

## COMPUTERS FOR THE BLIND

Each year an increasing number of blind persons are becoming economically self sufficient — thanks to the computer.

Hundreds of sightless persons have found employment in computer programming or related fields since the computer came into common commercial use. Most of these are in the United States, where an acute shortage of skilled personnel in a field which can be highly automated, so as to tie in with a blind person's abilities, has led several universities and at least six commercial schools to institute courses of instruction for the blind. The major computer companies have contributed by making their instruction manuals available in Braille.

The field of computer operation thus presents a rosy job-placement picture for the blind both in the U.S. and Canada, where progress has not been as swift as south of the border. However, the situation is improving in Canada and the University of Manitoba now offers a one-year course to train sightless persons as computer programmers. A dozen or so persons have been trained since the inception of the course in 1965.

### SPECIAL KITS

To date, most of the special instrumentation required by blind programmers has been provided by the major computer manufacturers. Conversion kits have been made available to produce Braille instead of print from computer printers. These kits can be installed or removed quickly and easily, and thus do not interfere with normal use of the facilities by other personnel. One company also makes a program available to convert their computer output to the condensed (Grade II) Braille code (i.e., instead of letter for letter translation). Special photocell devices have been designed to make it possible to read the lights on the instrument panel.

One aspect that has been somewhat neglected is the production of a device which will enable the blind programmer to read a single punched card at his desk. A type of single-card reader has been devised in the United States. The card is placed in a base plate and a slotted bar is moved along the base over detents at each of the 80 possible column positions; its position may be read by various markings on the edge of the base.

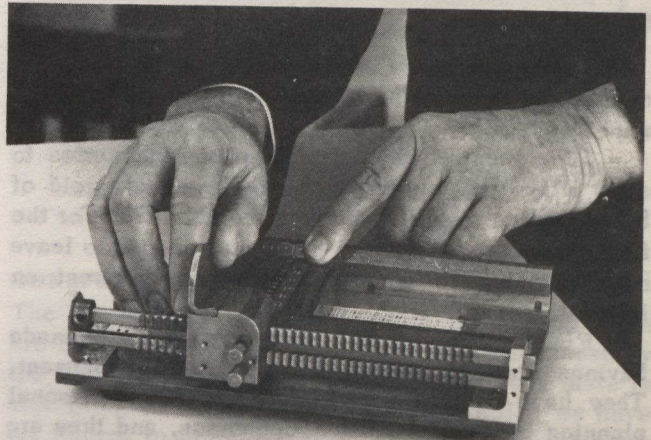
In each of the positions, the card is explored for holes by running a pin along the slot; when a hole is located its position is indicated by marks along the slot.

Although this method is quite successful when the locations are known and merely being confirmed, it is extremely tedious when each of the 960 possible hole locations must be explored, and it takes several minutes.

### NRC DEVICE

To assist blind programmers in their work, James Swail, 42, a blind electronics expert with the National Research Council of Canada, has devised a manually-operated reader for IBM punched cards.

With this device, the card is held in a base-plate and a carriage is moved manually along a track attached to the base. The edge of the plate carries a raised scale calibrated in Braille numbers from 0 to 80 to indicate the carriage's position in relation to the card. The carriage has a row of 12 pins which are normally flush with its top surface and a second Braille scale indicates the pin number.



*Blind programmer uses the new reader to scan a punched card in a matter of seconds.*

On the under side of this carriage is a corresponding row of 12 rollers which are connected to opposite ends of pivoted arms. The other ends of these arms drive the pins. The rollers are held against the surface of the card by spring tension and, due to the reversal action of the pivoted arms, the pins are caused to rise from their flush positions when the appropriate roller drops into a hole in the card.

Thus, when scanning a card for holes, the finger is held lightly against the surface of the carriage while it is moved along the length of the card. When a hole is found the appropriate pin rises, the carriage is stopped, and a reading of the location is taken from both raised scales. With this device a card may be scanned in a matter of a few seconds.

Mr. Swail took two years to design and build his reader. For the last few months he has been evaluating its operation in the hands of an upper-level blind-computer programmer.