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Crushing of Cultures: Western Applied Science in Northern Societies[1]

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ABSTRACT. Western scientific traditions and technology are both vital underpinnings for the dominant culture in the Americas. Although only rarely acknowledged as such, both science and technology are value laden. Both define and are defined by a habitual way of thinking that is rational and hence "true." While this tradition of thinking provides a kind of intellectual rigor and strength, it can also be tyrannical. The unbending thought habits that provide the strength and rigor in the scientific tradition also give rise to intolerance that often crushes other world views. This paper highlights issues that exemplify the problems inherent in applying Western scientific traditions in traditional northern societies. Citing personal experience with the creation of a new town for Indian peoples in the North, and drawing from Western philosophy and psychology, the author raises questions about cherished values and beliefs that are often unconsciously a part of the Western scientific tradition.

Key words: scientific traditions, applied science/engineering, cultural conflict, Native American societies, northern development, aboriginal traditions and western psychology, Rae-Edzo, new towns, northern policy and planning

RÉSUMÉ. La technologie et les traditions scientifiques occidentales forment une importante charpente de soutien pour le culture dominante dans les Amériques. La science et la technologie débordent de valeurs, bien que l'on ne reconnaît que rarement ce fait. Elles définissent et sont définies par une façon habituelle d'élaboration de la pensée qui est rationnelle et donc "juste". Bien que cette tradition de la pensée assure une certaine rigueur et puissance intellectuelle, elle peut aussi entraîner un genre de tyrannie. Les méthodes de pensée tenaces qui présentent force et rigueur à la tradition scientifique encouragent aussi une intolérance qui écrase souvent d'autres perspectives mondiales. Le présent article souligne des situations qui démontrent des problèmes propres à l'application de traditions scientifiques occidentales aux sociétés nordiques traditionnelles. Tirant de son expérience personnelle avec la création d'un nouveau village indien dans le nord, ainsi que de la philosophie et de la psychologie occidentales, l'auteur soulève des questions à l'égard de valeurs et croyances révérées qui font souvent inconsciemment partie de la tradition scientifique occidentale.

Most clés: traditions scientifiques, science et génie appliqués, conflit culturel, sociétés autochtones américaines, développement du nord, traditions autochtones et psychologie occidentale, Rae-Edzo, nouveaux villages, politique et planification du nord

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A paper with a title as deliberately provocative as this needs a cooling salve to begin with lest it irritate more that it illuminate. My intention is to offer a challenge. The strengths, merits, and benefits of the Western scientific tradition need no congratulations from me or anyone else. But perhaps a small pinch, a mildly provocative foray into an otherwise sacred place, can stimulate our thinking without too much offense.

Dealing with science in general is difficult enough. To deal with it in the context of public policy, credibility, and acceptance in the North is enough to frustrate even the most intrepid in a quagmire of generalizations. Let me therefore qualify the title with an observation by Mark Twain (surely one of America's foremost social scientists), who said: "All generalizations, including this one, are false."

Science, far from being an absolute, is simply a process of progressively refined generalizations. So, if we can accept Twain as an authority, it should be obvious that what we are dealing with, in general, is a progressive refinement of falsehoods. That refinement leads us towards the truth.

As an engineer I see my profession as the *art* of applied science. I think it is useful to look at engineering in this way because the way in which science is applied in the real world casts a penetrating light on what is conceived in the walled-in world of labs and libraries. Engineering offers insights on science in general because what we actually *do* is more telling than what we say, than what we think, theorize, or write. A case study will illustrate the point.

In 1970, I was the on-site engineer during the construction of a new town in Canada's Northwest Territories — the town of Edzo, named after a famous Indian leader and statesman from the area. The town of Edzo was to replace the existing Indian village of Rae. The decision to abandon Rae and to create a new town was based, to a large extent, on the advice of fellow applied scientists.

As a young engineer, I viewed my involvement in that project as the opportunity of a lifetime. It was a technological challenge for the obvious "betterment" of a northern society. I plunged into the task with great zeal. Two years later, when the town was complete, I began to recognize that a mistake had been made. Looking back several years after that, I realized the applied-science approach to the issue was a large part of the problem and that it stood in the way of a decent solution to the concerns of the people who made Rae their home and in whose name the project was originally undertaken.

Rae-Edzo is the largest Indian community in the N.W.T., with a population of about 1300 Dogrib Indians. It lies about 110 km west of Yellowknife on the shores of Marion Lake just off the North Arm of Great Slave Lake.

Rae was founded at its present site at the turn of the century because of the competitive trading between the Northern Trad-

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ing Company and the Hudson's Bay Company. The choice of location was based on easy water transport, access to the renewable resources of the region, and the travel routes used by the Dogrib Indians. Hence a trading post and later a mission, and then a school and other services, were added to what was originally a well-used Indian camp and rendezvous.

However, as the population of Rae grew and its infrastructure expanded, the community began to experience a number of problems. In the 1960s these problems seemed to peak, in a political sense, when a number of children died. Several of the deaths and many of the community's health problems were attributed to poor water, sanitation, drainage, and housing. Health officials and the community called for improvements. The federal and territorial governments responded. Public health officers, planners, and consulting engineers from the south were called in to survey the situation. All agreed it was serious.

The community was located on solid rock and seemed to be haphazard in its layout. Linguistic, social, economic, and cultural differences were profound. The outside technical experts seemed somewhat overwhelmed by the apparent chaos and the difficulty that they faced on applying traditional engineering and planning solutions. After several visits to Rae and many more meetings between officials in Yellowknife and Ottawa, it was decided that the best solution was to move the community to a nearby location. Although the new site was away from the lake, the engineers were able to show that the soil was better for laying underground water and sewer mains and was better drained and more suitable for building foundations, that the site had better highway access, and so on. In a very precise way, engineers were able to itemize material costs — e.g., the number of cubic yards of concrete and feet of water main. A town planner from the south, working with the engineers, laid out the new community, complete with neatly rowed houses, cul-de-sacs, and open park areas. It was to be the showpiece of the North. The responsible public officials, many of whom had technical backgrounds themselves and none of whom were native, were impressed. Everyone had the best of intentions.

Through all this, the Chief, the band council, and the people of Rae were subjected to countless meetings as federal and territorial officials and their consultants and specialists came and went. The people at Rae remained concerned about the health problems, but to that original concern was added a new one — the moving of the whole town. They quietly pointed out the need to stay near their fishing nets on the lake. They said that *they* didn't need to be near the highway. They talked of the value and meaning of their community in a geographical and historical context. They repeatedly spoke of who they were as a people. This was all done quietly and repeated many times. It was clear that the people didn't want to move.

There were more meetings at which engineers and administrators pressed home the merits of the new town and highlighted the problems with Rae. Eventually the southern officials got what *they* needed to justify what *they* wanted to do for the people of Rae. The Chief said that if all these outsiders really wanted to build the town so much, to go ahead, but the people from Rae probably wouldn't move. This was taken to be local endorsement for the project.

I spent two years at Edzo while the new town was being built. A residential school was erected to serve the region, which includes several small more isolated communities and outpost camps. Roads, houses, a nursing station, a fire hall, water and sewer mains, and a sewage lagoon were put in place. An area was zoned for future commercial and industrial development. When I left, a few families had moved into the houses, although at least half of them were still vacant. Children were being bussed 24 km from Rae to attend the new school at Edzo. As the Chief had always maintained, the majority of people refused to move to Edzo.

Since leaving Edzo, I have tallied up the costs and, with the considerable benefit of hindsight, I have concluded that the public health and other technically related problems in Rae could have been solved within that community at a substantially lower cost than that required to build Edzo. In fact, that has happened anyway. Today, the government has abandoned its hope of moving Rae. Huge new investments in infrastructure have been made in the old town. Edzo was a colossal error in technological, financial, and human terms.

If Edzo were unique, perhaps we could dismiss it as an unfortunate error. But what happened at Edzo is not unique. It fits into a larger and quite disturbing pattern. Look, for example, at direct parallels in Canada's North — the attempt in the Mackenzie delta to move Aklavik to Inuvik, and the more recently aborted grand design to relocate the community at Resolute Bay. Even so, attempted community moves are only the more obvious examples of the flawed thinking that permeates our activities in the North.

In the mid '70s, four years after my experience at Rae/Edzo, I accompanied the Hon. Mr. Justice Thomas Berger throughout his inquiry into the environmental and social impacts of a major engineering scheme in the North — the Mackenzie Valley pipeline. The pipeline project, sponsored by some of the Western world's largest oil companies, was to bring natural gas from Prudhoe Bay and the Mackenzie delta to markets in southern Canada and the United States. It was billed as the largest engineering venture ever to be undertaken by man. The sponsors conducted precedent-setting scientific research on northern soils, vegetation, fish and wildlife, construction methods, social impact, business opportunities and many other subjects. But during the course of the three-year Berger inquiry, the technological glitter of the venture began to tarnish. That was not primarily the fault of science and technology itself. Certainly, there were unresolved technological problems. But the underlying problems were very much like those seen at Edzo: they related to perceptions and values, the use of technology, the meaning of development: Who benefits? Who pays? When and how?

In the years since the Mackenzie Valley Pipeline Inquiry, I have continued to work on northern issues, first with the Canadian Arctic Resources Committee (CARC) as director of policy studies and as a member of the N.W.T. Water Board, and more recently as coordinator for the Alaska Native Review Commission. I continue to be amazed at the repeated manifestation of the kind of problem I first experienced at Edzo.

Of course, the use of science, and engineering in particular, is only one aspect of the encounter between Western societies and northern societies. Nevertheless, I think it is instructive. Difficulties seem to become most obvious in engineering ventures, because that is how we most obviously apply our science in the North. And engineering and technology form the conventional Western notions of progress and development.

But in all this, what is symptom, and what is cause, and why?

I think most would agree that the application of science, as I have described it here, created problems because it ignored

the human condition. That is not uncommon even in our southern societies. We are struggling to find ways of incorporating the social sciences and the humanities into decision-making. What is happening to northern societies highlights this struggle and at the same time goes beyond it.

The root of the issue was touched in a lecture by a distinguished political philsopher, Professor Leo Strauss (1967), when he noted:

> All the hopes that we entertain in the midst of the confusions and dangers of the present are founded positively or negatively, directly or indirectly on the experiences of the past. Of these experiences the broadest and deepest, as far as we Western men are concerned, are indicated by the names of the two cities Jerusalem and Athens. Western man became what he is and is what he is through the coming together of biblical faith and Greek thought. In order to understand ourselves and to illuminate our trackless way into the future, we must understand Jerusalem and Athens.

He went on to speak of the culture-bound perceptions that emerge from this Western tradition, adding:

> . . . every attempt to understand the phenomena in question remains dependent on a conceptual framework that is alien to most of these phenomena and therefore necessarily distorts them. "Objectivity" can be expected only if one attempts to understand the various cultures or people exactly as they understand or understood themselves. Men of ages and climates other than our own did not understand themselves in terms of cultures because they were not concerned with culture in the present-day meaning of the term. What we now call culture is the accidental result of concerns that were not concerns with culture but with other things and above all the Truth.

Obviously, indigenous northern societies emerge from a past that is not based on Jerusalem and Athens. They have different roots and different perceptions that offer a different meaning and a different avenue to the "Truth."

One is led to the same conclusion through linguistics. An important intellectual perspective for considering this in a northern context is contained in the book *Language Thought and Reality, Selected Writings of Benjamin Lee Whorf* (Whorf, 1956). Whorf was trained as a chemical engineer at M.I.T. but made profound contributions to linguistics by grasping the relationship between human language and human thinking:

> We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar or can in some way be calibrated.

Unlike other Indo-European languages, it seems that Indian and Inuit languages cannot be calibrated with our own. Native peoples dissect nature and the universe differently, and this often leads to fundamental differences in perceptions of what is true, what is right, and what conduces to public needs and welfare.

In northern societies, in places such as Rae-Edzo, we are confronted with a large portion of the population who do not share our world view. There is, of course, nothing wrong with this difference as long as it is recognized, accepted, and respected. But when it is ignored, denied, or downgraded, it creates serious problems.

I think that the application of Western scientific technology in the North is responsible for many of those problems simply because it does ignore, deny, and downgrade, even though it usually does so quite unconsciously. In applying science, we provide value-laden "objective" technological solutions that mask fundamental social issues. But because the solutions — to us — seem clear and definitive, and are so eminently quantifiable and rational, the decision-makers, people who share the same technological world view, embrace them. In other words, the only things that count are the things that can be counted. That is the utilitarian perspective that increasingly fuels our industrial and social machine.

The power of these ideas of practicality and rationality, and the unremitting condemnation of challenges to them, lock the application of science in an intellectual straitjacket. The uncompromising dedication to this power artificially restricts the imaginative avenues to what Strauss called Truth. This scientific power becomes an unacknowledged tyrannical force within. How does this happen? And why?

Our Western tradition brings with it an imperative to explain, to rationalize through a mental/verbal process of naming, separating, sorting, and structuring. In the process, our society, with its system of interpreted norms and its values, ends up dictating what is "real" or "unreal," what is "rational" or "irrational." This pervasive bias was explored by Otto Rank, regarded as one of Freud's most outstanding students and a pioneer in the field of transpersonal psychology. In his book *Beyond Psychology* (Rank, 1958:59), he said:

> All our human problems, with their intolerable sufferings, arise from man's ceaseless attempts to make this natural world into a man-made reality, thereby hopelessly confusing the values of both spheres. In this sense, all human values no matter how real they are to us — as, for example, money — are unreal, which paradoxically enough does not mean irrational. The rational and the irrational both being human values are not equivalent to the real and unreal representing natural values. The result of this confusion manifests itself in the paradox that the reality in which we live is determined by the unreality which we believe to be real because it is rational.

It was Rank's main thesis that ideologies, much more than realities, determine the behaviour of individuals and subsequently the fate of people. In other words, in our desperate attempt to become masters of our own destiny through science and technology, we become slaves.

It seems that in a vain attempt to establish uniformity, the Western scientific tradition rationalizes to explain (and to keep up with) the rush of events. Rank (1958:22) says:

> Because the will-ing side of human nature cannot allow for spontaneous happenings that are beyond its control, we falsify the whole outlook and meaning of life by conceiving of spontaneous natural developments as irrational and believing, contrary to all the evidence, the will-ful to be the rational.

Rank urges us to step outside the limits this imposes and to look at what is, not to judge the real or the unreal, but to accept as equally valid both the rational and the irrational. He advocates a new and proper balance. By accepting the irrational we can rediscover vital human values. These values have simply been masked by the living process — a rationalizing process plagued by fear of natural forces both without and within.

This represents sensitive ground on the Jerusalem side of our tradition. But there are important scientific insights to be gained through the exploration of this mystical side of human nature and history. For example, in *Varieties of Religious Experience*, William James (1961:130) points out that *only* individual experiences — whether rational or irrational to the observer — and not scientific facts or methods, are concrete:

> It is notorious that facts are compatible with opposite emotional

> comments, since the same fact will inspire entirely different feelings in different persons, and at different times in the same person; and there is no rationally deductible connection between any outer fact and the sentiments it may happen to provoke. . . . Whatever of value, interest or meaning our respective worlds may appear endued with are thus pure gifts of the spectator's mind.

This is the lesson of Rae-Edzo. These insights come from our own tradition. They are not new, yet they seem lost on our science as it is applied in northern societies. Why? I believe that specialization in the sciences, particularly the applied sciences, is a basic cause. As one critic has put it, perhaps too bluntly, "Scientific training produces sound technical knowledge more often than not saddled to the backs of donkeys." Strong stuff! It wasn't that we who were involved with Edzo were malevolent; rather we were incompetent beyond the rather severe limits of our specialization and, what is worse because it is so common, we couldn't even accept the limits when they were pointed out, as the people of Rae tried to do.

Specialization produces an expertise able to plumb the depths of science, but by its very narrowness and isolation it becomes less and less responsive to the living experience of the nonspecialist. This leads to a contemporary parallel to what David Hume crystallized in his *Natural History of Religion:* a two-tiered model of the elite and the vulgar, where significant insights are defined by the intellectual leadership while much of the everyday activity of people is relegated to the realm of popular ignorance or superstition. Edzo is a case in point.

Specialization need not be a problem, except that specialization often brings with it a self-importance tainted with arrogance. It is this intellectual arrogance that separates the applied scientist from the richness available within our own tradition of the humanities, the social sciences, and the arts. And such a lack of humility diminishes any capacity for appreciation of the values and traditions of those with a world view different from that of Jerusalem and Athens.

In specialization, and the power given over to the specialist, there is a tendency to become encapsulated in smaller and smaller spheres of intellectual certainty. We lose our ability to integrate and make comprehensible what is unknown or misunderstood in a particular economic, political, and social situation. So it is that science, and applied science, becomes an impersonal cult. We become confused. We are perplexed because things just don't seem to work out according to our logic and facts, our ideas of what is and/or should be.

Certainly, excellent scientific work is being done to break through the rigidities we have inherited. But with the increased complexity of science and its insistence on a mechanistic-reductionistic "rational" methodology, science is becoming increasingly divorced from itself. The various fields of science are quickly losing the necessary ability to cross-fertilize. Each specialty in its application becomes more like a malignant cell that destroys rather than supports its host. This is uncomfortably apparent as we see the effects of applied science in northern societies.

From these sweeping generalizations (each one, no doubt, as Twain says, false), I shall try to take this one step farther. Is science really the pursuit of truth? If so, whose truth? Or, if I may leap into the truly esoteric: What is truth? Is it different from meaning?

I raise these questions not to answer them — others have tried for centuries, and I bow to them. Going back to my Athenian roots, I am reminded of Socrates's statement in Plato's *Meno:* "It isn't that, knowing the answers myself, I perplex other people, the truth is rather that I infect them also with the perplexity I feel myself."

As an engineer, I am perplexed because I see, in the shimmering northern lights, a confusion in our Western scientific traditions. It is a confusion about the application of reason and judgement. It is a confusion about the differences among information, knowledge, and wisdom.

There is a tradition of Western philosophy that deals with these issues but, like science, it is a tradition biased by our Jerusalem-Athens roots. In science, we apply our Western-biased reason and judgement to establish an "objective" meaning for ourselves. But it is often just a Western-biased meaning, and not necessarily universal. Our science is therefore value-laden in what it chooses to acknowledge as important and to study and what it chooses to ignore. There is a scientific blindness in our perception of the vibrancy of northern societies. It is not myopia, but blindness. How can those who see explain to the blind that there really is such a thing as colour? No amount of scientific information can offer the experience of even the quickest glance. If only there were a means of really seeing, of really knowing. . . .

The confusion I see in information, knowledge, and wisdom arises from these different world views. Scientific application asks "what" and "how," and that leads to scientific information and knowledge. But when it comes to "why," the basis of wisdom, science, and particularly applied science, is silent. But the question "Why?" permeates all that we are. It is the internal compass that guides what each of us does, yet it can never be objectively defined or explained. It can only be experienced.

In my 20 years in the North, I have found that aboriginal societies have more awareness of the "Why?" than I ever found in institutions of learning in the south. There is a treasure there that must be acknowledged even if it can't be understood. But with our Western scientific fixation, plagued by intellectual arrogance and an unconscious cultural subjectivity masked by a claim of objectivity, we are crushing the very essence of what is vital to survival in northern societies. In the process we are losing what is vital to the expansion of our own notions of science.

Our experience in northern societies has illustrated how mechanistic science must be instilled with a new attitude. That attitude will arise from a new humility, a broader awareness, and a refined sense of responsibility. From that will emerge a new kind of knowing and a fresh wisdom on our mental as well as our geographic frontiers.

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