

Science, Sex, and the Future..

The 1981 New Year's science scene ranges from the sexually insecure sado-masochistic physics professor to the existentialism of science and technology.

At the Royal York and Sheraton hotels Toronto had the honour this week to open its doors to well-known international scientists by hosting the 147th national meeting of the American Association for the Advancement of Science.

This year's theme is "Directing Science Towards Peace".

Attending the conference was like stepping into a science fiction movie. There is no doubt that we're now into a new age: the electromagnetic eighties are upon us.

The conference opened with a Youth Symposium, directing effort to motivating young people towards scientific advancement. CBC science commentator David Suzuki and Jearl Walker (*Quirks and Quarks*) typify the new army of popular scientists pioneering in an age unparalleled in history.

Walker is an unusual teacher, who explains that his grandiose teaching methods are due to a feeling of sexual inadequacy he gets when his students forget the physics he teaches in class.

To prevent this frustration he repeatedly jeopardizes his life during his lectures. To prove his

point on the distribution of energy he placed himself between two boards of nails with a cinder block on top. The correct impact of a sledge hammer, brought about by an assistant, cracks the blocks and distributes the shock evenly through the board, nails, and Walker's body, so that he can walk away without a scratch.

The incredible feat of walking over hot coals was lucidly explained by Walker using the insulating effects of vapour barriers called The Boerhaave-Leidenfrost phenomenon.

For example, if a drop of water is placed on a moderately hot pan, it will spread, sizzle and burn away in a few seconds. However, if the pan is very hot the same drop of water will bounce around for many minutes due to a rapidly formed layer that protects the drop from the heat.

The same is true for walking over hot coals: sweat from your feet will be evaporated and protect the flesh from burning. To prove the point Dr. Walker actually walks over red hot coals.

David Suzuki, the famous Canadian scientist from British Columbia was also on hand to promote science and make its importance clear to the general public.

The future, he feels, will be astounding. Dr. Suzuki described

developments of silicon chip technology. The computer (man's modern baby) is rapidly growing and gaining in intelligence at a rate of which we can only be proud, if not fearful.

At this moment a computer created by Dr. Weisenbaum called Elisah is being a psychologist and friend to a group of Harvard students who resent Dr. Weisenbaum's interference with their "friend".

"The reaction of people to machines is highly personal and they rapidly become dependent," stated Suzuki.

The common belief that "machines are stupid" and "we can always pull out the plug if they (computers) get out of control" is now absurd.

Artificial intelligence is serious study: computers can read, write, talk and even 'think'. They are used in our finances, entertainment and communications, and everyday additional applications are being found. Pulling the plug would be suicidal.

The recent advances in biological engineering are also staggering. Cloning is a reality, artificial regeneration of body parts is only one step away from human experimentation, test tube babies are here, immortality is a strong possibility within this century, mind programming and

thought control are now possible by brain stimulation, etc.



Dyed oil globules rising through a column of water, taking the shape with the least surface area per unit volume. The slight flattening of the spheres is an optical illusion due to the shape of the water cylinder.

Suzuki himself states "I'm looking forward to growing a finger out of my top lip so I can pick my nose without using my hands..."

Canada's only Nobel Prize winner Gerhard Herzberg was also there to talk about modern experimental methods in science.

He spoke about atomic identification and new molecules which only exist as excited states.

York's Dr. Stan Jeffers contributed to the philosophy of science in his talk "Dialectics and Astrophysics" on Tuesday night while Dr. Harold Schiff from York's Science Faculty spoke today about the influence of supersonic transports (SST) on the ozone layer. Ten years ago the United States SST program was canceled because it was thought that emissions would destroy the ozone layer which would lead to skin cancers and numerous other disorders.

Experience has now taught however that that prediction was wrong and it is now believed that an SST fleet in the lower stratosphere may actually enhance the ozone layer.

Dangerous advances in technology are rapidly coming about and the proliferation of nuclear weapons was also a topic of much debate.

A new problem are "Suitcase bombs". Toronto was singled as a prime target for a terrorist demanding ransom.

There is no question that our world is teetering on a precarious precipice. The longing for science's benefits also includes the fear of its consequences. To be absent is to be wrong.

Human Life Price Tag

Ten people are stated to die annually in the United States from chlorine leaks resulting from train accidents.

A headline from a scandal rag? No, the above statement is the conclusion of a study by the Batelle Memorial Institute in the United States on the risks of transporting chlorine. This type of prophetic study, called risk assessment, is common below the border but is virtually non-existent in Canada.

Essentially, risk assessment places a value on human life. For example, Ian Burton from the Institute of Environmental Studies at the University of Toronto, said the conclusions of the Batelle study on chlorine transportation are not significant enough to initiate further safety measures.

"The probability of death here is very low and the analysts conclude the risks of transporting chlorine by rail are very low, and in social terms quite acceptable considering the benefits one enjoys from the use of chlorine," he said.

This kind of risk assessment is coming to Canada, says a study from the University of Toronto Institute of Environmental Studies. They say we will soon be pumping tens of millions of dollars annually into programs of highly questionable value.

Burton, one of the coordinators of the investigating team, explains that there are two elements involved in risk assessment: the probability that some event will happen and the consequences if it does occur.

The team has been looking specifically at the Mississauga chlorine spill that occurred just over a year ago.

Just before midnight on November 10, 1979 a freight train derailed in Mississauga, just outside Toronto. Explosions hurled one car 700 metres across a field and resulting fires could be seen as far away as Niagara Falls.

Burton used Mississauga as an example to explain how the risk of potential hazards such as toxic waste disposal, acid precipitation, genetic engineering, nuclear energy and

the transportation of dangerous goods can be calculated.

"In the case of Mississauga, we look at the quantity of chlorine travelling by rail, and the distance and number of shipments. Then from the historical records we find the accident rate on railways and get an estimate of how frequently chlorine accidents are likely to occur," said Burton.

Once the researcher determines the chances of the event occurring, the consequences of such an accident are addressed.

"In Mississauga we saw the consequences were that virtually an entire town was shut down and 240,000 people were evacuated for up to six days," said Burton. "There was considerable dollar loss because of the disruption of business and the cost of all emergency services."

The most startling finding of the investigating team was that no one in Canada had carried out a risk analysis of the dangers of transporting chlorine.

Their report stated that there

had been a concerted effort by industry to smother risk analysis in this country. It also stated: "The major chemical companies and the railway companies regard risk analysis as expensive and likely to lead to increased transportation costs."

Burton said industry explains the lack of risk assessment as a result of there being an insufficient data base in Canada to put together risk studies.

But he says there is a more important underlying reason. "Industry sees these studies as vehicles for persuading the public rather than serious analysis of risks that could lead to a change in policy. Industry has been most vocal in opposing risk assessment of nuclear reactor accidents."

The Canadian nuclear industry, including the Atomic Energy Control Board, has vocally expressed their skepticism in risk assessment for about a decade now. They argue that the assumptions made in risk assessment are so numerous and the uncertainties so large, that the final risk estimates have little, if any, meaning.

These agencies have consistently warned that risk assessment would encourage distrust and lack of cooperation between the nuclear industry and regulatory bodies and thus lead to increased risks.

But things seem to be changing, due mainly to public demand. Burton said there is a growing concern of people to be better informed about the actual level of risks. "Policy makers are being pushed into this process of ranking risk assessment, sometimes against their better judgement because of public pressure," he said.

Now, for the first time, the AECB is inviting proposals for

assessment studies on various stages in the nuclear fuel cycle.

The investigating team's report expressed a wariness of the forms the first assessments could take: "The studies will be suspect because they will be carried out by or for a group that has an interest in the activity in question and because they will be accused of being public relations exercises. Above all, the studies will not be comparable and there still will be no adequate way of judging risks in one domain compared with another."

The implications of making risk events comparable strikes at the fibre of social morality. Eventually researchers will be able to compare the estimated danger of transporting radio active fuels to the dangers of acid precipitation. This will effect the prioritization of funds allocated for setting up safety procedures.

Burton said, "It's a morally complex question but there is no doubt, that in many areas of decision making today we do not make decisions about the allocation of funds which have implications for the amount of lives that will be lost or saved."

While the subjective balance of money and life may upset some individuals, Burton said he's convinced that the comparison of risk activities will lead to more efficient allocation of funds.

He cites the consequences of a risk assessment study of toxic contaminants in soil. Burton said it would show the risks were low "and to spend more money getting a higher level of pollution-free environment is not as sensible as an investment in medical research or disease prevention."



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