Nerves of glass, thoughts of light

The future of Canadian telecommunications may in no small way be determined by tiny glass fibres about the thickness of a hair.

These frail strands of glass may in the next few decades replace most of the traditional copper cable and wire which carry Canadian telecommunications signals. And these glass hairs will not be carrying those electrical pulses and waves which are the very stuff of electronic communications at present. They will be carrying pulses of light.

Canadian research into and development of optical fibres began in 1972. There are now three large fibre optics research centres and three important manufacturers of fibre optics equipment.

The equipment is already being used in a few Canadian telecommunications facilities. Optical fibres are being tested under real conditions in nearly every Canadian region for many different telecommunications applications.

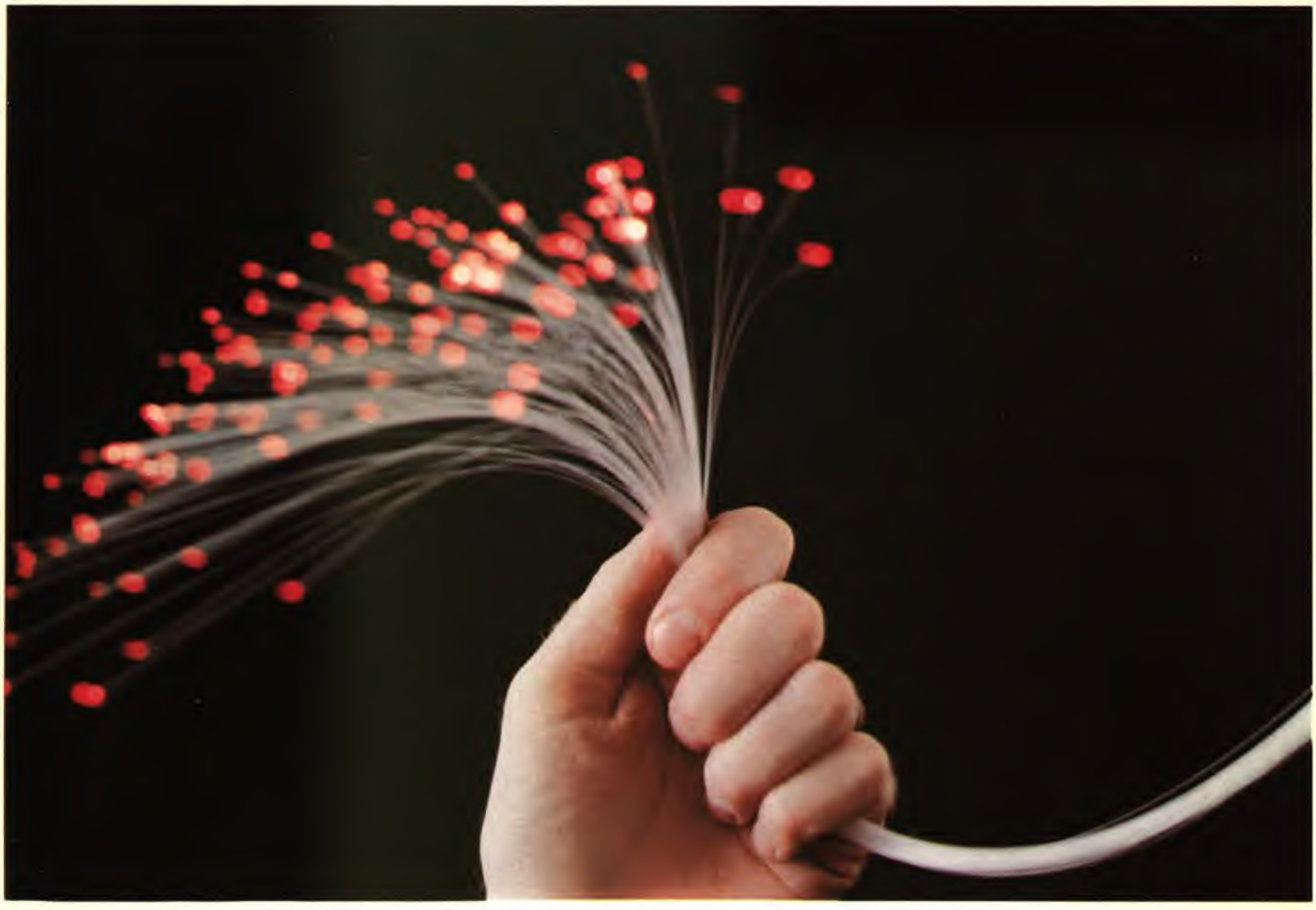
With Canadians so dependent upon telecommunications, existing transmission facilities may well become overloaded in the future. Already, the off-air radio-frequency spectrum is quite congested in many Canadian cities. Some Canadians have expressed concern that, with the burgeoning of telecommunications services in the future, their urban and rural areas will be transformed into a spider's web of copper wire and cable.

Optical fibres carrying light may solve the problem. Light is a form of electromagnetic energy with a much higher frequency – and, therefore, greater information-carrying capacity – than the electricity now used in our telecommunications systems.

A glass fibre carrying light can be much smaller in size than a copper cable carrying electricity. A few optical fibres can carry far more information or different kinds of telecommunications services than a copper cable, while occupying only a fraction of the space. The small size of fibres gives optical-transmission systems an unprecedented flexibility. The addition of another optical fibre to an existing system – with a resulting increase in information-carrying capacity or the number of telecommunications services available to users – does not require the excavations or large expenditures of time and money required for the installation of another copper wire or cable.

Optical transmission systems have other advantages. An optical fibre can carry a signal much farther than a copper wire or cable of equal capacity without equivalent loss of signal strength or fidelity. Most copper transmission lines require repeaters every 1.8 kilometres to amplify the signal; the comparable figure for optical fibres is from 10-12 kilometres.

Because optical fibres carry light rather than electricity, they are not subject to interference from lightning, high-tension lines, power surges or other communications systems. Their raw material is also not a potentially



Because optical fibres carry light pulses rather than electricity, they are not disrupted by lightning, power lines and the like. They are made of silica, a basic constituent of ordinary sand, which, unlike copper, is in great abundance.