



---

**Title:** On Science: Power/Love // The Dominant/The Repressed

**Author(s):** Dr. Shigeru Kounosu

**Published by:** Worldwide Indigenous Science Network

**Publish date:** 31 August 2013

Disclaimers:

The information and all content provided herein by the Worldwide Indigenous Science Network (WISN) are provided as a service and are for general informational and educational purposes only. Original creator(s) of materials contained herein retain full copyrights. Although WISN uses reasonable efforts to ensure high quality materials, WISN does not guarantee the accuracy or completeness of content. Neither WISN nor any party involved in creating, producing, or delivering this information shall be liable for any damages whatsoever arising out of access to, use of, or inability to use the materials, or any errors or omissions in the content thereof. Users assume all responsibility for the access to and use of these materials.

Translations of any materials into other languages are provided as a convenience, and translation accuracy is not guaranteed nor implied. Users may refer to the original language/official version to ensure accuracy.



wisn.org | 573 Waive'e Street, Lahaina, Hawai'i 96761

## For Education Seminar

## On Science: Power/Love // The Dominant/The Repressed.

1. It is well known that just before his death, Einstein talked about a necessity of changing "The Way Of Thinking". That was some 35 years ago. He warned that while everything else changed since two explosions of Atomic Bombs, our way of thinking had not changed. And as the consequence, we are drifting towards our own annihilation by the power of our own science. He meant our way of science has to be changed. His saying is famous, but so far we have failed to heed his warning.

Today, the danger of all-out Nuclear War between the two superpower nations has somewhat receded. But, we have not eliminated the possibility of Nuclear Holocaust. And, we have problems of Air and Water Pollutions, Acid Rain, Waste Disposal, and accelerated destruction of Natural Environment, all thanks to the rapid developments in our Science-Technology. We have come to suffer increasing Stress, Tension, Anxiety and Alienation in our society. Despite Economic developments, the gap between the Poor and the Rich is widening. We have now Permanent unemployment as a part of our economic structure, demoralizing young generation into despair. Economic inequality, internal to our own country as well as in international sense is reaching a degree that can be called criminally immoral.

We may not think of ourselves as privileged, but Canadians are within the top 10% of the richest nations and the fact that we are in a university places us in the top 10% of Canadians. That puts us in the richest 1% of the Humanity. The poor half of the Humanity live with an annual income less than \$500. We are the "Yuppies". Yet we cannot escape the problems of the World today.

Even if we think of Education to be the means to attain "Good Life" in personal sense, let alone thinking of Education for a better life of Humanity as a whole, we are failing. The warning of Einstein still stands like a bad prophecy. Einstein meant "Science" to be the "Way of Thinking" that has to be changed. But we have failed to do so. Perhaps, that is why Educators are concerned about Science (and Technology), and that is where "Love Science" comes in. [\*1]

2. But, you might ask what is wrong with "Science". Did it not work wonders? Let us think about this, for answering this question is one way to understand that our

science is "Power Science" and also we may pick up some clues as to how to change that.

Let me take the "Progress" of science-technology for example, and talk about it a bit. In the past 400 years or so, the progress was fantastic and it brought a general improvement of Physical Health standard. In industrialized countries, it helped the peasant class, at least some of them in the class, to climb out of the life of heavy physical labors and created the "middle class", if not "affluent" consumers. This came about because our "Power Technology" provided the means to convert and substitute the Fossil Energy for Human Muscle Power. The fossil energy had been accumulated and stored on the Earth for the past hundreds of millions of years. It was just sitting there. To exploit it was a very "clever" move, as I shall explain below.

Thanks to the free gift of Fossil Energy, we, at least some of us, are liberated from heavy physical labors to do things like science. (Please remember that we are the top 1% of the Humanity, and ones who have Time to think. The rest of the Humanity hardly have the "Luxury" of thinking. That puts us in a certain obligation.) And, at the same time, in order for the Progress of Technology to continue, Science as its Infrastructure had to be developed. This made up a "Positive Feedback Loop that can be nicknamed "Vicious Circle" and it took off and escalated. We call this phenomenon Industrial-Scientific Revolution. To be sure, for the Industrialization to advance, other Infrastructures, such as organizational management, systems of market distribution and government control had to be developed. The emergence of modern Nation-State and Colonialism coincided with the Industrial Revolution, not by chance but by necessity. Modern School Education system was also a product of the historical time. The development of Science was only a small part of the huge social movement as such.

3. However, the concentrated massive power is the characteristic of Industry. For an illustration, let us look at Energy Economy, (Physical Power Economy). In the U.S. and Canada, the average Energy Consumption per capita is like 10 tons of Coal Equivalent per year. In terms of "Human Power" unit, this amount is about 300 "Human Power-Year". That is to say, we have 300 slaves working for each of us. This is the reason why we have only 4% of working population in agriculture and we can still have plenty of foods.

Of course, we only use about 1/3 of that power for production of things and efficiency is low like 10%. Nonetheless, we are supported by the Fossil Power Input, equivalent of 10 very diligent slaves for each of us in average. But the labor force working in the primary energy production sector is less than 1% of the total. That is to say, the concentration of the energy sector is such that one person can provide for energy needs of 100 other workers. This is an example of "Concentration" of Power just as Nuclear Bombs are. (Every one manpower invested in primary Energy Industry is returned by some 10,000 manpower equivalent of "raw" Energy'. Unfortunately, this will not last too long.)

Number of active Physicists in North America is about 50,000. Scientists and Engineers combined, we may have 750,000. That is about 0.4% of the total population. They are the "Producers" of the "science-Technology" as the infrastructure of the industry and the rest are the passive "Consumers" of the science-technology as such. [\*2]

4. Thus, you might wonder if Public Education System needs to care about Science Education at all. It might make sense to have specialized schools for scientists and engineers --- like "Military Schools" and let them concentrate on Science Education. Even if there is a failure rate of 80%, the Lethbridge School District needs only one Science Education Class for each grade, and the rest of the children may be spared of the pain, frustration and humiliation of taking Science-Math courses which they hate anyway. As far as the Science that is needed for Production Industry is concerned, that would be sufficient.

If so, is it not a waste of time, money, and manpower to try "Ramming Physics down the throats" of children who are going to be passive consumers of "science" as such? In terms of economic efficiency, University of Lethbridge need not have a Physics Department. It is a lot economical to pay the specialized students to go to "The Western Canada Federal Industrial Science University" where Research in such Science can also be concentrated. (U.S.S.R. seems to practice this.) Science is often said to be "universal" and "International". If so, why not let a few American Elite Institutions for science-Technology take care of all the North American needs in this regard?

At any rate, unless one is going to be a Hard-Hat Scientist or Engineer, why should anybody know anything about Science of that sense?

I ask the above questions to you, for I hope you would think about what "Science" means to you, What Values Science has, other than being an Infrastructure to Production Industry.

Your answers to the questions, I think are keys to the fundamental question of Science Education, and ways to respond to Einstein's warning.

[\*1. Historical note.]

I quoted Einstein's statement made in 1954. But a long time before that the questions about "Science" and its relations with "Labor", "Industrial Production", "Power" and "Love" were raised by the 18th and 19th century Utopian thinkers.

F.E. Manuel. Utopian Thought In The Western World. (Harvard U. Press 1979. Leth. Pub. Lib. 335.02. M.) has chapters titled "New Face of Love", "The triumph of Love", etc. referring to Count Claude Henri de Saint-Simon (1790-1825), and Francois Marie Charles Fourier (1772-1838).

You find in the book that these philosophers dealt with problems of "Science" and "Love", and rightly or wrongly made concrete proposals for Education so as to make an ideal Society. Interestingly, at first Saint-Simon was a believer of Science and sought salvation of humanity in Science. But he soon came to criticize the failures of "scientists" already some 200 years ago. He saw that scientists were no more than servants to Industry.

If you read on to Robert Owen and Karl Marx et al who followed, you find a long history of the unresolved struggle about "Science" relative to "Power" and "Love".

As to Historical Development of "Masculine Science", Brian Easlea Witch Hunting, Magic And The New Philosophy, and Evelyn Fox Keller Reflections On The Gender And Science offer analyses.

As to Ideological Struggles about "Human Science" since the time of Marx, Paul Ricoeur's Lectures On Ideology And Utopia gives a philosophical analysis"]

[\*2. Canada has 1.2 Scientists & Engineers per 1,000 population. U.S. has 3.2, Germany (w) 2.1, Japan 4.3 (1981-82). About 40% of the U.S. scientists and Engineers

are employed in the military-industrial-complex, which makes the number to be about 1.9.

It is also known that some 1/3 of the US graduate students in science and Technology is imported from abroad. The science Education there, even for a limited purpose of supporting Industry, is failing, despite many "Tinkering" attempted on Science Curriculum. A recent joke (half serious) is that in order to free Male scientists to do SDI, science Education has to attract more Females who could replace Males in Science Teaching. That Teaching is considered to be "less important" than Research is the current ideology in the North America, and the joke carries the obvious Male Chauvinism.]

[References]

- |                |   |
|----------------|---|
| F. Cottrell.   | Energy And Society.                         |
| J.M. Fowler.   | Energy and the World.                       |
| E. Shumacher,  | Small is Beautiful.                         |
| B.Ward.        | Spaceship Earth.                            |
| J. Ellul.      | The Technological System.                   |
| A. Toffler.    | The Third Wave.                             |
| D. Bell.       | The Coming Of Post-Industrial Society.      |
| K. Polanyi.    | The Great Transformation.                   |
| E.P. Thompson. | The Poverty Of Theory And Other Essays.     |
| F. Capra.      | The Turning Point.                          |
| M. Bellmann.   | Reenchantment Of The World.                 |
| B. Easlea.     | Witch Hunting, Magic And The New            |
| Philosophy.    |   |
| E. Fox Keller. | Reflections On The Gender And Science.      |
| P. Medawar.    | The Limits Of Science.                      |
| M. Weber.      | Science As A Profession.                    |
|                | (in Gerth and Mills. From Max Weber.)       |
| H. Marcuse.    | One Dimensional Man.                        |
|                | Eros And Civilization.                      |
| M. Foucault.   | Archaeology Of Knowledge.                   |
|                | Power/Knowledge                             |
| F.E. Manuel.   | Utopian Thought In The Western World.       |
| P. Ricoeur.    | Lectures on Ideology And Utopia.            |
| I. Illich.     | Shadow Work.                                |
| P. Freire.     | Pedagogy Of The Oppressed.                  |
| P. Colorado    | "Science: A Way Of Knowing - A Way Of Life" |
|                | (in Child Welfare Needs. Indian Association |
|                | of Alberta.)                                |

Appendix to Part I.

On Tunnel Vision, Peripheral Vision,  
A-Life-Through-Doing-One-Thing-At-A-Time,  
Columbus's Vision, and Dream Map In Your Head.

There are differences in Ways of Thinking, (Levels of intelligence, or Quality of Mind, etc.) But it seems that people tend not to see them. Using familiar examples, I would like to demonstrate the differences. The examples are also useful in distinguishing Power Science and Love Science. Besides, for teachers to know the differences in the ways mind works may have a pedagogical value. Let me cite 3 examples.

(A). Wayne Gretzky is said to be capable of knowing what his teammates are doing while chasing a puck towards the goal. The defense men of the other team try to block his advance not only by physical presence but try harassment, so that Gretzky may be disoriented. In this sense Hockey is different from Baseball. It is just as a "mental" game as a game of physical power. You like Hockey because it is a complex game, besides being a Powerful and Exciting one.

I do not know much about Hockey, but I count on your knowledge to try illustrating what it means to have different ways of thinking, or different levels of intelligence. Help me.

My question is this. How does Wayne know and keep track of his teammates while concentrating on the puck in front of him?

Chasing the puck is a "Goal Oriented" task. Your eyes are fixed on the Object. You are moving the Object to the Goal with all of your Power and don't have time to look around. You have to have a Tunnel Vision to do that. That is the situation Newtonian Mechanics deals with. The motion is from a point A to point B. You force the way through. That is the way Power Science thinks; Max Weber in Science As A Profession, talked about this and said "If you are not willing to put on Blinders, you'd better go see a movie (i.e. you are not cut out to be a scientist/scholar)" If you have a purpose, you better concentrate on it. "One Track Mind" is the must in science. You understand that.

But that is not quite enough. Gretzky has something else in his mind. Remind you that just breaking through the defense is difficult enough. You do not have too much

room left in your mind to think about something else, like which movies to go, etc.

Yet, it is said that Gretzky has a kind of "Moving Map" in his head and know where his teammates are at that moment and also anticipate where they are going to be. He also knows defensemen of the other team are coming at him and about to give him a hard body check into the side wall. The Map is not the usual static one at a given time, but a dynamic one that contains anticipated Future, or the "Flow of the Game". In that sense, the Map is a Relativistic one.

[I do not know, but I do not think Gretzky has ever taken Relativity course. Here, what is important is not whether Gretzky knows Relativity in formal sense or not. What is important is that, as educators or educators-to-be, you recognize it. The role of educators is not "teaching" anything like Relativity, but to recognize it in actions of people and encourage them. Any mediocre person can read physics texts to a roomful of students and think it "teaching". To recognize what students are doing takes more understanding than just ability to read off texts.

Particularly, I think this ability to "recognize" what is in children is an absolute necessity, if one wishes to get involved in Cross Cultural Education.]

The "Map" is imaginary thing in his head. And I do not know how he carry and maintain it. He is not looking around. It seems that he make up the Map by Periphery Vision, plus perhaps by Intuition, Instinctive Feeling, or Dream-like Fantasy.

As to Periphery Vision, we know one thing. That is, even the 100 yard sprinter running gets the sense of his Body Balance from Periphery Vision. The sprinter has a Tunnel Vision as to the goal and the track in front of him or her. What the sprinter is doing is "One Track Minded" thing". But the Tunnel Vision on an object does not tell how one's body is oriented. It is the Periphery Vision that tells your body orientation relative to the Environment that you are Not Looking At.

If you make an analogy here, you can sense what I am driving at. The way our Power Science and Technology do things is very much like the 100 yard race. Things are done with a Tunnel Vision, often in competitions with something or somebody. That is, Power Science-Technology

has no Periphery Vision to sense its own orientation. The Natural and Social Environment is ignored.

What I am insinuating here is that Love Science is like Periphery Vision. Gretzky got it.

(B) To illustrate the Power of having a Map further, let me cite a historical event. This has to do with how Christopher Columbus got to America. In a sense, this is a bad example in that the Power was used to help build European Colonies. But the Map of Columbus is also a dramatic example of the fundamental method of modern science that I cannot resist citing.

Before Columbus' time, European navigators were sailing along coastline using landmarks. The mode of operation is characteristically "One Thing At A Time". This science of navigation was good enough for them to navigate around Mediterranean. It was powerful enough for them to go along African coast to its southern tip. They used to make maps with Landmarks. But to copy maps, and other reasons, they start drawing lines on maps. You note that these lines are not "Real". They do not exist out on the ocean. They only exist on maps that human minds made. They are mental artifacts.

But the imaginary lines had a great effect on the way people think and act. Once lines are on the map, it is a matter of time for some navigator to think of sailing along a line, like "go on East Wind 10 knots for 2 days" and trace the course on a map to keep track of where the ship is. In fact, Spanish navy perfected the method to locate a fleet in the middle of the Atlantic shortly before Columbus's time. Columbus learned that. Combined with the knowledge-vision that the Earth is round --- and fortuitously there was an error that made the Earth look half its size ---, Columbus came to see that India was just 40 days of sailing to the West.

Of course, only Columbus came to have the Map-Vision. Navigating on Imaginary Line was a new science, and others, even a map was shown, would not have had confidence in it anyway. The story says that Columbus had a mutiny on his ship, but since crews did not know how they could set a course to go home, he was not killed.

In a way, the lines are the Man-made Rules imposed on the Nature, and imaginary ones at that. Yet the Imaginary lines imposed on Space-Time was the foundation of modern Geometry and Physics. From that Descartes' Analytical

Geometry emerged, though the story is that Descartes had a Dream in which an Angel appeared and told him how to start New Science. Newton was very much impressed by Descartes's Geometry and wrote his Mechanics emulating Descartes. Einstein came some 250 years after Newton and negated him, but he also used an Imaginary Map, i.e. Geometry.

Now the point of narrating this story of Imaginary Map is that Gretzky is doing precisely what Columbus, Descartes, Newton, Einstein did. He overcomes the Tunnel Vision by having a Map in his head. By the help of Imaginary Map, which he is not even conscious of, he can do something beyond "reacting" to the immediate situation in front of him, and go beyond the level of "intelligence" that is characteristic to the mode of operation called "One Thing At A Time".

(C) When you become a grade one teacher, you have some 30 children each doing different things, each having peculiar problems, crying and laughing and some have to go to the bathroom. As a teacher, you care for each one and every one all the time. You know what each one of them is doing and what they are about to do. If you think Gretzky is a miracle, you are a miracle.

How do you do that? Your answer probably is "One Thing At A Time" " After all, that is the most any human being can do. But what about your Periphery Vision? While you are wiping off Jony's bloody nose, You are aware Betty and Rosy are pulling each other's hair.

On the top of it, you have a Map in your Head called Lesson Plan or Day Plan. The Map is like Ideal Dream and never works under daylight. Nonetheless, without the Map, you would not be able to keep your sanity.

When you said "I do one thing at a time, and just keep going", you are not telling the truth. You do not work like Scientists in teaching grade one. You have to care about everything at the same time. But you somehow keep your physical and mental balance relative to, or by the help of the imaginary Map you have in your head. It is just that you are not "Consciously" thinking about it when you are rushing Nick to the bathroom.

What a human mind can do is amazing. Consciously thinking part is just a minor insignificant fragment. Our "Rational Thinking" cannot do that" So we say "One Thing At A Time". And we imagine we are running in a Maze with a Tunnel Vision. (The reason why Maze is confusing and

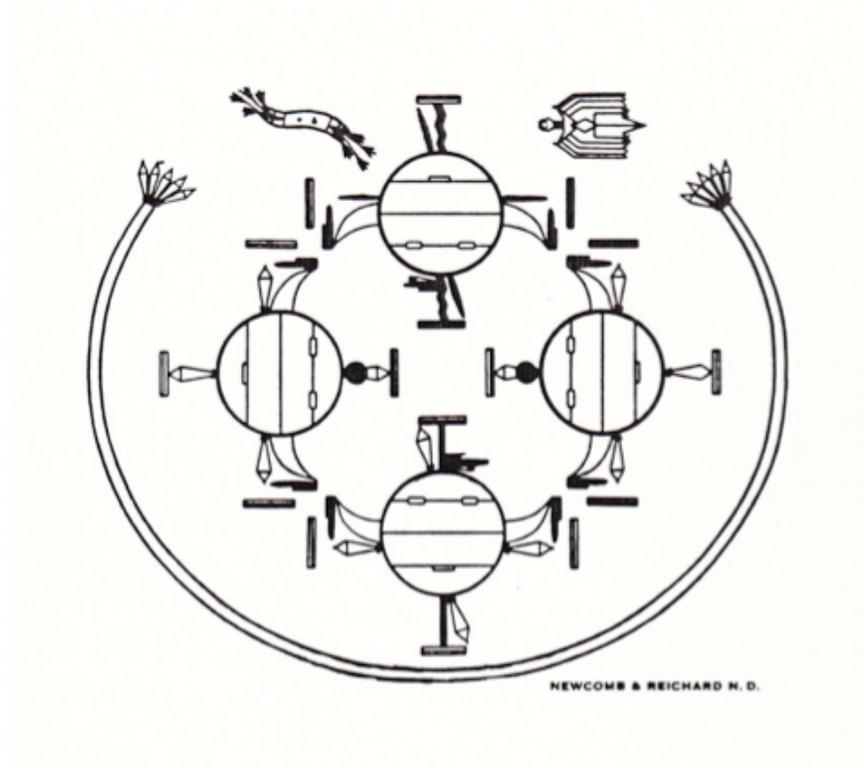
disorientating is that we do not see the whole picture. That is when we have no Map. We do not have Environment to know where we are and guide our way out.)

- - - - -

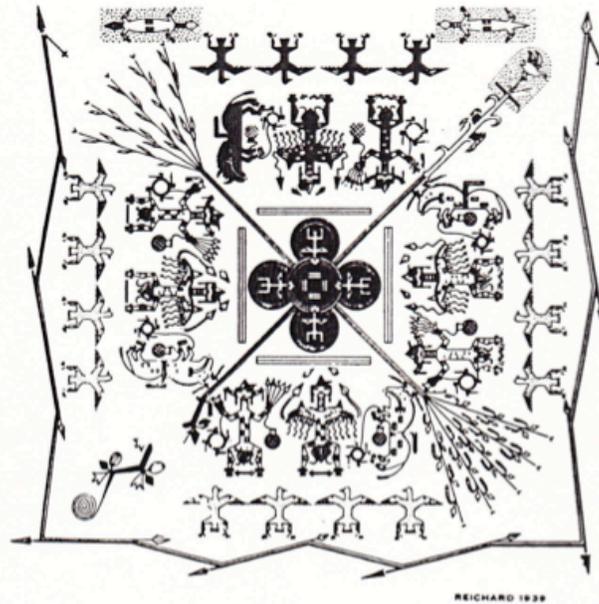
I think you know what I am talking about. When you are in the world of children, you no longer have the luxury of having a Tunnel vision on one object called "children" or "Class". You are in it. They are all around you. Perhaps, you feel as if you are trapped in a Maze and you say to yourself that all you can do is to do "One Thing At A Time". But actually, you do have Peripheral vision, Environmental awareness, Dynamic Map, and are performing a miracle.

"Love Science" to me is to recognize that miracle of yours, feel dignified and enjoy it.

\*\*\* I add here two notes. (i) Today, Science is fragmented and no longer has a Vision-Map. It is pursuing "One Thing At A Time" with a tunnel vision. I am afraid, Science today, in that sense, has retrogressed, (ii) The Science of "visionary-Map" navigation was practiced by Polynesians long before Europeans came to know it. Native Hunters in the North woodlands also knew the Science, as Hugh Brody's book Maps And Dreams (a NAS text) illustrates.



From Evelyn Payne Hatcher. Visual Metaphors: A Formal Analysis of Navajo Art. West Pub. Co. 1967



REICHARD 1828

Layout of a large drypainting "The Water People" from the Shooting Chant by Miguelito

