

Dr. Howard Rapson, a distinguished Professor of Chemical Engineering at the University of Toronto, summed up some of the complexities of risk assessment and drinking water with notable clarity in one of his presentations. Dr. Rapson is the co-inventor of the world-renowned Rapson/Reeve closed cycle pulp mill, where the sheer efficiency of the manufacturing process can eliminate pollution. The following is excerpted from his paper: "Benefits and Risks of Chemicals in the Environment."

"Although so many chemicals are required in limited amounts for us to exist, nearly five hundred years ago Paracelsus said: 'All substances are poisons; there is none which is not a poison. The right dose differentiates a poison and a remedy.'"

Professor Rapson's paper goes on to state that: "Every chemical is toxic if administered in sufficient doses, even water. 'Acute toxicity' is expressed for each chemical as LD50, the lethal dose which will cause half the test animals to die. For water, the LD50 is about 500 grams per kilogram. Many pesticides, like Picloram, have lower acute toxicity than salt, and some are no more toxic than glucose!"

A PERSPECTIVE ON CHEMICAL ANALYSIS

"Much of our concern about chemical pollution, and particularly toxicity and mutagenicity, has only developed very recently, and is direct result of the extreme sensitivity of our modern methods of analysis. Previously we have been much more concerned about disease producing microorganisms, and quite properly so, because they can multiply in our bodies and kill us relatively quickly. Only in the last decade or two, through these enormous advances in instrumental chemical analysis, has it become possible to detect, identify, and determine quantitatively the minute concentrations of toxic chemicals in our food and in our potable water supplies, and this has created alarm.

"Very few people understand that all of us can ingest some quantity of any non-living chemical without harm. If this were not so, we would all be dead long ago! Because Avogadro's number, as everybody who has studied any chemistry would know, is the number of molecules in a gram molecular weight of any chemical. It is so extremely large*, it can be expected that at least a few molecules of every stable chemical will be present in the water we drink and the air we breathe and the food we eat!"

Dr. Rapson once pointed out to Ralph Nader that he and his students had analyzed Metropolitan Toronto's Drinking water and found it to be purer than distilled water in the laboratories--because the lab water is stored and transferred in plastic bottles.

He says in his paper that he was about to announce his findings but was scooped by the Toronto Star, which, in a big front page headline, said that Toronto water was quite safe to drink. Co-incidentally, the Star had also submitted samples of Toronto tap water to three highly respected laboratories. None could find any chemicals above the accepted safe concentrations. "I was glad to have our work confirmed such a dramatic way," said Dr. Rapson.

23

* 6 molecules per gram mole

