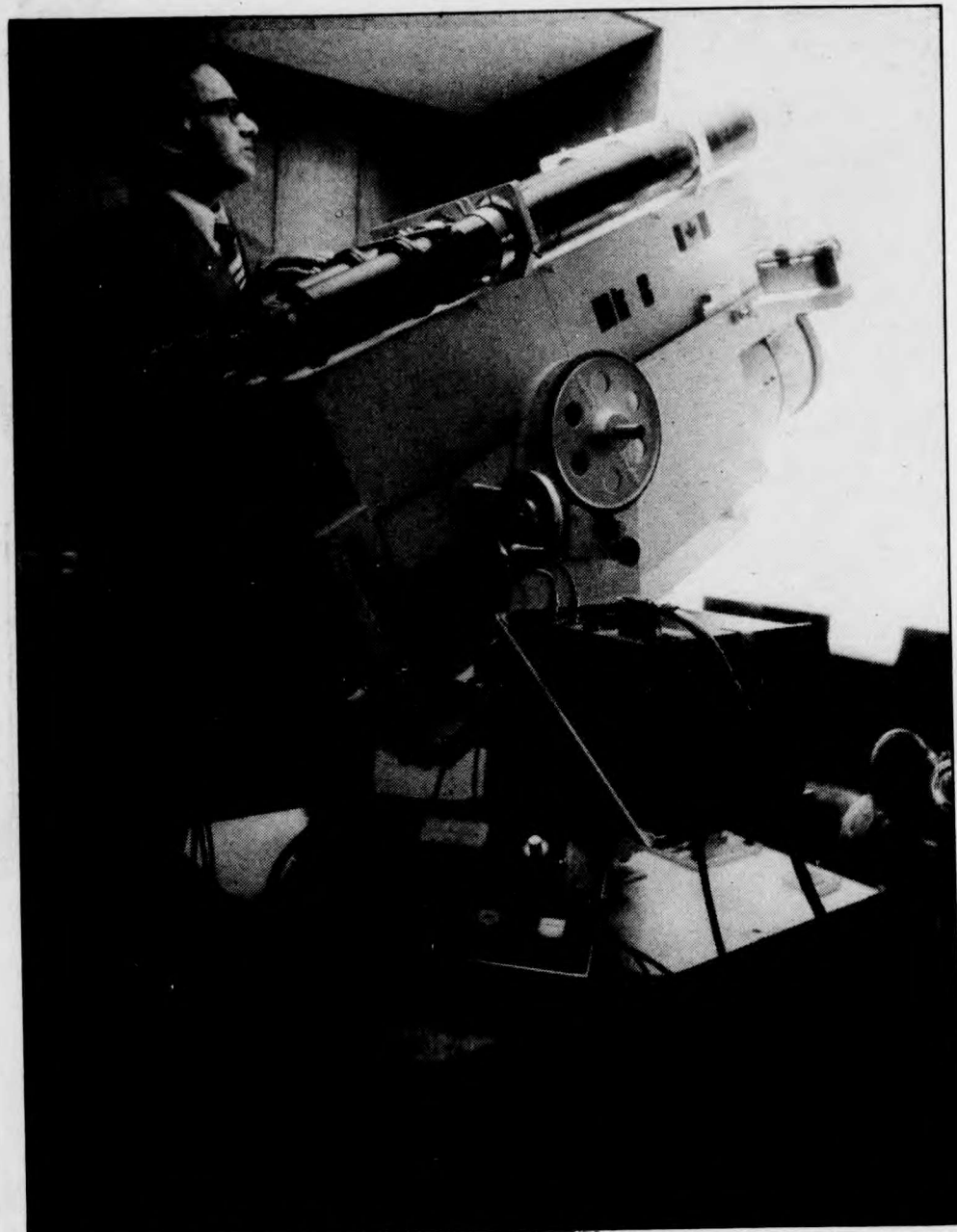


Millions of dollars in research being conducted at York yearly



Dr. Allen Carswell of the physics dept. shown with the "Lidar"—a laser radar—used to detect and analyze airborne molecules.

By GISELE WINTON

Professors at York are active in conducting research projects. In 1982-83, York received a total of \$9.54-million in external funding for research and there are about 600 funded projects currently in operation, with approximately 350 new projects each year.

The largest contributors of research grants in 1982-83 were all federal agencies: the Natural Science and Engineering Research Council (NSERC) with \$4-million, the Canadian International Development Agency (CIDA) with \$1.87-million, and the Social Sciences and Humanities Research Council (SSHRC) with just over \$1-million.

While federal grants are the largest, they require that the University supply the "infrastructure" for the research—the overhead must be borne out of the University's operating budget. In federal research contracts, as opposed to grants, there's a formula for reimbursement of overhead, and on private contracts the University claims the full overhead costs of the research.

The departments at York which received the largest externally-funded research grants were:

1. Physics (\$1.32-million);
2. Biology (\$1.24-million);
3. Chemistry (\$1.24-million);
4. Fine Arts (\$1.11-million);
5. Administrative Studies (\$524,000).

□

Two of the many professors currently conducting research are Dr. Donald McQueen of the Biology department and Dr. Allen Carswell of the department of Physics.

Dr. McQueen is trying to develop ways of fighting a form of pollution in small lakes called "eutrophication" which is caused when a lake becomes overenriched by nutrients from agricultural and urban runoff. This overenrichment causes an explosion of oxygen-hungry algae on the surface; when the algae die, they produce an "algal rain" that floats down to the bottom of the lake. Eventually the oxygen is depleted from these deep areas of the lake and toxic gases are formed, killing trout and other fish and the lake can remain anoxic—without oxygen—for up to six months. Then the cycle

repeats itself.

The question McQueen has been researching for about six years now is "how do you clean it?" McQueen is currently trying two approaches. The first is through an air bubbling machine that distributes air only to the deepest and coldest regions of the lake—where the fish live. This does not disturb the delicate temperature balance of the lake. The second method is to increase the lake's population of zooplankton (microscopic animals that consume the algae).

McQueen and his graduate students have been successful in removing toxic gases and phosphorus and adding oxygen to Lake St. George, a small lake situated near Oak Ridges, Ontario. McQueen's research is supported by NSERC, the Canadian National Sportsmen's Fund, and the Atkinson College Charitable Foundation.

Dr. Carswell's innovations with the process of diagnosing the contents of the atmosphere using a laser are providing useful applications in the areas of meteorology and environmental quality, although Carswell is himself more interested in "developing and understanding the laser technique."

Carswell has been working with lasers since 1968 and he has designed and built them from scratch. "We have to build the systems, test the systems, and get the measurements and understand them," he says.

The laser radar, or "Lidar," he is using "operates on the same principle as regular radar but uses laser light waves in place of radio waves. Since light waves are about 100 times shorter than radio waves, the Lidar is capable of a much finer measurement, to the point where it is possible to observe individual molecules in the atmosphere. Thus, the equipment can provide a precision map of airborne particles.

The Lidar can detect and record an analysis of industrial smoke plumes, as well as the amount of oxygen, nitrogen, water molecules, dust, and fog in the atmosphere, day or night. It is also capable of providing an accurate profile of the heights and shapes of clouds and aerosol layers in the atmosphere.

Dr. Carswell's research is supported by NSERC.

Technology has given the means, but we lack the will to end world hunger

By MARK SIMPSON

It is possible today, for the first time in history, to end hunger on this planet. And it can be done by the year 2000. Hunger does not persist because of any natural physical limitations, but because we lack sufficient political will to get the job done.

According to Worldwatch Paper #9, hunger hinders an individual's ability to think clearly, work productively and resist disease. Ultimately it leads to death. At a social level hunger destroys culture and family structure, drains the economy, creates divisions and antagonisms amongst people and fosters political instability.

Almost a quarter of the world's population is undernourished. The World Bank's World Development Report of 1980 estimates that each year 15 to 20 million of us die of hunger and hunger-related diseases. This means that every day hunger kills 41,000 human beings, 28 people every minute, 21 of them children. In the past five years, hunger has taken the lives of more people than all the wars, revolutions and murders of the last 150 years.

But great progress has already been made. Since World War II alone, over 30 countries have lowered their Infant Mortality Rates to below 50. IMR, an accepted standard used by many organizations, is a measure of the number of infant deaths by age 1 per 1,000 live births. (A country which has an IMR below 50 is considered to have ended hunger as a society-side issue.) The population growth rates in each of these countries has dropped dramatically. China, for example, had an IMR of at least 125 and a population growth rate of almost 4 percent in 1949. Today its IMR is 44 and its rate of population increase is 1.5 percent. According to the 1983 World Population Data Sheet the overall growth rate of the planet's population is 1.8 percent per year. Population growth in the more developed countries averages 0.6 percent annually, while that of the less developed countries averages 2.1 percent.

Those living a barely subsistence life have many children for a number of reasons. In his book, *The Lean Years: Politics In The Age Of Scarcity*, Richard Barnett writes that "for the world's poor, children are often the sole form of capital; they can work in the family fields or be hired out to big landowners.

"Children are also a form of social security; in most cultures they are obligated to take care of their parents when they are old. When the conditions for human development were present, people stopped having so many children."

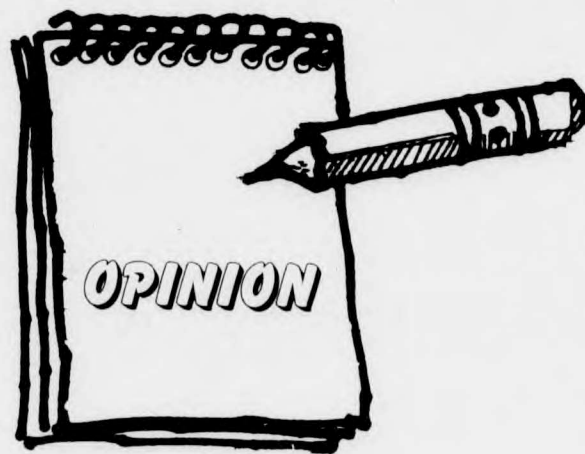
Contrary to popular belief then, ending hunger will help solve the population problem, not add to it.

Current world population is 4.6 billion people. The UN median population projection for the year 2000 is 6.1 billion. Is there enough food now to feed everyone? Will there be enough in the year 2000?

The planet produces an enormous amount of food. The Food and Agricultural Organization of the UN (FAO) estimates yearly production to be 3,400 million metric tons per year, enough to adequately feed 7 billion people.

Clearly, in absolute terms, there is more than enough.

However, there are serious difficulties which must be addressed here. Changes will have to be made in our agricultural practices to solve such problems as soil erosion, overuse of water, deforestation and higher energy costs. The good news is that we have the technology to make the needed changes while maintaining and even increasing yields. In many parts of the Third World for instance, soil erosion is washing away valuable topsoil. Reforestation could stop the process but this normally takes years. Recent research in India has developed a tree which is capable of reaching maturity within one year and would help solve the problem. Other measures such as the digging of irrigation ditches are less dramatic yet very effective. Agricultural production can be maintained and in many areas increased substantially.



The logical solution then, seems to be to redistribute the food to where it's needed. But this would be a logistical nightmare. The world's hungry are not all gathered in one spot. India alone has over 500,000 rural villages.

More importantly, while food aid shipments can be useful in meeting emergency famine situations, they often seriously disrupt the recipient country's agricultural system. When large quantities of cheap or low price grain or other foods are shipped to a country on an ongoing basis, they can undercut the local farmers. People do not buy the locally grown food, because it is more expensive than the food aid. Consequently the farmer may go out of business and the region loses some of its ability to be self-sufficient. However, food aid can be undertaken to minimize this effect and will have to be done in the short term. The point is that food redistribution is not a permanent solution to world hunger.

But other more viable solutions do exist. As previously mentioned, over 30 countries have ended hunger just since

World War II. They have all done it using different means and under different political systems.

Taiwan, for example, instituted a successful land reform program. Before land reform, a peasant had to pay as much as 60 percent of his crop to the landlord. When land ownership was transferred to the peasants, this sum no longer had to be paid. Once the people had a stake in their land, and some surplus income to make improvements, rice production increased by 80 percent.

As production grew and the country's wealth increased, an entire developmental process took hold. IMR declined from about 100 just after World War II to 29 in 1970 and today it stands at 9.1.

The cost of implementing such solutions is relatively small. The World Food Council estimates that the food consumption of the world's hungry could be raised to an adequate level for an annual investment of \$4 billion over 15 years; a total of \$60 billion. Others suggest that the cost of a global program to end hunger on a sustainable basis to be about \$25 billion a year from now until the end of the century. This estimate was arrived at by looking at the financial costs for things like irrigation, land reform, credit to the small farmer and so forth.

When this amount is put into perspective, we find that it is the equivalent of less than four days of the US Gross National Product, and less than half the amount of money US consumers annually spend on alcohol and tobacco.

This is not to suggest that if we all gave up alcohol and tobacco hunger would end, but that the financial resources to end hunger are well within our means. Moreover, if the amount of money currently spent on support of hungry refugees, food stamp programs and other stop gap measures were calculated, we might find that it would actually be more financially sound to end hunger rather than allowing it to persist.

Thus hunger does not exist because of any natural physical limitation. It persists not because there are too many people or not enough food, or no solutions, or because the financial cost is prohibitive. Rather, hunger persists because the political will to have it end does not exist in our country or abroad. One 1980 report concluded: "Mankind has never before had such ample technical and financial resources for coping with hunger and poverty. The immense task can be tackled once the necessary collective will is mobilized." This point is emphasized over and over again by numerous experts.

Aurelio Peccei, the President of the Club of Rome states that "assets and resources are more than sufficient to deal effectively with the problem provided we have the will to do so." And James P. Grant, executive director of Unicef, says that "the social and scientific breakthroughs of recent years are at this point coming together to put into our hands the sudden means of bringing about a revolution in child health. A serious commitment to that revolution by peoples and governments could yet reaccelerate progress for the world's children."

The necessary political will must begin with the individual. It has to be generated from the grass roots level. Each of us is the key to ending hunger. What we do matters.