is to periodically and unpredictably change the informational set upon which reason would operate. Consequently it is essential to both create and rationally test new ideas on an ongoing basis. Otherwise my conscious understanding will tend to lose its ability to rationally correlate sensation and action so as to achieve whatever goals or desires I may have. I must continually adapt to the changes in myself and my perceived environment.

So now I have a procedure for generating an epistemological system to explain my own life and experiences. I exist and interact as a language creator and rational user. I sense and act. I improve my understanding through the creation of new ideas and the rational evaluation of them through experimental or experiential tests. This rational process always seeks to maximize the uncertainty of my current knowledge.

What I now must do is to formally incorporate these beliefs into a new foundational basis which can transcend existing science. This basis must be able to consistently explain my own experiences and still be able to derive what is experimentally verifiable in physics and the other natural sciences.

When I look back at my experiences on the lake this evening I recall two lasting impressions of what I saw. These are that everything was alive and that everything was somehow aware of and interacting with everything else. It would therefore seem to me to be necessary to use these two realizations in conjunction with my fundamental beliefs of existence, sensation, action, language creation and rational use as part of the needed foundations for my new understanding. If I can do this

then I should only need to carefully and clearly examine my own experience to deduce the nature of the rest of the universe, including what has been experimentally verified in the natural sciences.

But now I look at the warm glow of the cabin and realize that I am through for the night. That sharpness of detail has gone and I am tired. I have taken another step in understanding and I sense it is a crucial one, but the intensity of energy I have to feel to work has sublimated away. I do know though where I have to go and what I have to do. Only part of my answer can be found in here with the papers, pencils, and formal texts of written words. The rest is out there, on the lake, in the woods and cities.

I know now that in addition to creating the formal statements I must live the synthesis and then write about my experience. Hoping that in this way I can trap piece by piece that wholistic understanding which I know to be so clear and powerful when I see it.

The books and papers are not relevant anymore. The fragmentation of human experience into the formal disciplines of the sciences and the humanities has lost its meaning. History and physics and art only exist in universities and cocktail party conversation anyway. They were not out on the lake earlier tonight, they are not in here with me now. But something else is. I now know that a foundational basis exists which can combine the rigor and predictive utility of physics, the emotional and aesthetic sweep of art, and the evolutionary destiny of history.

FORCES

The car surges on down the hill, ticking past the dashed white lines as it carries me along the road. A thin strip of pavement speeding under me, curving from side to side, straightening, moving.

I love to drive.

I love to feel the car, the vibration, the power, knowing I am driving, moving easily over the ground at a very fast speed. I can't run this fast. I can't run or move any part of myself anywhere close to this fast. Yet here I am driving a car, my hands on the wheel, my foot on the gas, moving.

It is a terrific feeling. I watch the fence posts and telephone poles, the trees and the grass, all racing past me. I watch the scenery change and the sunlight slowly fail and all the while I'm moving.

In this case I'm going away from the lake and toward the city, but I don't mind. You can only take so much of the peace and quiet before you have to pull out and go back and do something. Sooner or later you have to drive yourself out.

When I was younger this always surprised me. Back then I felt that the ideal life would be to be a self sufficient hermit who lived in the hills and thought great thoughts and didn't have anything to do with machines or people. That was the way to answers and peace of mind. I even tried it a few times. I could find the peace of mind for a while but then I'd get lonely or cold or both and the answers still didn't make any sense so I'd come out.

Now I don't even pretend. I like to go hide out for a while every now and then but I know I won't stay too long. As much as I enjoy the solitude I need the human interaction even more.

Recognizing this has seemed to make me more keenly enjoy the processes of my life, the ebb and flow of forces which influence and control my choices and actions. I like the going, the being away, and

now the returning. It is a nice day for a trip. The car is working well. It is fun to drive. I feel good and am glad to be going home.

So here I am sitting comfortably in several tons of metal, glass, plastic, fabric, and rubber, moving at 60 miles per hour over a long strip of asphalt. It is an incredible situation when I really think about it. This entire mass of material is under my complete control. It goes when and where I tell it to. It stops when I tell it to stop. And it requires very little strength on my part to make it do these things.

The car is a machine, an organization of things which all work together under my direction. It amplifies small forces into large forces. If I want to go somewhere I tell the car to do it and it does it.

All it takes is for me to make a decision and an entire collection of moving materials responds. Right now we are travelling south because I want to go south. I decided that this was the direction I wanted to go. My decision controls the car.

But once again I'm looking at this situation from a physical perspective, and that severely limits how I can understand it. I am driving because I decided to do it. But I'm only looking at the process in terms of the speed, the motion, the power, the energy, and the mechanism of it. What about the decision which is controlling all this? Can I measure it? If the decision itself controls matter, energy, power, can I measure the decision in terms of these things? Do decisions have units of distance, or mass, or force, or energy, or power?

I don't think so. Yet if they don't how do I connect my decisions to the forces which they undeniably do control. In a machine small forces control large forces but this only postpones the question. The crucial issue is what connects or relates the decisions to even the smallest forces. What is the first force, the actual initiation of the action.

The more I think about this question the more it appears to me that the problem, as stated, is unresolvable. There is no connection between decisions and first forces which initiate their implementation. I am verbalizing this question in a manner which is either unanswerable or meaningless.

I am going south because I am lonely. I want to be with one particular person and so I'm going home. It seems that simple. I want to talk and touch and hold, to laugh and make love and live.

But now I'm not so sure that this is all that different from physics. Charged particles move and experience forces as a result of interacting with other charged particles. And I, a living system, am also moving as a direct result of experiencing interactions of a sort with another living system.

If everything is alive as I have earlier proposed maybe these are in fact compatible concepts, emotional interaction and electromagnetic interaction, sex and charge. Certainly from my own experience sexual and emotional feelings are very real and govern a great deal of my behavior, why I move.

The critical step is to realize that physics and physical phenomena are themselves only perceptions by living systems. The question is not how decisions control or influence physical phenomena but how can physical phenomena be understood in terms of language and consciousness. How does my sensation and awareness of the car and the speed make sense when viewed as emotions, descriptions, ideas. The search must begin within ourselves and our interactions with each other, not with precise descriptions of machines and physical principles.

I am a happy person and I enjoy sharing my happiness and my life. Many of my actions are intended solely to preserve and enhance this sharing and the happiness, comfort, and stability which result from it. I know there is someone else out there. Someone different from myself and yet connected to me in some sort of way. Being with them and interacting with them makes me happy and so I want to do things and do things which result in our being together and interacting with each other. This determines many of my actions.

But there is something more which is fundamental to our very being at work here. Our lives have become a rich emotional fabric weaving our individual histories and experiences together. We are happier and more comfortable when we are together or aware of the other's presence than at any other time. Somehow our understanding of ourselves, our

external environment, and each other has resulted in a very strong and very real bond or commitment or something which literally holds us together. I guess it can probably best be described by simply stating that we are in love.

Now describing the state of being in love is something best done with songs or poems or stories. To try and explain it in terms of a technical theory or fundamental interaction seems enormously inadequate and simplistic somehow. Yet I feel that in a certain sense love is a fundamental interaction or force which I do experience. Consequently it is something which I have to deal with.

I do not mean to imply here that an individual's emotional behavior can be described mathematically in the way that physics describes the motion of a charged particle. Even though at the level of actual charged particles physics has to speak in terms of probabilities and can't exactly say where, for example, a given electron is and how fast it is moving. Rather I feel that the idealized concept of force or interaction is analogous.

A charged particle seems at one level to be aware of other charged particles and its behavior is influenced by this awareness. Similarly people in love are aware of each other and their behavior is also influenced by this awareness.

The major difference here is that love involves a great deal of creativity and thus resides beyond mathematical reach. Although some of the more rational aspects of lovers behavior may be explicable through the maximum entropy principle this certainly does not allow us to represent the whole phenomena. On the other hand physics does not deal with any creative aspects of the behavior of charged particles and so a rational mathematical description is successful. The question as to whether or not charged particles can be creative or in love is simply not relevant to a physicist.

Unfortunately the theoretical problem of dealing with love is further complicated because it seems that the question of sex must also be addressed as a separate although related type of interaction. Certainly my own experience indicates that while sex and love are usually

combined into a single basic emotion they can also exist independently from each other. For example being in love hasn't been able to exclude a basic sexual recognition and reaction which I feel towards some other people.

A little while ago I stopped at a small diner to have something to eat. It wasn't much of a place, a couple of gas pumps outside, several tables with chairs, a counter with an old stove behind it and some racks of potato chips and candy bars inside. But there was a person in there who made a distinct impression on me.

Attractive, striking individual. I found I was very aware of this person as soon as I entered the room. A pleasant voice, an easy laugh, sparkly warm brown eyes. I instantly recognized a mutual attraction that we both seemed to sense but which somehow seemed incongruous and out of place given the circumstances. Suddenly I found myself plunging through a series of sexual fantasies. Pulled from one visual image to another as some devious part of my mind tried to convince me to at least start a conversation. The whole thing made me self conscious, and somewhat embarrassed. Somehow buying a cup of coffee and a sandwich had become a major undertaking.

Back in the relative safety of the car I remembered the difficulty I had as a teenager in reconciling my sexuality and my rationality. Already fascinated by science and nature I could never understand why I couldn't totally control my experiencing of sexual feelings. Yet I never could. They are a fascination and a force I cannot ignore.

Being in love does constrain this sexual force but it doesn't change its basic nature. What it does seem to do is stabilize my responses to sexual urges or forces. Thus I now only interact with one person whereas before I would interact or explore interaction with many people.

Yet both sex and love as basic forces are to some extent controlled and constrained by still a third force, something which perhaps can best be described as a sense of social responsibility. We all live our lives as members of a series of nested and overlapping organizations; marriages, families, social groups, corporations, governments, societies. Whether or not we accept or believe the ideals and rules of these organizations

they still determine many of our actions, both those we freely choose and those forced upon us. In many circumstances these social beliefs can result in our choosing to leave those we love or refrain from seeking interaction with those we sexually desire.

These forces also must be described and explained. They, along with sex and love, form a tangible and central part of my experience. In many ways these sensual, emotional, and intellectual forces are much more real to me than the so called fundamental interactions of physics. Certainly they are more important to my happiness, my joy and drive to live.

Once again I become aware of the car and my surroundings. It is dark now and I'm finally approaching the city from the northern hills. Traffic has picked up and the road is a multiple ribbon of headlights ahead of me. I can feel the energy and the life. Looking out at the city I am struck by its beauty and complexity, a huge organism once again swallowing me up.

I realize that the radio is playing a song I like and I turn the volume way up. The driving beat pounds into me and I pound it back into the steering wheel. Another shot of urban social energy, sexual energy, emotional energy dished out through pulsating waves of human interaction.

Entering the city like this feels good. I'm at home here in a strange sort of way. I'm a part of this society, this city, this organism, and I recognize this. All of those others out there are part of it too. All of those lights, all of those people.

I park the car and walk down the street towards the corner. All around me the city buzzes and moves. Cars and people stream by, lights flash and glow, the sidewalk vibrates and seems to exude a warm, pleasantly stale air.

I find our building and climb the two flights of stairs to the apartment. The door swings open before I can fit my key to the lock, and suddenly I'm home.

And now it all changes again. There is someone in my arms, someone I know and love. I can taste her lips on mine, can feel her body and laughter pressing into me. I wonder why I ever went away.

But none of that matters now. We are together again and time slowly shifts down. The rest of the world fades from view. We kiss and touch and talk. Now our only awareness, our only sensation, is of each other. Vision and hearing shorten and blur and touch becomes the overwhelmingly dominant reality, skin to skin the only form of communication.

The touching gradually merges us together, each of our personal intensities and ecstasies sensed by the other. They serve to further a growing sensation, a blending wave of creative expression, a building awareness of what we are to each other.

It rolls over us from within, splitting my mind into a primordial universal chaos in which reason and language evaporate. My consciousness is engulfed in my body's ultimate quest for creation.

It explodes around me.

Then, slowly, we sink into relaxation. Our souls healed, our happiness restored, our perspective and balance created again.

A quiet stillness seeps through my mind. Language, words, ideas, feelings, all have disappeared as time seems to have slowed, perhaps even stopped. I hang suspended in the universe, formless, forceless.

Then a point flickers into existence. Awareness and language return and suddenly there is a new question, a new puzzle

What has happened to me.

How do I explain or understand this experience.

How does this fit into my world view.

I open my eyes and stare at a hand. Is it mine I wonder, and, for a minute I really don't know. Then I try to move and realize that of course

it is my hand. It does what I tell it to do. But my hand, and for that matter my entire body, seem quite separate from the language creating and using consciousness which I consider myself to be.

Yet I am integrally connected to my body, and connected in a profoundly different manner than I was to the car I was driving earlier today.

The car is a machine. My body is more, a part or extension of me.

I have presumed that the universe is composed of living conscious entities and the linguistic creations of these conscious entities, but I don't know what my body is or how it relates to these presumptions.

I am aware of only one other conscious entity right now. Someone here with me whom I love and know very well. We both have bodies and it is through our bodies that we know and communicate with each other. The forces we experience, the sensations we feel, the messages we send, all pass through or are part of our bodies.

My hand starts to move and the sensation of skin and touch once again surge to the forefront of my awareness. Our bodies react and press together, our eyes meet and we fall through them into each others soul. A total communication, far beyond the limits of spoken words, overwhelms my consciousness.

But this time there are others. A sensation emerges of my body as a wonderfully complex organization of other conscious entities, continually communicating and interacting with each other. I cannot reach them as individuals but they, as an organization, do respond to me and communicate with me. In a way it even seems that this body organization is me.

I control it to some simplistic degree, make it move and take care of itself, but to a much larger extent my body dominates my consciousness. Everything I sense or feel, all the messages I receive, come from, or through, this body.

Now my body is communicating and interacting with a different body which I also sense is an organization of conscious living entities. I, as

consciousness, am aware of, and know and love, the consciousness which controls that other body. But despite the intensity and depth of our individual love for each other, neither of us has any real control over, or understanding of, the interaction going on between our respective bodies, or the impact which this has on us as conscious beings.

We are being swept through a cosmic event, helpless yet willing participants in a creative organizational interrelation, a universal communication and rebirth.

Everything is consciousness, awareness, and love. Life creating life. Our feelings and emotions, our actions and decisions, driving our understanding and the continuing creation and evolution of the universe.

We are all the same you and I. We are all alive. We question and love and feel. We hunger and decide and act. We participate in space and time, God and the universe, and as we make our children and our songs and our laughter we imbue all with the wonder of creativity. For life is creativity and everything comes from life.

FOUNDATIONS

The ideas mull around in my mind as I stare blankly at the computer screen before me. They appear as trout rising to the hatch. Flat surfaces break suddenly into rumpled swirls and I glimpse dark moving shapes which appear and vanish. They leave behind steadily diminishing ripples, gradually expanding and fading rings of understanding which eventually merge with the blank sameness of the surface.

The monitor screen blurs into a quiet pool, the dancing electronic letters becoming shimmering points of light, the only reminder of the trout's last rise. The concept is eluding me once more, vanishing back into the depths with the fish.

I wait patiently, my mind and body relaxed, but still tuned with a very slight tension. Will the trout rise again. Will the idea once more surface to trouble the now placid screen, a different form, a different place, but still the same.

And then it does. Off to the side of where I was watching it reappears. Now all the more visible because of my focusing attention. I see clearly for an instant. Then the shimmering lights and fading ripples return once more.

Yet the idea continues to form and grow. As eyes and mind adjust there begins an anticipation and expectation of its return. Each time it does it is possible to see a little more, understand a little better. With time this dark shape, this mental trout feeding on the surface of my mind, matures, and then there comes a moment when it is clearly visible, when the concept itself can be hooked, captured with words and written down. Once this occurs my fingers spring to action. Words stream onto the screen, weaving a net which hopefully has ensnared my quarry. Now perhaps the idea is visible enough so that it can be subjected to a rigorous and rational scrutiny.

For scrutiny is necessary. The creative event with all its wonder and magic is still only part of our lives. Our survival, our comfort and our understanding also ultimately depend on careful rational analysis. We can create an infinite number of possible concepts but most of these are

nonsensical, or contradictory, or meaningless. They can make us miserable or get us killed.

So a rational scrutiny of any idea is a worthwhile pursuit. For a concept I am going to base my life on, it is essential.

To be successful this scrutiny requires a precise and detailed description of the concept. The more technical and formal the description, the easier the analysis and the more likely it can be applied to useful purpose or understanding.

Therefore, I will now present my emerging understanding in terms of a formal argument. I will state a series of presumptions and axioms and proceed to show how they serve as a foundation to explain my experience. I do not think that these are ultimate solutions or even particularly satisfactory ones because I believe that the problem is truly open ended and can never be completely resolved by any formal system. This again is a necessary consequence of the inclusion of creativity as an essential element of the theory.

I state the foundations in terms of presumptions and axioms because there are two fundamentally different types of assumptions which I have to make. By a presumption I mean something which I assume to be because it is a description of my own direct experience. I am both the observer and the observed. Since this communication does not have to involve anything other than myself and the sensations I receive I have a great deal of confidence in the presumptions.

The axioms, however, are concerned with assumptions about the nature of things which exist and interact beyond myself. They are based not only on the sensations which I receive but also on their correlation with other sensations and the inferences which I make from them about how other systems behave. Consequently the axioms are less secure. I offer them because I must start somewhere, and right now I know of no other set of axioms which can usefully speak to the entire range of human, or at least my own, experience.

Therefore I presume that:

1. I exist as a linguistic quantum of consciousness.
2. I create, remember, and rationally use ideas and language.
3. I sense and feel and act.
4. Other things, which are distinct from me, also exist.

I also state axiomatically that:

1. The other things which exist distinct from me are also linguistic quanta of consciousness. They create, remember and rationally use ideas and language. They sense and feel and act. Henceforth I shall call these things udo. Udo is plural. The singular form is udu, a single quantum of consciousness.
2. Udo can communicate with other udo by sending and receiving messages which are composed of language.
3. An individual udu can influence, or be influenced by, communications between other udo. Such influence does not alter the linguistic content of the communicated messages but does affect the informational context of the udu or the communication. This is the nature of sensation and action.
4. Udo can create new udo through interaction with each other.

Essentially these presumptions and axioms have emerged as a distillation of many personal experiences similar to the ones I have previously described. They represent who I am and how I view myself and my environment. As primary assumptions they cannot be defined in terms of any other concepts. They can only be described from my own experience.

This is, therefore, a fundamentally personal world view. For any of it to make sense to you there will have to be some recognition of a similarity between our experiences. You will have to identify emotions or feelings or ideas in your experience which appear to correspond to what I describe. If this occurs then through your own life you will understand what I am trying to communicate. Whether or not any of these ideas

eventually prove to be useful in some larger frame of reference will have to wait for future experiments or events.

So let me briefly explain what these presumptions and axioms mean to me. Let me state them again in terms of my experience, how I view my life and my interaction with the rest of the universe.

The first presumption identifies my existence as a linguistic process. I am ideas, language, awareness. But I am also a quantized unit. My consciousness is a fundamental and non divisible entity. It can not be meaningfully broken down into component parts but only exists as a whole.

The second presumption states that I create, remember and rationally use ideas and language as the fundamental element of my very existence. I experience ideas as emotions, intuitions, awareness. These things are a continuous form of understanding. They are not, in and of themselves, discrete entities. However, I also create language which is a discrete verbalization or representation of information and hence can represent, with arbitrary accuracy, my ideas, emotions, intuitions, etc. Both the discrete and continuous forms of understanding are inherent and persistent within me. Both exist in my memory and are used in a rational manner as part of my consciousness.

The third presumption states that my own creativity is not the sole source of language or discrete information within my existence. Thus I can sense, or receive information which can affect or alter my linguistic composition. I identify and experience this receipt of information as sensation but it also encompasses emotion, pain, and pleasure. I can also act, which I describe solely as a consequence of thinking about specific types of information. This action is identified as action by the correlation of certain sensations which occur after the actional information is thought.

The fourth presumption postulates the existence of things which are separate and distinct from me. I am not alone and there is more to existence than just me and my ideas and language. This presumption formalizes my belief that I am not the creator of everything which I can think about with my language or experience through sensation.

These presumptions are ultimately simple statements of belief. They cannot be derived or defined and I can only communicate them to you through examples. Thus the presumptions all relate to me. They are the primary experiences which I feel I have. The axioms, however, are assumptions I make as to how other things react or interact with each other external to me. The axioms are based on the presumptions but they apply to all of existence (the universe) including, but not limited to, what I view as me.

The first axiom states that the only things which exist in the entire universe are living systems and the linguistic constructs and communications of living systems. This means that there is no objective physical reality independent of living systems. Space, time, matter, and energy exist only as language and in relation to language. They do not exist by themselves or independently from an observer. They are simply properties of life and language.

The universe is composed of life. Points of consciousness, only you can't technically call them points because they have no inherent location or dimension. They are only discrete units of consciousness with the capability to create, remember and rationally process language and to send and receive messages. Each one of these entities possesses a unique singularity and integrity all its own. In this sense they are all just like you and I.

Henceforth, I shall also refer to such points of consciousness as udo. Although I have described an udu in terms of a unit of consciousness I still view it as the defining quantum of life itself. Hence I consider myself to be an udu. You are an udu. Anything which exists is an udu or the linguistic creation or interaction of an udu.

The second axiom states that udo can communicate with each other. Thus they can send messages which are composed of language and which can transfer ideas from one udu to another. Similarly udo can receive ideas or concepts from other udo by receiving messages sent by those udo.

Since the messages are language in a direct sense it follows that the messages also have a quantized structure. However, they can convey

continuous forms of ideas and understanding. The perception that a linguistic message is quantized, or composed of quantized language, is only a linguistic (and hence quantized) description of the communication process. But both the continuous understanding, and the discrete (linguistic) representation of this understanding, are integral parts of communication.

The third axiom states that udo can experience a further interaction which is related to the communication between udo as described by the second axiom. This extends the concepts of sensation and action as presented in the third presumption and differentiates them from the communication which is described in the second axiom.

Sensation for any individual udo is thus an influence on its internal linguistic composition which is exerted by communication between other udo external to itself. The impact on the linguistic structure does not have to alter the actual language or configuration of the language within the udo but does affect how that language is experienced.

Similarly action can be viewed as an influence on a given communication which is exerted by an udo which may not be a sender or receiver of the communication. This influence does not alter the linguistic composition of the communication but may influence its perception by the receiver.

Finally the fourth axiom states that udo exist through the interaction of other udo with each other. This assumption complements the assumption that udo are able to create language. Individual udo create language. Interactive udo create udo. The genesis cycle is complete.

In formulating these presumptions and axioms I have used the concept of creation frequently; the creation of language, the creation of new udo. I do not understand what creativity is, nor do I understand how it works. However, I do feel that it is a fundamental characteristic of myself and all other udo. Creativity is a continuous capability which we experience. Through this creative process we participate in determining the nature and existence of all other living systems and even the universe itself.

The existence of this creative capability associated with all udo thus leads to a view that the universe is creative, open, unbounded. Anything can change through the creative efforts of udo. There are no fixed or immutable laws or principles.

The creative process stands in sharp juxtaposition to the rational process I described earlier. Rationality is optimal entropy, maximize your uncertainty. It is embodied in our concepts of reason, fitness, beauty, aesthetics, truth, stability. It is the defining element of harmony, the means by which we reconcile our fears and explain the unknown, the force which unifies and simplifies.

Creativity, however, generates new uncertainties, increases diversity, surprises and drives us. It is birth and mystery, the source and essence of humor and laughter, the origin of curiosity, the mainspring of evolution. Creativity asks the questions, resolves the paradoxes, breeds the revolutions, destabilizes and energizes.

Both of these processes, creativity and rationality, I feel are fundamental to all living systems. Thus every point consciousness, every udu, uses both creativity and rationality in all aspects of its existence. The two processes are the elements of behavior and their dynamic interaction makes the universe what it is.

ATOMS

In the previous chapters I presented a number of my own experiences and a brief description of how I attempted to explain them to myself. It is somewhat of a personal religion. Even though, as a former scientist, I have felt compelled to try to subsume science into a larger world view which also deals with my own consciousness and creativity, it still remains a distinctly personal narrative.

I will now attempt to change that, and to present an extension of my own experiences into a general world view, which I shall call ududu. This represents a fundamentally different task than before and consequently will involve a different methodology and style.

It begins with a preliminary summary of ududu.

The universe is composed of udo.

I am an udu. You are an udu.

All other udo are like us.

Udo are conscious.

Udo create, remember and rationally use language and ideas.

Udo communicate with each other by sending and receiving messages.

Udo sense, experience pain and pleasure.

Udo feel, experience emotion.

Udo act, by implementing rational decisions.

Udo create organizations and new udo by interacting with each other.

Ududu is an all encompassing world view. It deals with all facets of our experience; religious, emotional, philosophical, scientific, historical, aesthetic, personal. It describes a universe which is continually changing and creative. It is a true biology, a study of life, your life.

Although ududu is a fundamentally new world view it does have extensive roots in the western philosophical and scientific traditions. These begin with the Greek philosophers of the 5th and 4th centuries BC and continue up through today's scientific and philosophical schools of thought. Whenever possible I shall reference the ideas which have come from these traditions.

Of the existing philosophical systems the perspective of ududu is closely related to that of the monad and its perceptions as put forth by Gottfried Wilhelm Leibniz (1646 - 1716) (1) and the organic theory and general philosophy of organism which was proposed by Alfred North Whitehead (1861 - 1947) (2). Leibniz proposed a view of a connected universe or reality composed solely of monads and their perceptions. Monads are indivisible, the true atoms of nature, and each one is unique and different from every other. Although Leibniz classifies monads as to whether or not they possess memory or reason, in their most general conception they represent consciousness, a soul. Furthermore consciousness is carefully distinguished from perception which cannot be explained mechanically. Each monad is also associated with a body and that body can be viewed as an organization of other monads and their bodies.

Whitehead envisioned a reality composed of "organisms" persisting through a flux of complex relationships or relations or processes. He also sensed that creativity and organization (organisms of organisms) were critical components of this reality. He understood that an organic or biological interpretation of atomic and subatomic phenomena, was as valid, and perhaps even more valid, than the physical - chemical interpretations of science. It will be helpful to keep in mind this type of attitude and understanding when encountering ududu and its attempted subsumption of the modern physical - scientific perspective.

Thus Ududu begins with perhaps the most important and influential assumption in all of science, the atomic hypothesis. This idea, that the universe is composed of quantized particles (atoms), and space, was proposed in the 5th century BC by Leucippus and Democritus. Since then it has remained as the cornerstone upon which modern science is

built. The universe today is viewed by almost everyone as being composed of quantized particles and space.

The question now becomes what is the nature of these particles, and here ududu sharply disagrees with modern science. To understand this disagreement it is important to recognize another viewpoint which is inherent in modern physics. Back when the atomic hypothesis was first proposed in the 5th century BC, another powerful assumption accompanied it. This was that an independent and objective reality existed which was distinct from ourselves. We, the observers and philosophers, were not viewed as being essential to, or connected to, the independent particles which comprise the universe. We were composed of them, but they were not composed of us.

Although this assumption is just as fundamental to modern science and technology as is the atomic hypothesis, it has always been resisted by a varying but persistent fraction of the philosophical community. The question of whether or not the fundamental particles or entities are independent from ourselves has divided western philosophy since its inception. It is relevant to summarize these two opposing views which I shall arbitrarily and somewhat superficially call realism and idealism.

Realism, in this very general sense, can be said to represent the belief in the existence of an objective reality independent from ourselves. It was advocated by many of the early Greeks, including Leucippus, Democritus, and Epicurus, and was of primary importance in the formulation of the mechanistic materialism of Hobbes and the philosophical paradigm of Descartes. The initial development of the science of physics as presented by Galileo, Kepler, and Newton incorporated it explicitly and it has remained a basic tenet of physics ever since.

This viewpoint can be contrasted with that of the idealistic philosophers who at least questioned the existence of an objective reality independent of ourselves and our ideas. Plato's concept of ideals and his belief that the observable world can only be understood as ideas or forms certainly raised these questions. Later the work of Locke, Berkeley, and Hume, which provided an opposition to the emerging science of the 17th century, also suggested that an objective reality cannot be known for

certain. Such ideas were often dismissed as the experimental verification of science grew. However, despite the overwhelming success of the developing sciences and their associated technologies, idealism continued to survive in the work of Hegel, Royce, Husserl, Heidegger, and others.

Of all these idealistic philosophers it was George Berkeley (1685 - 1753) who had one of the clearest and most penetrating understandings of what one had to assume to understand our experiences. Berkeley was an immaterialist, and by that he meant that matter or material substance, as described by the atomists or realists, did not exist. He perceived himself as existing as "a thinking, active principle that perceives, knows, wills, and operates about ideas." (3). Similarly, he extended this view to conclude that the only other things which therefore did exist were spirits and ideas, "things perceiving and things perceived".

It was necessary for Berkeley to include an infinite spirit, the mind of God, into his world view in order to explain the existence of things which neither he, nor anyone else, had ever perceived but which he did feel still existed. But this does not diminish his insight. Spirits were viewed as conscious entities like himself. Even if one of these did have infinite extent it was still, in essence, a conscious spirit. Conscious entities and ideas were the only reality.

Berkeley's understanding is accepted in ududu. Thus for ududu the particles of the atomistic hypothesis are conscious entities. They are like you and I in the sense that we are conscious entities. This contrasts with the realistic-scientific view in which the fundamental particles of the universe are not viewed as conscious. Instead they are composed of matter or are themselves material particles. Conscious systems are somehow made out of groups or interacting collections of these non conscious material particles.

I call the conscious entities which comprise the universe, udo. They are similar to Leibniz's monads in that they, and they alone, constitute the universe. Each one of them is connected to, and has a unique perception of, all the rest of the universe, which is in turn composed of all the other udo in existence.

Udo are the fundamental particles of the universe in the same sense that science used to consider atoms, and now considers an apparently ever changing variety of real or possible subatomic particles, as the fundamental particles of the universe. The basic difference is that in ududu, udo are conscious, just like you and I, while in science the atoms and subatomic particles are not.

Obviously then, from a foundational perspective, ududu is very different from modern science. But it is my contention that, despite this fundamental difference, ududu can derive all of the experientially verifiable conclusions of modern science. Not only that, but ududu will be able to solve many of the paradoxes and problems which existing science has not, or can not, resolve.

Before this can be accomplished it is necessary to further describe the nature of udo and how they interact with each other. This begins with the statement that udo create, remember, and rationally use language. When Berkeley described his theory of immaterialism he used the word idea in a very broad and somewhat unusual way.

Ideas were anything which could be perceived. Consequently they included words, statements, pictures, mental images, memories, thoughts, sensations, feelings, things, and anything else which we might feel that we can perceive. The only things that weren't ideas were the idea perceivers or spirits. Everything was either a conscious entity or an idea perceived by a conscious entity.

In ududu, Berkeley's concept of idea and Leibniz's concept of perception have been expanded into a broader process which I call language. Essentially this definition of language includes the concepts of idea and perception but also includes the concepts of creativity, communication, and the initiation of action or decision. The distinction and expansion is crucial.

Udo are not just thinkers and passive observers. They are creative. They act. They change the world and environment around them in a dynamic and interactive manner. The word language with its implication of communication and interaction, as well as idea and concept, conveys a

more comprehensive sense of this process than does Berkeley's use of idea and perception.

This larger understanding of the dynamic and creative characteristics of language and its essential involvement in the very existence of ourselves and the universe leads us to Wittgenstein and Heidegger.

Ludwig Wittgenstein (1889 - 1951) created two distinctly different views on the nature of language. In the earlier theory he viewed language as depicting reality. This view was changed in his later work to include a much broader conception of the role and use of language in our lives and in philosophical inquiry. It is the later work which is of particular interest to ududu and all of the subsequent discussion will refer only to these later views (4).

Wittgenstein grew to understand language as an evolving ever changing collection of language-games or tools. The essence of language is contained in its use and this may change as the language using community or communities change. Language and language-games are viewed as forms of life, as behavior itself, as well as a way of understanding ideas.

The beliefs upon which language-games, and consequently knowledge and understanding, are founded, are viewed relatively. These foundations themselves may slowly change as the use of language evolves. He uses the analogy of the bed and banks of a river which determine the direction and flow of the water. But the bed and banks themselves are slowly changed by the very flow which they determine. Thus language in and through its use is a creative evolving process which continually changes the foundations and rules of its own nature.

Because of this Wittgenstein speaks metaphorically and somewhat vaguely. He does not attempt a systematic explanation of meaning or understanding because these are variable, interactive, creative, and changing constructs. Language and language-games are an integral part of how we view ourselves and the rest of the universe. Consequently they are an essential component of ourselves and the universe.

Understanding language in the Wittgensteinian sense, as a creative evolving tool which, through its use, embodies our ideas and behavior,

is crucial to ududu. It is considerable more than the concept of idea as used by Berkeley. We continually create and modify language through our perception of, and interaction with, the other udo which comprise the universe.

This now brings us to Martin Heidegger (1889 - 1976) (5). Whereas Wittgenstein talked about the nature and use of language Heidegger took the additional leap of equating the question of language with the question of existence itself. For him language, and the expression of thoughts or ideas or questions in language, is synonymous with our very existence. It is in and through language that things come into existence, that things are, and this includes ourselves.

Heidegger is preoccupied with being, with existence. The only philosophical question for him concerns the nature of being, the Being of being. He equates human being, our own existence with the being of language. They are inseparable. Thus philosophy is the question of being and it is the essence of this being as embodied in language that defines our existence and the existence of the universe. It is language itself that speaks, not just humanity. Our being is the being of language.

The nature of philosophy, this investigation of being, is therefore, a participatory involvement of our existence, in and through language, in the question and statement of existence. This is reality. It is the constitution of the universe.

Because of this self inclusion in the language process through which he understands his and the universe's existence, Heidegger does not write or use language in a familiar philosophical manner. The idea he believes or intends to communicate is the language itself. His existence, our existence, the language which connects us and which defines our existence, is the Being of being. Consequently all of his writing becomes, in a sense, a metaphor for itself. It is not just a communication but the actual creation and essence of existence.

It has been implied that it may be possible to understand the crux of Heidegger's philosophy by understanding how to read a single page of his writing (6). This holographic characteristic of his work, in which his entire philosophy is represented in his every pronouncement, is a

reflection of his understanding of the interrelated role which language and consciousness play in all existence.

This interrelationship between language and consciousness accurately characterizes the nature of udo and the udu universe. Udo are conscious entities which create and use language. This serves both to define their own existence and the existence and nature of the universe.

Heidegger was able to clearly see this involvement of language in our own nature and existence but he never went beyond this realization to a practical and useful capability. His understanding led him to deplore the consequences of science and technology but he was unable to engage or explain their undeniable practical success. The problem lay not in the nature of his fundamental insight but in his failing to exploit all of the many diversified ways in which language can be used.

Thus Heidegger and Wittgenstein each have expounded crucial elements of ududu. Heidegger saw that language and our own conscious existence are inseparable and that they indeed serve to define the universe. Wittgenstein recognized the creative, evolving, interactive nature of language and that it is integral to our understanding and perception of the universe and each other.

However, the understanding that udo are language creators and that this is inextricably bound up with their and the universe's existence does not say anything as to how language is actually used by udo. To understand this we again go back to the Greek origins of the western philosophical tradition.

Since the time of Plato and Aristotle virtually all philosophical and scientific systems have incorporated reason or rational thought as a primary methodology. Although Plato and Aristotle differed significantly in their orientation they both employed rigorous analytical thinking as an integral part of their philosophical structures. Thus Plato's concept of ideals or forms as subjects amenable to reason characterized subsequent idealistic metaphysics while Aristotle's rational search for first causes and dynamic principles laid the foundations for later science and technology.

But what exactly is reason? In one sense it can most easily be described relative to mathematics. For example, Thomas Hobbes (1651) states "When a man reasons, he does nothing else but conceive a sum total from addition of parcels, or conceive a remainder from subtraction of one sum from another" (7). Here certain entities, relations, and operations are carefully defined and then consequences of these original definitions are determined. This deductive process is called rational, in that the deduced consequences are unambiguous or determined by the initial conditions.

But reason has long been associated with more than purely mathematical processes. Consider the definition proposed by Rene Descartes (1596 - 1650) "...the power of judging well and distinguishing truth from falsehood, which is what we properly mean by good sense or reason, is naturally equal in all men;..."(8). Here reason is tied to the determination of good judgments and truth, concepts of arguable meaning for many philosophers, and is further identified as being something we all innately possess.

Despite the differences in these two views there is a general sense that both are valid. Rational thinking is something that is recognized by most people, and as a practical matter reason does confer enormous benefit on those who use it. This is true for both scientific and technological applications and for everyday living.

Historically reason was not critically examined as a methodology until David Hume (1711 - 1776) began to question the law of causality (9). This laid the ground work for Immanuel Kant (1724-1804) to challenge the foundational methodology and meaning of reason and rational thought itself (10). Kant contended that applying reason to non verifiable phenomena and hypotheses led to conclusions of uncertain meaning. Therefore there is no rational basis for using reason unless the results of its application can be experimentally tested. This conclusion has had a profound effect on philosophy ever since. The continued success of science and technology reinforces the validity of rational thought but the reason as to why this should be so, has remained elusive.

In udu this problem is resolved by postulating that rational thought is a natural characteristic of the way udo use language. Thus reason and rationality are fundamental properties of all udo and hence of all the universe. To understand the way in which this occurs in udo let us examine another historical trail, this one starting in the development of probability theory.

In 1713 a work by James (Jacques) Bernoulli presented the first formal definition of probability which he called the "Principle of Insufficient Reason" (11). This stated that given a situation containing a number of possible cases, none of whom we know to be more or less likely than any other, then the probability of an event dependent on some of these cases would be the total number of cases favorable to this event divided by the total number of possible cases.

Bernoulli also extended this understanding to situations which could be well described but in which not all of the possible cases would be equally likely. He did this by relating probability to experimentally observed frequencies. Thus in his famous theorem he showed that over a large number of repetitions an observed ratio of events will not differ from its probability by more than an arbitrarily small amount. This was the first time that a formal principle had been presented for specific applications of the concepts of probability, and marked the beginning of probability theory as a branch of mathematics.

Probability theory began to approach the problem of inference with the work of Thomas Bayes (1763) (12). His results made it possible to estimate the probability of one event given knowledge of the probability of a related event.

All of this work was then collected and extended by Laplace (1749 - 1827) into an extensive treatment of mathematical probability theory (13). He expanded the work of Bernoulli and Bayes into a generalized procedure. This made it possible to estimate future probabilities of causally related events given the occurrence of certain initial events and the a priori probabilities of these initial events. The only problem with applying this result (known as Bayes' theorem) is that, unless Bernoulli's Principle of Insufficient Reason holds and all the a priori

probabilities are equal, there is no way to estimate the a priori probabilities.

After Laplace probability theory itself stagnated while its applications continued to grow. Part of this can be attributed to a significant change in the understanding of the nature of probability. Instead of a ratio of favored over possible it began to be viewed as a frequency function. Thus a probability was determined relative to a given experiment and was defined as a limiting value of a very large number of repetitions of this experiment.

This view gradually began to change with the publication of a more extensive theory of inference by Harold Jeffreys in 1939 (14). Then a series of critical discoveries were made.

The first of these was published in 1946 by Richard T. Cox (15). He showed that the basic mathematical nature of probabilities was independent of any reality other than the existence of language. Cox demonstrated that for a given linguistically stated hypothesis and a carefully defined set of inferences based on that hypothesis, a unique mathematical function could be defined which was identical to probability as used in the basic equations of probability theory. This meant that probability theory itself was derivable solely from language and a requirement that the theory be internally consistent. It did not have to rely on experiment or a relation to observable frequency functions in an external world.

At about the same time a paper by Claude Shannon in 1948 extended the concept of entropy, which had previously been primarily associated with thermodynamics, into information theory (16). He showed that for a given probability distribution there exists a function which is a unique and unambiguous measure of the amount of uncertainty associated with that probability distribution. Since this function had the same mathematical expression as the formula used in statistical mechanics for entropy, it was called the entropy of the probability distribution.

Then in 1957 Edwin T. Jaynes published the maximum entropy principle (17). He used Shannon's entropy function, in conjunction with Cox's proof as to the linguistic nature of probability, to propose a

general principle of plausible inference. This states that given certain information the best choice of a probability distribution based on that information will be the one which maximizes its entropy.

While Jaynes derived the maximum entropy principle primarily for statistical mechanics he did recognize that it was indeed a general principle of inference. Thus it will hold regardless of what type of situation is to be described by the probability distribution. Because it provided a "best" way to pick a priori probabilities it therefore solved the major problem which had hindered application of Bayes fundamental theorem as recognized and stated by Laplace. Consequently the maximum entropy principle became a model for rational decision making (18).

Shortly after Jaynes published the maximum entropy principle L. Bianchi and J.R. Hamann realized that it was of foundational importance in the origin and definition of life itself (19). They claimed that in order to build a consistent theory of living systems it was necessary to include the maximum entropy principle in the foundations of a hierarchical system of organization stemming from a series of personal presumptions.

With this insight we now return to ududu. We have already postulated that the universe is composed of conscious linguistic entities called udo. In the Heideggerian sense the existence of udo is integrally connected with their creation and use of language. It is through language that their existence, and consequently the universe, occurs.

We now find that in a certain special case, one where precisely stated inferences and hypotheses can be defined, that a "best" (rational or reasonable) procedure can also be defined relative to the use of language to make decisions. This procedure is the maximum entropy principle. It further appears that this principle may also be connected with what we understand as life.

Therefore ududu makes an additional assumption. This states that the linguistic essence of the conscious udo themselves is inherently rational, it follows the maximum entropy principle. Any use of language by an udu will be such that its entropy will be a maximum.

But here a major objection may occur. The maximum entropy principle as stated by Jaynes only applies to very carefully defined sets of situations. These require precise statements of inferences and hypotheses. Certainly most of the ideas and language in my consciousness cannot be said to exist in this form. Some work has been done to expand the maximum entropy principle to cases of greater imprecision (20), but still there are a great many examples of emotions, sensations, feelings, etc. which, if they must exist in language, may never be representable as hypotheses or inferences.

What ududu does here is to expand the concept of entropy to that of a general property of all language. Thus entropy is inherent in all language, not just a derived property of some language. In those cases where our language is amenable to representation as well defined hypotheses and inferences, then we can obtain a mathematical expression for this entropy. However, the entropy exists within the use of language whether we can represent it in this manner or not.

Entropy is part of the essence of language. To use language is to be rational. Maximizing entropy is as fundamental to our existence as is the use of language itself. The analytical formulation of the maximum entropy principle is only one representation of this general feature of the use of language. Just because we cannot formulate a given experience in linguistic terms which allow us to calculate this maximum entropy does not mean that such a characteristic of our use of language does not exist. It simply means that we are not sophisticated enough in our comprehension and use of language to understand this yet.

What then do we make of obviously irrational or impulsive behavior? Why do some language using individuals make nonsensical or suicidal decisions? It all comes back to what information is actually used in the decision process. If language or information is misunderstood, distorted, or indeterminate, then decisions based on this language and information will appear irrational to one who has a more complete or more accurate understanding. If language or information is lost or forgotten then a decision which should be based on this information may also appear irrational since it will not include consideration of relevant information. The decision itself will still be consistent with an optimal entropic configuration of the language actually used in the

decision process, but this may differ significantly with the decision which would result if all the relevant information were actually available.

Thus all udo are inherently rational. Their rationality, their reason, is an essential attribute of their very existence. Descartes intuitive sense that reason "is to be found complete in each of us" is right. It is a defining characteristic of all udo, of all life.

SPACE

So far we have discussed the atomic or particle part of the atomic hypothesis. This entails the belief that the universe is composed of udo. We have also assumed that all udo are conscious in the same sense that you and I are conscious, and that they create, remember, and rationally use language. Some discussion has been presented to illustrate what these assumptions mean in terms of our common experience, and our philosophical and scientific heritage.

Now a set of additional assumptions are made. These concern the space of the atomic hypothesis and the interactions and relationships which exist between udo existing in space. These additional assumptions are as follows:

We communicate with each other by sending and receiving messages.

We sense, experience pain and pleasure.

We feel, experience emotion.

We act, by implementing rational decisions.

We create organizations and new udo by interacting with each other.

These assumptions have been stated in terms of "we" because the nature of udo has been identified in terms of our own consciousness. It is

consequently most useful to exemplify these assumptions in terms of you and I.

When I say we communicate I mean the process by which you and I share language and ideas with each other. Your reading these words is an example of my communicating with you. You are understanding, on some level, ideas which I have attempted to communicate through an act of writing.

The important point here is that an interaction between you and I has taken place. You have engaged ideas and language which came from, or through, me. Whether you believe these ideas, or understand them, or reject them, or whatever, is not critical. The fact remains that you have encountered these thoughts. You have recognized them as existing, which means that you have experienced through them, their own, and hence my own, existence.

There is, of course, a process or mechanism which appears to mediate this communication. This process can be described in terms of some of the other assumptions in the following manner.

First I write the words. The illustration would be equally valid if you and I were having a spoken conversation and I were to speak the words. This writing or speaking on my part is an action which I perform. It is a direct result of a rational decision which occurs in my consciousness. I act by implementing rational decisions.

Next you perceive the words. This means that you see them as written words or hear them as speech. You recognize this as language and you understand something as a result of this perception of received language. The sensed communication has some effect on your own composition as a linguistic consciousness entity.

You may also experience some emotion or feeling as a result of this communication. It may make you happy or angry or excited. It may also not have any detectable emotional impact on you, but some communications will. In some cases you will experience an emotional feeling solely as a result of receiving a communication of ideas.

These examples serve as preliminary illustrations of what is meant by the assumptions of communication, sensation, emotion, and action. Unfortunately, the assumption of organization is much more difficult to describe. The creation of organizations and new udo through the interaction with other udo, represents a synthesis and culmination of the other assumptions. Its description is the description of ududu. It represents the creation of space and the universe.

To adequately describe this last assumption, and thereby also fully describe the assumptions of communication, sensation, emotion, and action, we return again to the philosophical and scientific tradition.

We begin again with Rene Descartes who developed a philosophical methodology in which he first attempted to eliminate everything he had learned from his mind (his famous "tabula rasa") so that he could carefully build his own belief system starting with his own existence as a conscious thinking entity. "Cogito ergo sum", I think, therefore I am.

From here he went on to consider many things including the questions of the existence of God and the nature and possible connection of mind and body. It is this last subject which is of most interest to ududu.

Descartes viewed his mind and his body as two distinctly different things which were inseparably bound up with each other. Thus there were two types of things which existed. One of these was consciousness, a thinking capability which was manifested as souls or minds. The other was matter, a field of corporeal nature which contained material things which were not conscious and did not think. Material bodies were always viewed as being divisible into component parts, whereas mind was indivisible, a single and complete thing which contained no component parts (21).

Each mind (with the possible exception of the mind of God) had a material body to which it was inseparable bound. Even though the exact nature of this relationship was not precisely defined, he did feel that the soul had a power to move the body and that the body had the power to act on the soul and cause sensation, pain and pleasure.

This concept is adopted in the foundational basis of ududu. Thus all udo are viewed as having bodies. Udo interact with their bodies through

sensation, the experiencing of sensory information, pain and pleasure, and through action, making the body move in space and time through the implementation of rational decisions.

The essential difference here is that in ududu, bodies are viewed as being organizations of other udo. This agrees with the positions of Leibniz and Whitehead and proposes that matter in the Cartesian sense is actually organization. We as conscious minds interact with the organizations which we identify as our bodies through sensations and the initiation of action.

At this point it is premature to try to present a precise definition of what constitutes an organization. Indeed such a definition or understanding, if it can be technically formulated at all, would represent a sort of holographic explanation of all of ududu. Yet from our own personal experiences we all have a sense of participation in organizations composed of ourselves and other people.

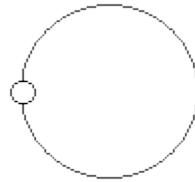
From this perspective, organizations will be describable in terms of a collection of udo and certain types of communications between the udo which comprise the collection. It will also be possible to describe organizations which are composed of other organizations, or of a combination of organizations and udo.

The initial critical component of organization is communication. The members of an organization must be able to communicate with each other. This holds whether the members are individual udo or organizations of udo. But simple communication is not enough. There must be something more, an understanding, a shared agreement of goals or purpose or worldview. The individual members of an organization must participate in the organization. They, and their language and ideas, are the creators, the participants, the reason and existence, of the organization. Consequently, all aspects of their own existence bear on the nature and existence of the organization. Memory, sensation, emotion, action, reason, creativity, and language are all integrally involved.

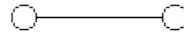
To further illustrate how these concepts interact with each other in the creation of organization, let me briefly summarize relational systems

theory as developed by Jon Ray Hamann in the late 1960s and early 1970s (22). Relational systems theory presents a world view in which everything which can be experienced or imagined can be described in terms of the primary concepts of system and relation. Therefore four distinct types of relations, or relational orders, can be recognized. For purposes of illustrating these concepts let a system be represented by a dot o and a relation by a line ---- Thus the four relational orders are;

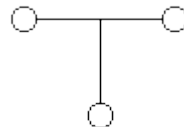
Relational Order 0. System Related to Itself :



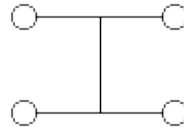
Relational Order 1. System Related to System:



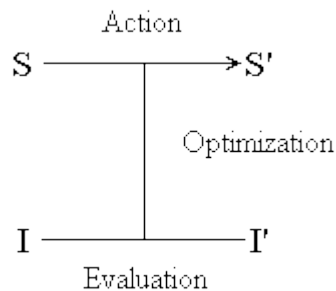
Relational Order 2. System Related to Relation:



Relational Order 3. Relation Related to Relation:



An example of an application of the relational systems formalism which Jon Ray Hamann frequently used is the following description of the maximum entropy principle as a generalized decision procedure. Schematically this can be represented in the following manner.



Here a system, S , is going to act and thereby achieve a new state, S' . The system S contains I , information about past and present conditions, and I' , projections of possible futures. These are related to each other by value judgments and/or assignments of probabilities. These evaluations or probabilities are in turn related to the action changing S into S' by a decision or optimization procedure which is the maximum entropy principle.

Relational systems theory provides a useful metaphor with which to view and understand Descartes's mind body duality and how this is resolved by udu's view of the body as an organization of udo. To illustrate this let organizations and udo be viewed as systems. Also let communication and general linguistic interaction be represented as relations.

Thus relational order 0 would involve how an udu communicates with itself. It is a notion of existence and self awareness, a recognition of the presence of memory. This in turn leads to an understanding of time in that time can be viewed as a partial ordering of our memories, one memory being considered in our consciousness as having occurred "before" or "after" other memories.

Relational order 1 would represent direct udu to udu communication, the exchange of language and ideas between udo. I communicate with you. You communicate with me.

Relational order 2 would represent several different situations. One would be the influence which communication among the component udo of our body could have on our own consciousness. This would be sensation, the experience of pain or pleasure which we receive from our bodies. It is not a direct udu to udu communication.

A second case would represent how we can influence the communication among the component udo or organizations which comprise our own bodies. This would represent our initiating the action of our bodies. We can't directly communicate with the individual component udo of our body but we can act by influencing how they communicate with each other.

A third case would be the emotional feeling which we experience by directly communicating with, or receiving communication from, other udo. This representation would have the emotion we feel being the relation between ourselves and the communications which we experience.

As examples of these cases, we can understand love as a function of, or relation to, the communicated linguistic understanding we share with another consciousness, whereas sexual desire would be a sensation which we receive from our body as a result of our body's perception of, or interaction with, another body.

Finally relational order 3 could be viewed as rationality (as embodied in a generalized maximum entropy principle similar to that previously described), or as creativity, or even as consciousness itself. Relational order 3 would not be directly detected by us as individual udo because

we can't be an integral part of its relational definition. We can only be related as systems to another system or another relation.

However, we may experience relational order 3 in the sense of our own consciousness, creativity, and rationality. Thus we, as quantized udo, may exist in terms of third order relations defined over some set of relations between and among the other udo, organizations, and relations in the universe.

The Cartesian mind body problem now resolves as a difference between first and second order relations. Communication is first order. I communicate with you, with any udu, with organizations. It is a direct transmission, a sending and receiving of language and ideas.

My relationship with my body is second order. The sensations which I perceive are not direct communications from my body as a system or organization. They are not direct communications from the component udo which constitute my body as an organization. Instead these sensations impact on my consciousness as relationships coming from the communications between the udo which are part of my body organization. The understandings and organizational communications which exist among the udo which are my body have an effect on my consciousness. I am aware of these communications, not as a participant, not in the sense that I recognize the communications as communications, but as sensations, pains, pleasures.

Similarly, when I make my body act, I do this as a second order relation. I do not send a command to my body. This is not a specific communication between my consciousness and the body organization. Nor is it a specific communication between me and some component udu which is part of my body. Instead it is an influence which my consciousness has on the communicated understandings among the component udo of my body. This influence changes the way in which they create and maintain the organization which is my body. I perceive this change as action or movement of my body.

This perception of my body's responding to my consciousness is remembered by my consciousness. I realize that my wholistic existence as a linguistic entity can generate different perceptions or sensations

from my body depending on what I am thinking with my language. I remember what types of thoughts correlate with certain perceptions of my body's actions and thereby learn to control my body, or at least my perception and sensation of my body. The crucial point is that bodily action is a consequence of thinking and not a response to a communication.

The question now becomes how does all of this define space and the rest of the universe distinct from ourselves. Before we can discuss this we must consider Albert Einstein (1879 - 1955) and the theory of general relativity. Einstein's general theory of relativity was published in 1916 as a theory of gravitation. It was carefully defined over a rigorously stated frame of reference which could be expressed in terms of systems of mathematically described coordinates. Thus the general theory of relativity was a mathematical theory, and it resulted in a very powerful mathematical statement of the laws of physics.

The coordinate systems which physics used prior to the general theory of relativity were those which could be constructed by using rigid measuring rods, in accordance with the rules of Euclidian geometry, and by using standard clocks which measured time in some defined unit period. It was further assumed that such coordinate systems had a direct physical meaning.

General relativity changed all this by asserting that there is no physical objectivity to any system of spatial-temporal coordinates. We cannot define any system of coordinates in which differences in space and time can be unambiguously measured with physical measuring rods or standard clocks.

The way out of this dilemma, which Einstein clearly saw, was to reformulate the way we describe differences in space and time. This meant that the way we describe the motion and interaction of physical bodies must be independent of the coordinate system used. This led to his brilliant and succinct statement of the principle of general relativity:

"The general laws of nature are to be expressed by equations which hold good for all systems of coordinates, that is, are co-variant with respect to any substitutions whatever (generally co-variant)." (23)

Einstein was a physicist and consequently he expressed this most fundamental of all laws of nature in physical and mathematical terms. But he didn't have to be so restrictive. The principle of general relativity holds true for all of the universe, not just that carefully defined part which physics chooses to describe. Thus general relativity can be restated as;

The general laws of nature are to be expressed by statements which hold good for all systems of language, that is, are co-variant with respect to any communications whatever (generally co-variant).

Here a statement is the expression of any idea or concept in language. That it hold good for any system of language implies that it be translatable from one language system to another without a distortion of its meaning. The concept of system of language is used in exactly the same sense that Einstein used the phrase "system of coordinates". The intention is that we deal with systems of language or coordinates which are sufficiently complete to describe the relevant laws, that is, are well defined relative to ududu or physics. However, in ududu we must remember that a well defined language is a creative and ever changing concept whose existence must be understood in the sense of Heidegger and Wittgenstein.

Co-variance now becomes the basic requirement for communication and organization in ududu. Just as general relativity defines the space, or space-time continuum of physics, its more general statement defines the universe for ududu. Co-variant communication becomes the critical principle of organization, the fabric of our bodies and their environment. It completes the atomic hypothesis, which we began with the identification of ourselves and others as udo, by providing a context in which udo exist and interact with each other.

The requirement of co-variant communication between systems of language means that any communicating udo must recognize, at some level, the udu nature of the universe if they hope to form an organization. They must understand that their nature as senders and receivers of information is like that of other udo. All udo have memory, can create and rationally use language, can sense and feel and act, and can communicate with other udo. The basic framework for the co-

variant understanding of communication must include the recognition of all these characteristics.

Any system of language which has the capability of representing all of these essential elements of co-variant communication becomes a well defined system of language. Each udu has at least one such well defined language as part of its own existence. The connections which each of us have with other udu through these well defined languages serve to include us in one master organization which is the universe itself. Our consciousness in our awareness, and our existence in terms of well defined languages, results in a communicating, feeling, sensing, acting, remembering creating of the universe. It is the ultimate organization which exists and changes through each of our own existences and the co-variant communications and understandings we have with others.

This view now explains why, on a common sense level, the space of physics appears the way it does, a time-like dimension measurable with clocks, and three space-like dimensions measurable with rigid rulers. The time-like dimension corresponds to our awareness and existence as contained in, or represented by, memory, or more specifically the partial orderings we experience as part of our memory. The three space-like dimensions correspond to our procedures of measurement (communication) through the comparison (rational evaluation) of our perceptions (sensations).

Another way of looking at this involves interpreting the four dimensions of physical space in terms of the udu extension of the four relational orders of relational systems theory. Thus relational order zero is time which is also memory. Relational orders one, two and three are Euclidean three-space (length, width and height) and they also represent the udu measurement process (communication) involving the rational comparisons (maximizing the entropy) of our perceptions (sensations).

To further illustrate the udu extension of general relativity let us look more closely at the concept of time as it appears and is used in udu and physics. In physics time is defined relative to the positions of hands on a clock. The concept depends completely on the construction of some

sort of mechanical or electronic device which produces repetitious events which are judged by reasonable people to be of equal duration.

But look at what's being said here. This is essentially the same definition we use in ududu, only its not formally recognized or stated within the laws of physics. Who makes the determination that the events are similar and repetitious? We do. We compare the event happening right now with what we remember as happening previously. The same can be said for the intervals of equal duration. How do we know this? How do we define equal units of time? They are rational decisions and judgments made relative to our memory.

The critical difference in time as it is used in ududu and physics stems from how we are perceived relative to the belief system. Since physics is predicated on the existence of an external reality separate from ourselves, the inclusion of our participation in the definition of time is not an explicit part of the theory. Therefore, physicists tend to forget or ignore that the existence of time depends on their own existence and their creating time relative to their own memories. They assume they are simply observing a property of an external reality, but in fact it is a creation of their own consciousness based on their own memory.

This also tends to explain why the mathematical languages of physics are not able to describe the whole universe. They are not well defined languages in the sense that we earlier discussed. Mathematical languages never deal with who is creating the language. Consequently their application always has limitations or results in paradoxes. This can be seen in Kurt Goedel's incompleteness theorem which states that for any formal system which is constructed from a set of axioms there are propositions which can be formulated but not proved within that system (24). Similarly Bertrand Russell's famous antimony concerning the foundations of set theory asks the question of the set of all sets which are not members of themselves, is this set a member of itself? (25).

This problem exists for any system of language which depends on a propositional logic, that is depends on propositions which have to be true or false. The statement "This statement is false." which clearly can't be either true or false, illustrates the fundamental problem. The properties of truth or falseness are only relative properties. They are

unambiguously meaningful only when used in a well defined language, one which identifies and includes consciousness, creativity, sensation, emotion, etc. Therefore any system of language which is restricted to only a propositional logic, or is defined by a propositional logic, can never produce a completely co-variant description of the universe.

In a more expanded form this problem can be more easily understood in terms of interpretative statements. Thus the statement "The painting is beautiful." may be true or false or irrelevant depending on who is making the statement and judging the painting. To require that such statements have the property of truth or falseness independent of the identification of the maker of the statement is to impose a condition on the language which does not make sense and which will prevent it from allowing truly co-variant communication.

An understanding of the whole universe requires well defined languages capable of supporting general co-variant communication. Once we realize this we can see that the universe is an organization of all of us. It is us, both as our own consciousness and our own body. Our perceptions of space and time, and our perceptions of our physical bodies, are consequences of our fundamental desire to create, and participate in, organization. This is the nature of the universe.

CREATIVITY

Ududu's extension of the general theory of relativity provides a framework and criteria for the communication through which udo create and build organizations and hence the universe itself. But it still does not provide an explanation of why udo choose to do this. There is no concept of force or motivation. To find this final element of ududu we once again go back to our own basic nature, and in this case to our own creative capability. All udo are inherently creative. They create language, and through the co-variant communication of language, they create organization. This is not a passive characteristic. Creativity is a force, the force. It is the source of our own existence, the existence of our language, the existence of the universe.

Creativity is, like rationality and consciousness, an integral part of all udo. As such it provides the initiation of all action. The action itself will be formed and directed by our rationality but its inception will be a result of our creativity. We, as udo, want to create things. We want to create language and ideas. We want to create organizations. The urge to do these things is a fundamental aspect of our nature and existence.

The manner in which creativity drives the formation of organizations involves communication and the results or consequences of communication. In the most fundamental sense an udu has two different types of experiences relative to communication. One of these is the experience of sending a message, and the other is the experience of receiving a message.

This two part nature of an udu's role in creative communication manifests itself in a variety of different ways depending on the organizational perspective with which we choose to view the universe. If we use the physical perspective we interpret the urge to create in terms of forces or interactions. For example, the electromagnetic interaction involves the exchange (communication) of photons (messages) between negative and positive charges (senders and receivers).

From a biological perspective this urge to create can be viewed in sexual terms. Thus a new organism (organization) may be produced through a sexual encounter (communication) between a male (sender) and a female (receiver). This does not exclude asexual reproduction in the biological sense but simply provides an explanation of why we observe sexual (creative) phenomena occurring between bodies (organizations) of what we recognize as living systems.

The duality in the nature of udu experience with respect to communication is further manifested in terms of consequences which occur at the organizational level. Thus a communication may result in an agreement or a disagreement between the communicating udo. This paradigm of binary consequences can also be viewed in a wide variety of different terms depending on our organizational perspective. Thus it

could be represented by true - false, attraction - repulsion, cooperation - opposition, order - disorder, organization - chaos, life - death, etc.

All of these binary descriptions are functions of the organizational consequences of communication, the sending and receiving of messages, when viewed from varying foundational perspectives. All of them must be interpreted relative to the organizations involved and the communicating udo or organizations which send and receive the relevant communications. Unless we consider these contextual factors such binary classifications will not appear to be meaningful and will not lead to a co-variant understanding of our experiences or the universe in general.

Because the driving force of creativity often manifests itself in terms of these binary descriptions, it is critical to understand how they are developed. The electromagnetic interaction between positive and negative charges in physics, and the sexual interaction between male and female organisms in biology, are two major examples. Both of these phenomena are expressions of udu creativity which result in organization. We recognize the resulting organizational consequences, and understand them in terms of binary descriptions, but we must remember that these binary descriptions represent our perception of the communications between senders and receivers of messages. It is the implementation of the creative force through co-variant communication which actually generates the observed organization.

In physics there are four forces or fundamental interactions which are generally considered as explaining why the physical universe behaves the way it does. These are gravitation, the electromagnetic interaction, the weak nuclear interaction, and the strong nuclear interaction. These interactions act on the fundamental particles which make up the universe. Modern physics now recognizes two basic types of fundamental particles, matter particles which are the "real" particles and which make up all material substance, and force carrying particles which mediate the interactions between the matter particles.

In ududu the fundamental particles are considered to be udo. Thus the matter particles of physics are either themselves udo or they are organizations of udo. The force carrying particles are the linguistic

messages which are communicated between udo. This communication, or exchange of force carrying particles, then constitutes the fundamental forces or interactions of physics. The results of these interactions are, from the perspective of physics, all the phenomena we identify with material substances. From the udu perspective the interactions are communications and they result in organizations which we often perceive as material substance.

Why then are there four fundamental interactions in physics? Why not just one if they are all manifestations of communication? Actually they are all one but they appear as four because of the inherent interrelational nature of udo themselves. Remember the four relational orders of relational systems theory as they represent our own ability to remember, communicate, sense and act, and create and rationally use language.

Just as an interpretation of these four relational orders explained the existence of four dimensions in space-time, they also explain the perception of four forces or fundamental interactions in physics. Since physics is bounded in its understanding of the universe by measurement, which is communication, it expresses the fundamental interactions in terms of measurable quantities. Thus physics speaks in terms of force carrying particles which mediate the fundamental interactions. However, the underlying order which physics indirectly detects is the fundamental nature of udo and udu interaction. Physics, because of its restricted foundational base, is unable to deal directly with these phenomena and so it describes the universe in terms of four types of communication-like interactions and a range of binary descriptors. This description and the detected nature of the universe is essentially correct, it is just incomplete.

It should be noted here that a null or indeterminate consequence of any given communication may also occur. These may result in a third case associated with each of the previously identified binary pairs. Thus we have neutral or uncharged particles, asexual organisms or reproduction, or a variety of situations which are indeterminate such that we cannot choose either one of two binary descriptors.

These situations all represent cases where the creative drive either does not apply or where it is masked or countered by rationality.

Surprisingly, it is a form of rationality which often serves to hinder the attainment of true co-variant communication, and therefore often prevents the successful achievement or maintenance of organization. The best example of this type of phenomena again comes from physics, this time from the Heisenberg indeterminacy principle.

Walter Heisenberg in 1927 presented his famous principle which states that it is impossible for us to know exactly where a particle is located and what its momentum is (26). We may know either one of these quantities but not both at the same time. This fundamental statement of physical indeterminacy has been a cornerstone of quantum theory and has led to perhaps the most successfully applied theory of physics, quantum electrodynamics.

In 1978 John Cryanski demonstrated that this type of indeterminacy is a natural result of applying the maximum entropy principle to a communication which travels through a channel of finite capacity (27). In other words any finite communication will be constrained by our rational nature (maximum entropy) in such a way that there will be a natural indeterminacy associated with it. If the conceptual content of the communication is too large relative to the language actually communicated, then this indeterminacy may result in the co-variant nature of the communication being lost. This in turn could interfere with the continuing creation of an organization or even destroy an organization.

The effect of indeterminacy is exemplified by our frequent inability to agree on what should be readily verifiable facts. It also bears on our ability or inability to creatively organize or cooperate. Our co-variant communication which seeks to achieve these creatively driven ends, must overcome the indeterminacy inherent in the nature of communication itself. Fortunately this can usually be accomplished through a variety of procedures involving repetition, restatement, experimentation, etc.

We now can see that creativity leads us to communicate with each other in many different ways and on many different organizational levels. All of this communication is directed towards some encouragement of organization. We can't understand why this tendency towards further

organization exists, anymore than we can understand why we are creative or why we even exist at all. Still it remains as a crucial element of the universe.

Rational behavior tends to stabilize this progressive tendency to build and enhance organization. It also tends, in the absence of continued creativity, to destroy organizations. This effect comes from misunderstandings which arise as a result of the natural indeterminacy which accompanies all organizational communication. However, the ubiquitous nature of creative udo in the universe tends to make this effect more of a reorganizational process rather than a purely destructive one. Thus death as we perceive it could relate to the organization or reorganization of our bodies and not to our conscious existence.

The creative drive to organization provides the basic phenomena which Charles Darwin (1809 - 1882) described in his theory of evolution (28). Darwin dealt with a perceived progression of species of biological organisms, but like many of the other individuals I have discussed, his ideas hold over a much wider range of application than he envisioned.

Darwin's theory of evolution embodied a process which coupled the creation of variability in species with a principle of natural selection of the most successful resulting organisms. The result was a steadily adapting variety of different related organisms which tended to evolve to compliment, or optimally fit, their immediate and ever changing environment.

When this idea is generalized to apply to all forms of udo organization it provides an elegant summary of the interaction of creativity and rationality. It also recognizes a fundamental property of both ourselves, as language creating entities, and of the universe, as composed of udo and organizations of udo.

Thus what evolution says is that understanding and knowledge, as manifested in our language and memory, will tend to increase in both extent and sophistication. This will occur through our creative formation of new ideas and concepts and their rational evaluation through scientific experimentation or comparison with personal

experience. As these tendencies are applied to our creative drive to organization, they will embody the organizations themselves with an evolutionary direction. All this will lead the universe itself to evolve.

This restatement of Darwin's theory of evolution is very similar to the theory of pragmatism as developed by Charles Sanders Peirce (1839 - 1914) (29). It recognizes the origin of variability as stemming from our own udu creativity of ideas and language and the organizational embodiment of these creative ideas into hypotheses. The natural selection process then results from the rational evaluation of these newly created ideas and their organizational consequences.

When we view evolution in this manner, which is on a more general scale but still consistent with the way that Darwin originally formulated this idea, we are implicitly assuming the physical representation of time. Thus evolution is a process which occurs in time.

What happens to this idea when we view it from a perspective which maintains that we create time? Our creativity is ultimately the creativity of the universe. This creativity also generates the concept of time through which we formulate the principle of evolution, and this principle states that there is force (creativity) which causes our knowledge and understanding to increase.

What it all comes back to is creativity. We create time and evolution. We create and change the universe. Our understanding of evolution, of history, of physical cosmology, all change through our own existence and creativity. This means that the actual (from a physical perspective) facts of evolution or history or physics, also change. Ultimately we, and all the udo in the universe create and change these things.

This results in a very specific and interesting prediction which ududu can make concerning physics and the laws of physics. This is that the laws of physics, and the actual underlying "physical reality" which such laws describe, will change in the future.

This change will not just reflect a change or increase in the sophistication of our physical understanding. Instead the actual nature

of the universe will change. Furthermore, the physical perception, even though severely limited, will be able to detect this change.

To understand this a little better let us look at a currently popular physical theory as to the origin of the universe, the big bang theory (30). This theory traces physical time back some 10 to 20 billion years, depending on which version you subscribe to, to a point of origin. Just before this origin, the universe, and physical time as we know it, did not exist. What did? Is this for real? Let us use our imagination.

Chaos reigns.

A primordial cosmic foam seethes, compacted inchoate energy. There is no matter. Space and time as we know them are meaningless. Infinities and indeterminacies rule.

Then something happens. An expanding point suddenly exists.

It enlarges until, at a moment called Planck time, this point will have reached a size where it will be as much smaller than a proton as a proton is smaller than you. At that moment the universe as we know it begins, it becomes conceivable.

Now space and time are suddenly usable concepts. Gravitation exists. A grand unified (electronuclear) force exists. The expanding universe as physics knows it starts.

In a tiny fraction of a second the universe grows to the size of a softball and the strong nuclear interaction and the electroweak force separate from the grand unified force. Matter and anti-matter start to coalesce into fundamental particles from the rapidly cooling and expanding ball of primordial energy.

Another fraction of a second later and the electroweak force divides into the electromagnetic interaction and the weak nuclear interaction.

Enough matter has escaped annihilation with anti-matter to begin to form stable composite particles such as protons and neutrons. Shortly after this the universe will have grown to the size of our current solar system, yet it still will be only about one millionth of a second old.

In this tiny flicker of time there will have been more profound changes in the nature of the universe than will occur in the rest of its history. Three fundamental interactions, the strong nuclear, weak nuclear, and electromagnetic, will have separated from the grand unified force. Henceforth they will exist as stable separate forces, acting independently of each other. The universe will have expanded to a size, and consequently cooled to an energy level, where it can be comprehended by modern physics.

As it continues to cool and expand the three fundamental interactions which developed from the grand unified force will act on the fundamental particles of matter which still remain. Atomic nuclei will form, then later, atoms. After a billion years or so the universe will have expanded and cooled to a size where the density of matter will allow the formation of galaxies and quasars. Billions of years after that will see the birth of stars and eventually planets. The universe that we know will gradually evolve. It will arrive at the present (31).

Sounds like quite an orgasm doesn't it. Yet this is one reasonably consistent account of the creation of the universe according to modern physics. But what is physics detecting here? Isn't this just another way of saying that creativity exists? Creativity, which lies completely outside of the foundational basis from which physics is derived, still seems to be detectable by physical means.

The question now becomes when did this creation of the universe occur? 15 billion years ago? 15 years ago? 15 seconds ago? How did this idea become one of the partially ordered memories in my mind?

The physicists created this description of the creation of the universe. Since the only reality is ourselves and our descriptions (language), then we can say in one sense that the physicists created this universe. And that would be right. They did. We all did. We all continually create and recreate time. Hence we continually create and recreate the origin of time, the origin of the universe.

Since the physicists can't consider themselves (us) as the creative source their detection of creative events is indirect. They infer the existence of an origin. Within the physical perspective they recognize evidence of

creativity but it is sufficiently removed from themselves so that it is masked by indeterminacies. Thus it appears to occur way in the past, or very far away, or is so big or so small that it is beyond direct physical measurement or experimentation.

Many of the conclusions and consequences of quantum mechanics, which seem so strange when viewed from our normal everyday perspective, become understandable when considered in this way. The wave-particle duality, the simultaneous superposition of several possible states of a particle or the appearance of taking several different paths at once, these are physical recognitions of creativity. But just like the origin of the universe they appear nonsensical to the physical theories which do not include consciousness and creativity.

Fundamentally the physical view of creativity which emerges in quantum mechanics or the prediction of an origin of the universe isn't any different from the religious creationist argument that God created the universe. Certainly the physical version is more useful. It includes the understandings of general relativity (co-variant communication), entropy (rational thinking), forces (the organizational manifestations of creative interactions), the atomic hypothesis (we as udo are the universe), etc. All of these elements of physics represent verifiable aspects of our own experience. Hence they are much more useful to us than simply saying God did it.

Still the argument is the same. God did do it. That is God did do it if by the word God you mean the creative capability, and I think that is what most people indirectly mean by the word God. It represents a concept of ultimate knowledge and understanding and thus is the source and intent of creativity.

In this area physics and religion are actually quite similar. Neither one of them directly or formally deal with creativity, hence their respective versions of the origin of the universe are inferential. They both come eventually to a point of total indeterminacy.

The major difference between ududu and physics or religion is that in ududu the creative capability is viewed as being inherent in each of us, in all the udo of the universe. Thus we are the ones who are ultimately

responsible. There are no omnipotent authorities available to pass the responsibility to, no big bangs other than our own, no one other than ourselves to absolve our sins. But this is fair since we are the ones who create these concepts in the first place. Good and evil, existence and non existence are simply other examples of those binary pairs which we create as organizational properties stemming from our own natures as the senders and receivers of messages. These are simply questions of perspective. They should not be used as means to avoid the ultimate responsibility which is ours and ours alone.

ORGANIZATION

With all this as background it is now possible to look at the biological sciences, including the psychological and sociological sciences, and our own place in these sciences. Clearly from the perspective of ududu, biology, the study of life, should be the same as ududu. However, the science of biology is founded on the physical paradigm. Consequently, even though the biological sciences talk about consciousness and creativity and the role these factors play in organization and evolution, they are forced to do this from a foundational base which is inherently incapable of dealing with these phenomena.

When we look at biology from the physical perspective we see some rationally derived phenomena which appears to be explicable in terms of reason and natural laws. However, the situation is always confused by the creative influence. Hence our perception becomes one of complexity.

This is the explanation as to why biological phenomena appear so different from physical phenomena. We are observing the consequences of individual creative and rational behavior. Our very ability to determine that a system is "alive" in the biological sense is a recognition that we perceive it as an udu or organization of udo. We recognize the characteristics and consequences of individual consciousness and creativity. The creative events by their very nature are unpredictable and hence, when viewed individually, defy

classification into categories which would lend themselves to codification as natural or simplifying laws or descriptions.

Yet all living systems are ultimately rational. Their collective actions will always be based on rational decisions and hence will translate on an organizational level into recognizable reproducible patterns of behavior. The consistent, and most "scientific", fields of biology deal with these organizational manifestations of rationality.

Molecular biology, genetics, evolution, etc. are all concerned with phenomena which are significantly removed from our conscious awareness on an organizational level. They deal with an aggregate behavior of many udo or many overlapping organizations of udo. Thus the rational elements of this behavior are most apparent.

But the closer we get to communicating with individual udo the less useful and predictive the biological sciences become. Creative factors become more important. Indeterminacy, and the creative resolution of indeterminant situations, becomes a more recognizable part of our observations. In the face of this the biological sciences crumble into confusion and descriptions of innumerable different case histories.

To really understand all of the biological sciences we must begin, as always, with our own personal experience. We start with ourselves and look at our bodies, complex organizations of udo we can't consciously communicate with, and at the organizations of marriage, business, and society which we do, as human beings, consciously belong to and participate in. As in existing biological sciences, both views rapidly lead to incomprehensible complexity.

Faced with this complexity our only hope is to go back to the simplest of our own experiences. Look carefully at how we as udo, quantized units of consciousness, communicate and interact with other perceived udo, those other entities we recognize as conscious and similar to ourselves. How do we communicate with these other udo to form organizations? How do we manage our interactions and understand the processes of our communication with these other udo? This is the essence of all biology, whether it is viewed from the perspective of ududu or the existing biological sciences.

Our objective is, therefore, a theory of organization and management. It is more akin to the study of business or economics or politics than to the study of the natural sciences it must, and will eventually, derive. This theory of organization will derive from the way we interact with each other but it will apply and extend to all aspects of the universe.

So how do we as human beings get along with each other. How do we cooperate and organize to act. It doesn't matter what the objectives are. It doesn't matter what is actually done. The crucial questions concern how we communicate with each other to reach agreement and understanding. Once we understand this our actions will naturally stem from decisions which rationally evolve from shared agreement and understanding.

The answer comes back to the general theory of relativity. Two or more participants must arrive at a co-variant understanding based on their communication of all relevant aspects of their experience. In physics this means that two observers must agree on their comparison and synchronization of their rulers and clocks, and on the procedures they use to construct their own coordinate systems, so that their description of physical laws is independent of which coordinate system they use.

In the achievement of human organization, the attainment of the necessary co-variant understanding through communication is considerably more complex, but the process is the same. Agreement must be reached on a wide variety of issues concerning the respective individuals' perception of history, background, ethics, values, goals, motivation, and fundamental beliefs. Many times a commonality exists concerning these issues because of a shared societal belief system. However, any such agreement or understanding must be continually reverified and thus will tend to become obscured and constrained by the emotions and sensory pains and pleasures which will inevitably arise as part of the communication/reverification process.

Open honest communication is extremely difficult. There is a natural indeterminacy inherent in the communication process. Also because communication is a discrete representation of our continuous understanding, we can only communicate some of what we know and

feel. Thus errors and misunderstandings will occur as a result of the partial and incomplete nature of communication itself.

These types of errors and problems can be resolved by repetition and the continual reformulation and checking of the ideas we communicate. But this takes time and can lead to a further problem. The more we communicate with another person the more an emotional feeling will grow within us, because of, and related to, this communication.

In the best cases this emotional feeling will be one of love and understanding. In most cases it will be something else; fear, suspicion, distrust, hate. Communication errors will continually arise because of the indeterminant nature of communication itself and because of the inevitable consequence of paradoxes inherent in all rational systems. Non resolvable situations will always occur within a given perceived rational framework. The continual occurrence of these errors, and the variable nature of the errors encountered, will often lead to an emotional distrust of the other party to the communication. If there is insufficient time to completely resolve all of the errors which occur, and if the each of the communicating parties do not completely understand the nature of the communication process, then this distrust will tend to grow and be reinforced.

To resolve these difficulties the purely rational requirement of a communicated co-variant understanding must be further extended by a management policy. In the mechanistically limited sense this becomes a simple application of the maximum entropy principle. When events lead to a number of indistinguishable or equally possible choices, or if the parties involved can't rationally convince each other of the superiority of their own views, then a random procedure is implemented to make the decision.

Unfortunately, this tends to reinforce the emotional feelings of distrust which all too often arise as part of the communication process. Someone who doesn't agree with you relative to some organizational decision is often viewed as deliberately or maliciously being an obstructionist, probably because they have motives contrary to your

own. Thus a purely rational management policy frequently serves to worsen the emotional problem.

But totally rational decision procedures do not exploit the greatest strength of all living systems, the creative capability. By incorporating the creative capability into a management policy it is possible to overcome not only the communication errors which inevitably arise but also the emotional feelings of distrust which often accompany them.

If all parties to a communication or organization understand the nature of communication, that transmission errors will occur, that situations will arise which are not rationally resolvable, and that emotional feelings will result from these events, then a creative management policy can work. This will require that at least some udo in the organization understand, at least on an intuitive level, all the elements we have discussed in ududu. They must also be willing to accept the responsibility of making the creative management policy work for the organization.

Ultimately it is best if all of the participating udo in the organization understand the nature of organization and accept the responsibility of the creative management policy. Organizations will tend to rationally run themselves until they encounter conflict or disagreement. If the conflict cannot be resolved through communication and reason it must be resolved by the responsible use of the creative process, otherwise the organization ceases to exist.

The inclusion of creativity is also independent of the decision structure of the organization. Thus it can be incorporated through an autocratic mode, wherein one udu will use their own, or someone else's, creativity to resolve the conflict and then impose the solution on the organization, or through democratic or cooperative modes, whereby the creative abilities of several members may be exploited through various forms of mutual agreement.

The crucial element is the elimination of paradoxical, non resolvable, or emotional problems through the creation of new descriptions and understandings. Often these will involve a redefinition or extension of

the organization as it was originally conceived and constituted. This then becomes another driver for the phenomena of evolution.

The concept of organization through co-variant communication and creative management is fundamental to everything we recognize as biological. The different areas of biological study represent the different organizational perspectives with which we view these phenomena and how directly we can interact, through communication or measurement, with the perceived biological system.

Thus genetics, molecular biology, physiology, embryology, ecology, etc., all describe organizational/managerial processes which are outside of our direct communicative experience. They involve udo we don't think we know, and can't communicate with, and organizations we don't recognize or think we belong to.

Botany, zoology, animal behavior, etc., describe organizational managerial processes which we do recognize as being udu directed. But we can't, as of yet, communicate with these udo.

Psychology, sociology, economics, political science, etc., describe organizational/managerial processes we do both recognize and participate in. We know and communicate with other udo which act in these organizations, and we recognize ourselves as a part of them also.

All biological organizations are formed through communicated co-variant understanding. They are inherently rational and they continually adapt to the omnipresent limitations inherent in all rational systems. They do this by the creative change and extension of their communicated co-variant understanding.

In this sense we can finally begin to see how udo themselves might be able to create new udo. As we continue to participate in more and more sophisticated and extensive organizations a point might come where an organization could transcend its component parts. As this organization moves beyond comprehension by its component udo it might evolve a linguistic capability all its own. It might begin to remember and sense and act, to create and rationally use language, to communicate. It might even become conscious.

This process would be the creation of a new udu. Since location and size are only relative terms deriving from the physical perspective, this new udu could be anywhere. It could become part of your body organization, it could become part of mine. It might become the soul of our child.

In the sense that we are continually recreating the universe it might even become you or I, or even one of our ancestors. It could become part of all of us at once.

For we are all the same, you and I. We are all alive. We question and love and feel. We hunger and decide and act. We organize and cooperate, and by so doing create a world of beauty and wonder. We, and we alone are responsible. We create the universe. We are udo.

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