## Brain waves used to activate machine systems

The prospect of getting a machine to perform a task simply by thinking about it may not be as far-fetched as it seems. It could be demonstrated soon by a group of researchers at Simon Fraser University in Richmond, British Columbia, who have a contract to study the magnetic fields produced by nerve cells in the brain.

Contracts have been awarded to Simon Fraser University researchers and to a company in Port Coquitlam, British Columbia, to apply the research to medical diagnosis and to military applications, including use of brain waves to activate machine systems.

At the heart of the work is a device called a biomagnetometer, manufactured by CTF Systems Inc. It measures the electromagnetic field generated when impulses travel between neurons – the nerve cells – in the brain. The field is generated by the electric current associated with the impulse when it jumps between two neurons at the intervening synapse.

There are two technologies in widespread use for diagnosing neurological disease that differ from this technique:
– Electro-encephalography, or EEG, uses electrodes that must contact the skin and is limited to measuring the electric potential of the brain's tissue. EEG's disadvantage, when compared to biomagnetrometry, is that it requires electrodes, said CTG president Maxwell Burbank. The measurements are affected by the brain tissue and surrounding bone and skin.

The ability of an EEG to provide brain function data is correspondingly limited, because it provides less specific information.
– The basic anatomy of the brain, and effects of disease on it, can be analyzed by several medical imaging technologies, such as X-rays, CAT scans and ultrasonics. But a problem can only be discovered if it results in changes to the structure of the brain.

In contrast to EEGs, the magnetoencephalography (MEG) technology employed by CTF's device allows for "accurate source localization of brain function in addition to providing an independent and uniquely characterized signal", Mr. Burbank said.

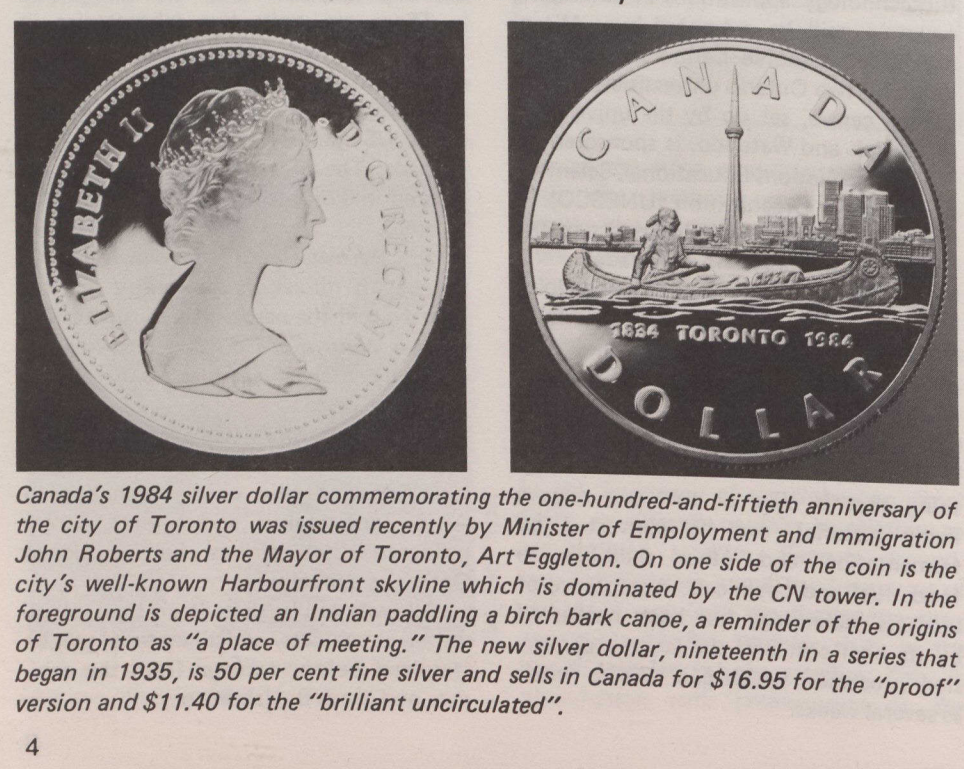
The benefits of MEG are twofold: it can be used to diagnose and localize disorders that may not produce anatomical distortions in the brain and it can be used by scientists to map the functions of the brain's regions.

"If systems in the brain responsible for regulating complex human responses can be accurately understood, then they can be predicted and utilized in human performance evaluation and diagnosing neural disorders," said Harold Weinberg, director of the MEG team at Simon Fraser's Brain Behaviour Laboratory.

CTF is one of only three companies in the world, and the only one in Canada, making the biomagnetometer. Its commercial application as a medical diagnostic tool has been limited by the lack of an easily manoeuvrable housing enabling it to take pinpoint measurements of the brain.

By combining the biomagnetometer with a gantry system and associated mapping and scanning technologies, CTF hopes to enter the medical imaging market.

## New silver dollar celebrates Toronto's anniversary




*Canada's 1984 silver dollar commemorating the one-hundred-and-fiftieth anniversary of the city of Toronto was issued recently by Minister of Employment and Immigration John Roberts and the Mayor of Toronto, Art Eggleton. On one side of the coin is the city's well-known Harbourfront skyline which is dominated by the CN tower. In the foreground is depicted an Indian paddling a birch bark canoe, a reminder of the origins of Toronto as "a place of meeting." The new silver dollar, nineteenth in a series that began in 1935, is 50 per cent fine silver and sells in Canada for $16.95 for the "proof" version and $11.40 for the "brilliant uncirculated".*

## Europeans invest in Ontario

Ontario's Industry and Trade Minister Frank Miller returned from Europe recently with at least three major manufacturing investments confirmed.

The projects – two joint ventures in the automotive industry and a direct investment in the steel sector – are expected to bring millions of dollars and hundreds of jobs to Ontario.

The deals confirmed by Mr. Miller are:
– O.S.B. Company S.A., a Belgian firm, will build a $12-million factory in the Brantford area, outside Toronto, to make forged steel rolls for the sheet metal industry, which is expected to be in production in 15 months.
– Société Anonyme des Usines Chausson, a French company, is going into partnership with Magna International Ltd. of Markham, Ontario, to establish an $8-million factory in the Toronto area making aluminum radiators for automobiles. The plant, to be in production in March 1985, will produce 350 000 radiators at first and up to 600 000 ultimately. Some of the output will go into North American products of Renault, which is a major shareholder of Chausson.
– Brown Boveri & Cie. of Heidelberg, West Germany, has entered a joint venture with an Ontario company to manufacture sodium-sulphur batteries for electric vehicles. The batteries, which function at 350 degrees Celsius, have four times the power by weight of conventional lead-acid batteries.

The minister visited Germany, France, Belgium and England in the course of a 16-day trade and investment promotion tour.