

SCIENCE / ENVIRONMENT

Keji's loons threatened by high mercury rates

BY DAISY KIDSTON

A government report says Nova Scotia's Kejimikujik National Park is located downwind of the industrial heart of North America, and is strongly affected by acid precipitation and other air pollutants that emanate from the south.

The 1994 State of the Parks government study says the park is ideally located for monitoring these regional and continental phenomena, and two Nova Scotian biologists are using this knowledge to study unusually high mercury levels in Keji's loon population.

In 1996-97, Joe Nocera, a biology masters student at Acadia University, and his advisor, Dr. Phil Taylor, conducted an Environment Canada/Canadian Wildlife-sponsored study of the common loon at Keji as part of this government monitoring project.

One reason that common loons of Keji interest and concern

biologists is that they have the highest levels of blood mercury in all of North America. High amounts of mercury in the loon's system causes a range of abnormal behaviour, such as decreased reproduction, loss of nest fidelity, over-preening and decreased brooding. It is also suspected that mercury, a neurotoxicant, may cause impaired vision in loons — thus affecting their foraging ability, a concept which Nocera and Taylor are currently examining.

What is so disturbing about these abnormalities in the loons' behaviour is that they may be the results of the pollution of humanity. As stated in Nocera and Taylor's 1998 report on their loon study, "human activities that release mercury into the environment... pose significant dangers to both human health and wildlife."

The main causes of this mercury assault on nature, as stated in the Nocera and Taylor report, are the by-products of fossil fuel combustion, municipal waste

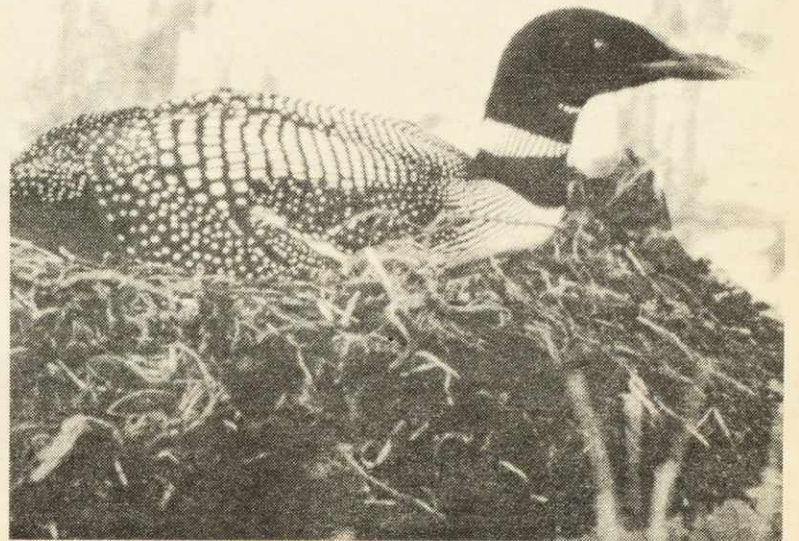
incineration, and other industrial processes.

Loons are particularly vulnerable to mercury contamination because they are predators, feeding on fish, crayfish, frogs, snails, salamanders and leeches. When such prey get mercury poisoning from contaminated water, the loons subsequently get poisoned. This vicious cycle continues when the adult loons pass mercury contamination on to their young.

In fact, according to Nocera and Taylor's study, it is the baby loons that have their behaviour most altered by the mercury contamination.

"Chicks at such an early developmental stage are more prone to suffer severe detriments because their developing systems are prevented from using the necessary resources that should otherwise be available to their bodies," Nocera said.

However, though much evidence points to industrial



LOONS IN KEJI: Threatened by mercury.

sources causing mercury poisoning of the Keji loons, Nocera stresses that one cannot implicate a particular source.

"Sources of mercury in Keji park have not been identified and research is ongoing," said Nocera.

Nonetheless, Nocera feels the evidence hints that the mercury in

Keji is not from natural sources, such as the "bedrock type" of the park.

"This does not necessarily point directly at atmospheric deposition," Nocera said. "But most atmospheric mercury comes from industrial processes [such as] coal-fired power plants."

On the future of death**Immortal cells are being created, are immortal bodies next?**

BY PASCAL LANGUILLON

Our life span as a species increases year after year, thanks to the progress of science, medicine and a better standard of living. People turning one-hundred still have a long time to wait until they can see their names written in the *Guinness Book of Records*.

Soon enough, though, it will be nonsense to look for the oldest person on Earth, because we may all simply be immortal.

We are already able to fight death in an incredible fashion. Scientists realize miracles that were not even conceivable a few decades ago. Brain surgeries, blood transfusions, organ transplantations and artificial hearts are famous examples of a battery of new biotechnologies that keep us away from a premature death.

A great number of anti-aging molecules are also being discovered, giving the hope that nerve cell loss and the consequent impairment of brain activity will soon be old news.

The miracle of immortality is coming

Prolonging life is one thing. Preventing death is something else, rather impossible. However, at the very end of the millennium, the craziest dream of all has turned to reality — scientists have rendered normal human cells immortal.

This miracle happened last year when two American teams added the telomerase gene in lab-cultured cells. Normal cells divide only a limited number of times because their chromosomes become unstable. Telomerase is a protein that rebuilds the tips of

chromosomes, therefore stabilizing them and allowing new divisions. This protein is produced by a normal human body, but in very few cells and in very small proportions. Adding an overactive version of the gene for telomerase in normal cells prevent them from dying, at least

"The craziest dream of all has turned to reality: scientists have rendered normal human cells immortal."

in lab cultures.

But the big concern of the scientific community over these amazing results was that non-dying cells are usually cancerous cells. As a consequence, the two same teams are now about to prove that their immortalized-cells don't show any signs of cancer activity. Furthermore, they intend to add regulatory sequences to the gene that would enable it to be turned off or on at will by drugs. The first

application of this amazing technique, if proven to be safe, would be to replace cells lost to injury or disease.

Meanwhile, other researchers are finding ways to re-program early brain cells into blood cells, changing the long-held belief that cells are wedded to their specialized roles in the body, and raising new hopes about a variety of possible treatments. Nothing is definitive in science — what seemed impossible one day is realized the next.

Immortal cells leading to immortal bodies?

By looking far ahead in the future, it seems likely that these new techniques could be used to immortalize populations of cells in the body, and then whole organs and ultimately the human body itself. After all, we are just a big package of trillions of cells. The single unit of the body is the cell. So if we can render one cell immortal, why can't we age-proof organs as well?

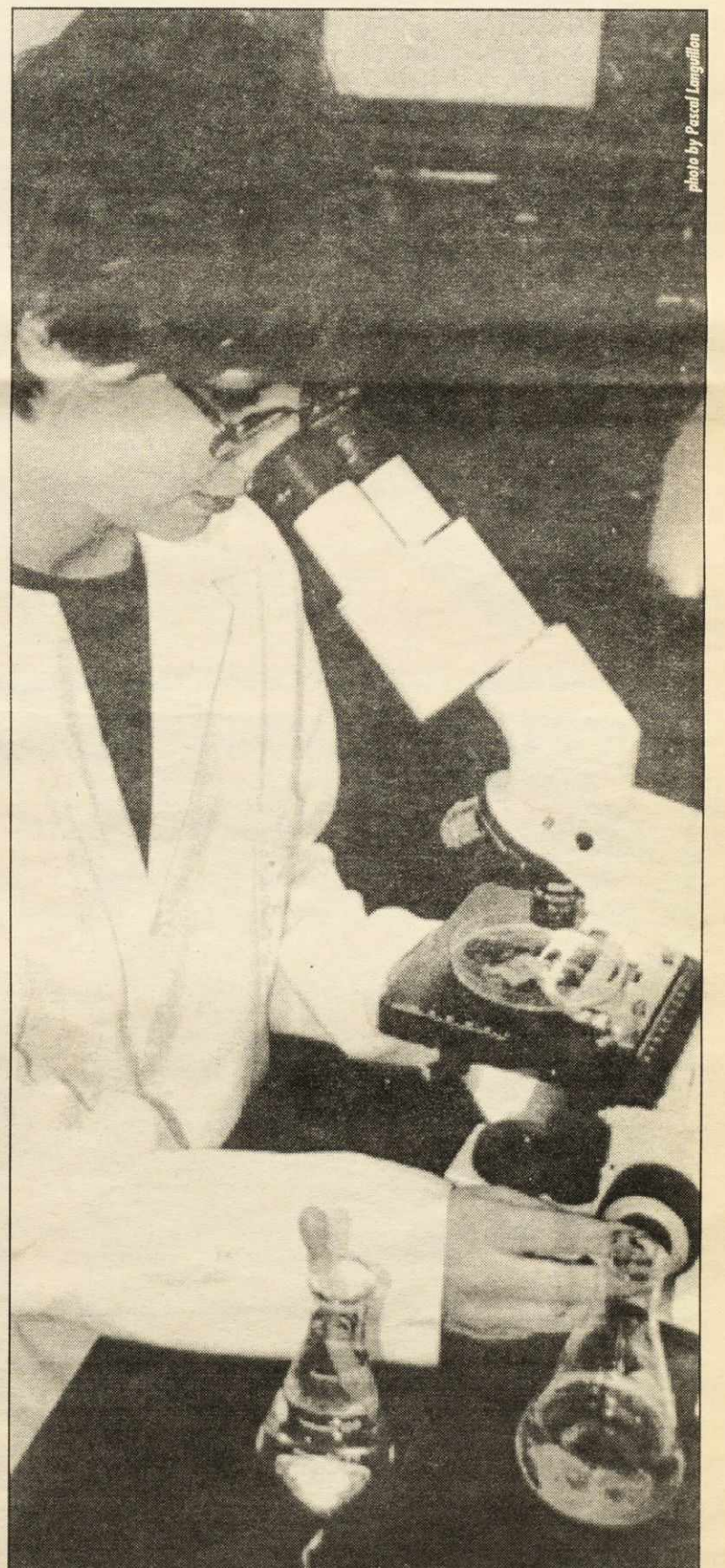
In less than 300 years, the average life expectancy of the human being has more than doubled. What will it be 300 years from now?

One day, if it doesn't destroy itself first, the human race will certainly join the gods in the land of immortality.

Is it good? Is it bad? One scientist once said that "technology is not in itself good or bad. It's what we do with it that determines its effect."

These discoveries might leave us with the most extraordinary power we have ever had in our hands, raising a variety of ethical problems.

But what people will say about the prevention of death?



SCIENTISTS TWIDDLE KNOBS: The scientist pictured here will not be twiddling with your lifespan.