DRAFT. (Version 06/05/87)

Notes on The Native Science I. Force and Energy F1ow.

1. Introduction: The Problems of European Science and the Alternatives by the Native Science.

One characteristic of the way the modern men in European cultural background do things is that they try to "force" what they think as the answer. In Native American Culture, however, such a behavior pattern is considered to be extremely rude, equivalent of declaring a war, even if the answer is correct. Natives may suggest things, but do not force anybody, even for the good. This apparently baffles and frustrates the modern men. They might think that the Natives are irrationally resisting the progress.

However, one needs to reflect if the modern way is indeed correct. F. Capra in The Turning Point talked of the troubles of the European Science and the need of alternatives. M. Bermann discussed what was lost in the development of the Modern Civilization in The Reenchantment Of The World. And there have been many other thinkers who warned us of the arrogance of the "Science" and its consequences; Destruction of the Environment, Nuclear Holocaust, Dehumanization. The Modern Civilization not only "killed God", but also is about to annihilate Life. Whether or not one agree with those thinkers, there is a critical need to examine what our "science" is.

I shall take up only a small part of the task, and discuss the notion of "Force" in Newtonian Mechanics and contrast it to an alternative in "Flow" which is a counterpart to "Force" in the Native Science.

2. What is "Force"?

One might think that the word "Force" is so commonly used that there is nothing to think about it. If we see an obstacle on our way of doing something, we automatically think of a use of Force to remove the obstacle. If we have problems like confronting our opponents, we talk of use of Force to resolve the problem. We have phrases, terms like Police Force, Air Force, etc.

We may have trouble answering the question as to what precisely the "Force" is, say in physics exam. But then we have a good excuse. Namely, we can point out that, in precise mathematics, the fundamental terms are formally declared to be "undefined". The terms like "Line" and "Point" are not defined. And if one press mathematicians, they would say that there exist no such thing in the real world. Those terms are "pure concepts" and do not need any object to identify them. And if that is not enough, logicians would come to rescue us. They assure us that there exist "this horse" and "that horse", but not "Horse in general". "Force" as a general concept is not an object which we can point to and say "this is the Force".

To be sure, we may not want to be saved by mathematicians and logicians. For we used to feel/think that our Physics is about "Facts". The Mathematicians and logicians are converting our "science of facts" to a "Linguistic Construct", similar to the arts of "Story Telling" and "Poetry". We would not like to reduce Physics into an "art". That is, our "pride" (arrogance) in knowing the "Factual" World prevents us from total surrender to the "Subjectism".

> [Marxists warned us the danger of the "Bourgeoisie Subjectism" which would seduce the revolutionary workers to powerlessness by denying "Objective knowledge" of the "Historical Material" Wor1d, though they acknowledged that no knowledge can be free from particular interests of the Class to which the thinker belongs. We shall come back to this issue later. Here, it is sufficient to note that even the issue of "Objective Fact" is a political matter. The pretended value neutrality by the European Science represent a Cultural Bias, against which the Native Science has to struggle.]
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> [As to the meaning of "Surrender", see Kurt H. Wolff Surrender And Catch Boston Studies In The Philosophy of Science vol. LI. (105). D. Reidel Pub. Co. 1976.
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> European Science is preoccupied with the task of exerting controls, and Marxists are fighting to win. They paid insufficient attention to the "surrendered".
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> We tend to listen to the winners and the Powerful ' It is a form of "surrender". It is about time that we listen to the victims, as Bishop Remi De Roo says in Cries Of Victims - Voice Of God (Novalis 1986). This is one of ways of self liberation.]

Rather, we observe that, despite our vague understanding of the term "Force", we do use the concept almost routinely and we feel we are making a sense, if not claim a "righteous position" to us --- i.e. we feel "we are thinking right" ---. And in this "culture" nobody challenge us in doing that by asking questions like "what do you mean by Force?", we rarely reflect what we are saying/thinking.

In schools, we are demanded to produce sentences or stories in the form suggestive of the Force metaphor, in order to be certified as knowing something. I cite here a fanatic example from what is going on in the reputed institution of intelligence of Academia.

In Psychology and Social Sciences, scholars use Statistics to "prove" what they regard as the "Causa1 Re1ation". That is a very difficult thing to do, because Statistics cannot "prove" the "Causal Relation". Anybody who studied elementary Theory of Statistics knows that. It is an impossible miracle that those scientists are trying to achieve. But, I am not concerned with the ignorance as to the Theory of Statistics, but with the social phenomenon. Why they do that? And there we see the enormous Power of the notion of "Force" from Newtonian Mechanics.

Newton himself had never equated "Force" with "Cause". In fact, in a letter, he denied his "Force" had anything to do with "The Cause" (God). Unfortunately, the metaphor of his "Force" and what people had in their mind as "Cause" were identical. The word "Cause" had been in the Bible and the notion that "Some Agent Must Be There To Make Things To Move" was firmly implanted in the culture. And, Newton did use the term "Agent". His metaphor of Force was not too far from "Ange1s Pushing The Planets In Heaven". Therefore, the association of Force with Cause was unavoidable. In fact, the association helped the popular acceptance of Newtonian Mechanics.

> [This point can be discussed in detail in comparisons with other similar theories Proposed by Newton's contemporaries, notably Liebnitz who sunk into an oblivion in his competition with Newton as far as his mechanics was concerned. We today know of Liebnitz as a "philosopher" (meaning "unscientific" thinker).]

In terms of the structure, Newton's Mechanics had three parts. In the first part, he postulated that it is the proper motion for things to move on a straight line with a constant speed.

> [This is called The First Law Of Motion. Note, however, that this is not observational fact. Our experiences, observations appear to contradict such an assumption. Newton's genius was in boldly assuming a principle against what was so obviously factual.]

Having denied the "reality", Newton then introduced an amendment to the first assumption. He, of course knew that things do not move on straight lines with constant speeds. He, thus, had to explain why they do not behave as his Law dictates. That was where "Force" was introduced. He said "Because Force make them do". That is known as the Second Law of Motion. It is the same rhetoric as that of saying "Because Devil Made me do it".

Of course, "planetary motions" are not crimes. If anything, people might have had "unconscious anxiety" that the planetary motions night be messed up and bring disasters upon the Earth. The "cu1tural wish" was to keep the planetary motions as orderly and as regular as possible. So that the Newton's "Agents" ware "good angels", if not the Almighty God himself. Nonetheless, the rhetorical structure of "attributing to God"/"blaming some Agent evil" is the same.

> [As to the hidden anxiety about astronomical disasters, see Immaniuel Velikovsky Worlds In Collision Dell 1967. and subsequent publications. Velikovsky was a Freudian Psychoanalyst and concerned with the phenomenon of the "Cultural Amnesia". We shall not deal with Velikovskian thesis here. But, it is important to take a note that European Science stemmed from Fear of the Nature. Native Science is not.]

Although we think, or rather are taught to think, that Science emerged against Christianity, Newtonian Mechanics was accepted within the Christian Cosmology --- i.e. "God is the Prime Mover, the Cause of all motions and changes ---. People had been in the Culture where saying like "God made are respectable statement. The cultural habit, particularly language habit, and hence the habit of thinking could not change quickly.

European scientists stop using overtly religious terminology. For any "in group" thing people make up, the first thing they do is to learn the "lingo" of the group. So that they no longer used terms like "The Prime Mover", "The First Cause", but used the term "Force". However, the metaphor was not changed. When they talked and listened, the rhetoric referring to "Cause" (some agent forcing) was

"impressive" of knowing something, because of the traditional rhetorical habit of the Culture.

The psychologists and social scientists, seeing the success of Newtonian Mechanics, try very hard to emulate the rhetoric. And, if a young researcher wish to be a recognized member to the institution, the ritual of saying things in the established rhetoric is a must. He would not get his paper published, if he does not observe the proper ritual in his knowledge claim. That is the reason why they are looking for "Causal Relations" --- find the Agent, if not the God/Devil that is making the phenomena observed ---.

It is irrelevant, if they are knowledgeable about the Logic of Statistical Inference and aware that it is not capable of saying anything about Causality. Recognition in a social institution is primarily a "political" matter. "Knowledge" recognized in those institutions of "sciences" are social product, to which individual thinkers have to "culturally" adapted into, if they wish to be the members. If anyone does not like the political system of those institutions, one can always work at hamburger joints etc., and do what one likes. There is nothing to stop any one from doing research. However, the recognition by the society of the individual "doing a science" is not an easy matter. One has to play politics, particularly if one wish to have an income from the recognition. That is the reason why the Psychologists and Social Scientists are crazy about "Causal Relations" in their Statistical Rhetoric.

3. The Politics of Recognition that one knows.

We note that there is no such thing as "The Native Science" as yet today, precisely because the Natives has no political power to gain recognition to their Science.

And the ease or hardness of gaining recognition has a great deal with the Culture in which statement of knowledge is made. One who goes along with the dominant Cultural bias, or even takes advantages of implicit assumption/superstition of the Culture would have an easy access to the recognition.

If you propose some idea foreign to the culture, you would meet "deaf ears" or even you would be prosecuted as a "disturber of peace". People probably would not understand what was said, but nonetheless they do sense that you are bringing in a "cognitive dissonance" which arouses their anxiety and make them uncomfortable. After all, not everybody

in a society is "creative thinker". For the majority, the "science" is a common agreement that they worked hard to achieve. For the sake of maintaining "stability", they stick to "the Established Truth". By bringing in something that does not fit in the established order of thinking --- even in abstract thinking which may have little immediate political or economic consequences ---, you are "disturbing the peace" and you are a Heretic. You are challenging the Legitimacy of the well established intellectual Authority of "Science" in the society. Therefore, you are a Rebel.

"Not making wave" is a political act, just as "making wave" is. But the former is "covert". Whereas, the latter is "overt". Those who "surrendered" to the Authority would resent anyone who make them aware that they surrendered. They would not welcome the "Liberator". Rather, they would like to entertain their illusion of being Free thinkers. (If you doubt this, try to convince Americans and Canadians that they are not Free, or that their private property is not sacred under their government who is willing to accept death of a hundred million civilians as the price for the "National Interest". You would quickly find out that you be lab1ed as a trouble maker. Besides, you would find that they regard you "political", while they think they are not political at all. They are feeling that they only live in a "Natural Order" which cannot be other than what it is. The psychology is the same with regard to Newtonian Physics, even if they may not know what Newton's Laws of Motion are. They are believing in the established Authority and anything that sound different is "devil’s work".)

We remark here about a cultural difference. The God of Judeo-Christian religion gives "Commandments". "The Great Spirit", which is the Native equivalent of God, does not issue commands, but gives advice. Native Americans are not Authoritarians like Europeans are, but quite "Democratic" free people.

The above religious backgrounds make a difference in the manners of "statement of knowledge claim" and "assertion of facts". In the European psyche, people tend to assume that they ought to be, and are, "god-like” --- in particular, when they try to do what they think good to others ---. They say “We are God's side" and whoever stands on the way deserves to be punished by death. Killing of pagans and heretics are not only justified, but often a moral obligation.

When European scientists and scholars are asserting their knowledge, their postures are the same as that in their religious tradition. And Newtonian rhetoric of asserting "Force" (Agent) is very well suited to the ritual of knowledge claim. (To them, there is not much psychological difference between "Claiming Knowledge" and "Asserting Facts". Both let them feel like "being close to God".)

Natives have no such "emotion". The Natives respect each person's ways. Persons who disagree with one's ideas and preferences are not "evil", but just being merely "the way they are". It is not that Natives did not fight wars on disagreements, but that they did not need to condemn the enemy in the name of God.

In a close translation into European language, the Natives were "Pantheistic --- i.e. everybody, everything has its own "spirit", directly sharing a connection to the Great Spirit ---. Therefore, they cannot be "Forced". Each spirit is the primary mover, autonomous and free. The Great Spirit is a Flow in the multi-dimensional Space-Time. It "Goes On", but does not "cause" anybody to do anything.

I shall try to translate the sense of "The Flow" in to the terms understandable to European Science. Fortunately, Relativity and Quantum Field Theory are somewhat similar to the Native Science. And I can use them in my attempt to translate the Native Science of "the Flow".

3.2. [There is a problem about what we "feel" as knowing. Before Galileo's time, scholars apparently thought that they knew (understood) planetary motion by reciting what Aristotle wrote. Namely, planets move on circles, "because circle is perfect, and planets as heavenly body (angel-like) have to be perfect, the planets must move on circles".

Then came Kepler, who discovered that the orbits of the planets are elliptic, not circle. That represented "knowing" planetary motions for the people then.

Newton, after that shown mathematically that "Force" inversely proportional to square of the distances from the Sun reproduce the elliptic orbits of the planets. That satisfied people's wish to know "why" such motions.

Newton did not explain how such Force is generated. Einstein tried to explain the Gravity Force by

saying it is a property of Geometry. Evaluations on Einstein's work are not uniform. But I imagine physicists and astronomers felt, by the theory, that they then knew what Force is.

Today, some physicists suspect that Gravity might be an unbalanced electricity. Suppose they are right. Dose that make "knowing" planetary motion or force?

Each successive generation of "knowing" was "knowing" to the Culture of the stage. It is like "knowing" of our friend. We have a feeling of "knowing". But do we really know? Sometimes, in surprise, we say like "I do not know you" to our friend.

What that sense of "knowing" is? Is it not just a "state of mind", indicating there is no anxiety when we say "I know"? Science is a social entity. So that the "state of mind" must refer to the "Collective psyche" of society --- we call it "Culture"?

Then, "Knowing" is a kind of Psychotherapy for the Culture as a whole. Science is a Part of the therapy. If so, it is not surprising that "Science" is ritualistic. By "science" we are performing ceremony. It is akin to Harvest Dance, Rain Dance etc. We ought then recognize those Dances as "Science" and respect, honor, and perhaps participate if we can.

At any rate, the distinction of "knowing" and "science" etc., verses "superstition" etc. is cultural and political.

There is another problem in "knowing" concerning "practical" and "intellectual" kinds. As to this see Micheal Polany Personal Knowledge etc.]

4. What is "The Flow"?
--- an explanation from Newtonian side ---.

Here, I shall try the language of European Physics to explain what "The F1ow" is.

Since the Energy Crisis of 1973-74, "Energy Flow" is familiar concept to us. "The Flow" is similar to "Energy F1ow". Technically speaking, the "F1ow" which corresponds to "Force" of Newton is "Flow of Momentum". Perhaps, I shall explain this elementary Physics, as an introduction to

the Native Science. For in this case, the translation is perfect.

In elementary physics texts, you would find that "Force" is defined, detected and measured by a formula "Mass times Acceleration". It is equivalent to the "Rate of Change of Momentum", For "Acceleration" is the "Rate of change of Velocity", and "Momentum" is "Mass times Velocity".

In mathematical symbols, we can denote the above as:

(1) F = m A (Force = Mass times Acceleration)

(2) A = dV/at

(Acceleration = Rate of Change of Velocity.
dV denotes "change in V". And dt is unit time interval.)

(1) and (2) combined makes

(3) F = m dV/dt = d(mV)/dt

But "Momentum" P is P = mV. Hence,

(4) F = dP/dt.

Now, the critical rhetorical trick (hence change in ways of thinking) is to read the express (4) as:

"The Rate of Momentum Flow per unit time".

There is nothing in the Mechanics to prohibit this reading. It is just that, for the original metaphor Newton and his followers were entertaining, the "Momentum" was understood to be "belonging to the body/object". It is like a private property, and stay with the owner. They did not imagine the possibility of "momentum" flowing.

One of obstacle to imagine a flow of momentum is that, for it to f1ow, there have to be "somebody/someone" to receive it and give it away. In Newtonian World View, the Space surrounding Objects is absolute "Void", "Vacuum", "Nothing". (Not even "Soul", "Spirit" or "God" could possibly exist in the Vacuum.) The Space cannot, therefore, act as the "Medium" to mediate any flow. Only flow possible in Newtonian Wor1d View is the flow of matters, such as Water.

Apparently, this "Nothingness" of Space was an embarrassment to Newton himself. He was reputed to have been muttering to himself "It is impossible to exert Force through Vacuum". He was genius enough to sense the problem. But the lesser physicists did not notice the problem at all and worshiped Newton's Theory of Force as if God-given Truth. (Often, the followers of a Belief system are far stronger believers than the one who created the system. It is perhaps because the creator knows that it is what she or he made up. I wonder what kind of doubts God has as to his creation.)

Leibnitz appeared to have had some doubt, but he could not put forth effective counter theory to this respect. It looks some two hundred years, before "Flow" metaphor of Force came to be recognized. It was the works of M. Faraday and J. Maxwell on Electromagnetism that brought a notion of "Field" in vacuum. The Fields are capable of mediating "Force". And this is the idea which led Einstein to Relativity. Once Field is permitted as "physical", there is no problem in thinking of "Momentum Flow". That makes a kind of "Feynmann Diagram" in Classical Mechanics. In fact, M. Faraday fantasized on such a picture.

> [For "Feynman Diagram" see Capra Tao Of Physics. Incidentally, in Relativistic format, Energy and Momentum make up an entity, called "4-Vector". It as a set can flow. The "Mass" of the entity can be calculated from squares of Energy and Momentum. In this sense, one can say that it is the Flow that makes the "existence of matter".]
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> [However, in one important aspect the Native Flow is not quite identical to Energy-Momentum Flow. That is Energy-Momentum Flow is "conservative" --- stays constant, except for Quantum effect in very short time interval ---. Whereas, the Native Flow is "creative". It needs not be a constant, but can Increase or decrease. And, perhaps, the Native Flow may be of a very high dimension, not limited in 4-dlmenslon.]

And in this picture (metaphor) one can say that things move or are supported in a place by Flow Of Momentum, instead of saying "Force" acted on them. Both "Force" and "Momentum Flow" are invisible like ghosts. Or one might say the both are "rhetorical" invention. But without them, we would have trouble in making our sense. Those two metaphors are completely different, but neither can be said "more true" than the other. The both "ghosts" are useful in making sense of what are observed in motions.

As a physics, the change in the metaphor from that of "Objects existing in absolute nothingness" to "Space filled with Fields mediating inter-relations" is rather trivial. (Actua1ly, it was not trivial, in the historical context. We have the benefit of hindsight.) Newtonian view is cold and individualistic. It views the Cosmos hostile and fearful. The Field View is sensual, communal, and loveful. The choice seems a matter of psychological tastes.

But let us think about implications of the alternative view. In the Field Theoretical View, one would not think of "Forcing" anybody to do anything. That coincides with the Native philosophy.

The "Spiritual Field" surround you and you are in the flow of the Spirit. You cannot be arrogant in the view to think that you can force anything. Just as fishes swim in a flow, you may possibly swim in the Flow of Spirit. But you are not anything like the A1mighty God to Cause any motion. If "man" is made after God's image, in this very important aspect, the "man" is completely different from God. Christians have an admirable ambition to simulate God-like actions. But according the Flow Physics, they can only be "witnesses" to the wonderful flow.

Interestingly, Hegelian sense of History, which Marx inherited, talked of History in the Flow sense. And Hegel did have a sense of the Flow in which everybody is a part. That sense of flow shared by the community of the human race is very much like what the Natives say. That is, the "primitive" Natives have been Hegelian Philosophers since the time before Hegel was born.

Only trouble I can foresee for a popular acceptance and practices of the Flow View (F1ow Metaphysics) is that it sounds very much "Feminine". You sort of "go along with the flow of things", which is not appealing metaphor for the proud male ego. Loss of "Force" is loss of "Power". They cannot claim "I did this and that". Instead, they have to learn to talk like Inuits who would never claim any achievement but simply say "It happened while I was there". But, I remind you that the Flow Of the Spirit goes through you. It is your life that makes up the Flow. 'You have a great Power of messing the flow up, and become so much of distresses to the community. It is not your own individual misfortune that matters in this view, but the whole community suffering misdirected Flow that is the concern.

In contrast to the Flow View, the Force View is individualistic. You can cause Good to others. Yes. But

when you fail, it is your individual misfortune. Aside from charity, the other people have nothing to do with your sorrow, your pain, your disaster. And this view is convenient, If you want to justify Inequality among People. You have achieved your enormous wealth and power by your individual talent and merit of your individual force. Nobody shall have any claim to share that, even if that was largely "wind fall profits". And if you are aiming at fierce competition, that would be good metaphor and rhetoric to use. Since the majority was educated (brainwashed) in the Mechanics --- not in understanding, but in worshiping its authority/legitimacy --- you would meet very little of resistance, even the majority is unhappy with the system. The reason why our schools do not teach the alternative Mechanics of Flow may have to do with this political effect.

However, in terms of Nuclear Arms race, we have a great difficulty. Because we believe in Force, for good and for bad, we cannot give up arming ourselves, despite our wish of Peace. Environment as a Flow is not well understood by us and consequently we cannot effectively deal with Pollution Problems. tie also accumulated Social Problems. Our anxiety, so heightened for the sake of the Market Competition, is literally killing us. Yet we cannot do much, because we deny the Flow.

To be sure, to some extent, Flow Thinking has been applied. Keynesian Economy is an example, where circulative Flow of Money is the central concept. But collectively, we are not good at Flow Thinking. There may be ideological reasons for our incompetence. But I do not overlook the fact that our education system is not keen in teaching the alternative physics. There are well developed "System Dynamics" in which one might see Flows, such as "Feed Back". But except for specialist training, we do not teach the art. That is, we have not come to teach anything beyond the 300 year old mechanics of Newton in general education. Unless this was not from a cultural or ideological bias, physics teachers and educators in general can be accused of incompetence.

> [We need to write a textbook f or Flow Mechanics. In the meantime, I recommend reading of Capra, and Bermann, mentioned before. In addition, for the Electromagnetic Field notion, I add J. McGuire. "Forces, Powers, Aethers, and Fields" in Methodological And Historical Essay In the Natural And Social Sciences. Ed R. S. Cohen & M. W. Wartofskv Boston Studies In The Philosophy Of Science XIV (60). 1974.

J.F.Woodward "Early Attempt at a Unitary Understanding of Nature" in O1d And New Questions In Physics, Cosmology, And Theoretical Biology. (ed) van der Merwe Plenum 1982.]

[For the Native sources, I have difficulty specifying one definite text. The Natives do not believe in writing texts, let alone a dogma. One has to decipher from anthropological observations/interpretations.

And, even after we get texts, we have troubles of English translation. Translators do import Newtonian metaphysics, because, English language carries it.

For an illustration, I quote one extreme example of English translation from The Sky Clears by A. Grove Day. Page 25. (U. of Nebraska press 1951):

An Indian poem goes as:

Ho-o-o
Kakati chiri wakari pirau Tiraa;
Kakati chiri wakari pirau Tiraa;
Kakari chiri wakari pirau Tiraa;
Kakari chiri wakari pirau Tiraa;
Kakari chiri wakari pirau Tiraa;
Kakari chiri wakari pirau Tiraa;

which is translated as:

I know not if the voice of man can reach to the sky;
I know not if the mighty one will hear as I pray;
I know not if the gifts I ask will all granted be;
I know not if the word of old we truly can hear;
I know not what will come to pass in our future days;
I hope that only good will come, my children, to you.

The translation was deemed to be authentic. However, one ought to be aware of the difficulties involved.

When I said in the above "The Native Cosmology is …", I was doing an English translation. Readers Beware!!! One needs to check with Native elders with proper and spiritual sensitivity.

See also Michael Castro Interpreting The Indian. U of New Mexico press 1983.]

In connection to translation/interpretation problems, I must add one apology. I am not authorized to speak for the Native, nor do I pretend that. What I said is no more than what I have so far learned. The readers are recommended to find Native sources. I am only trying to encourage research into Native Science. A few ways to translate European Science into alternative rhetoric are suggested. I hope they are useful as "clues".

[As to the problems of Non-Native to interpret Native Culture, see:

H. David Brumble III. "Indian Sacred Materials: Kroeber, Waters, and Kroeber"
in Smoothing The Ground (ed.) Brian Swann. U. of California Press 1983.]