

for such users as highway departments, trucking and construction firms, fire and ambulance services and police departments. A pocket radio signaller carried by a person temporarily leaving a telephone instrument area will indicate an incoming call requiring his attention.

Improvement and extension of local and long-distance telephone services continue to absorb the bulk of invested money and labour. However, the increasing mechanization of government and business operations and the resultant need to transmit large volumes of information at economical rates have led to the accelerated development of machine-to-machine communication. The growth of such communication in the past few years has been made possible to a large extent by the introduction of Data-Phone data sets which convert the electrical impulses from business machines into tone-signals acceptable to telephone circuits. A Data-Phone data set at the receiving business machine re-converts the tone-signals into machine language. Data-Phone service is now used in conjunction with a variety of business machines to send information from punched cards and from paper or magnetic tape.

Several optional services introduced recently provide great flexibility for machine-to-machine and voice calling over long distances. Wide Area Telephone Service extends a customer's flat-rate calling to telephones within seven progressively wider zones, the largest of which includes the whole of Canada. Telpak, a private line intercity service, is available to organizations which transmit large volumes of information requiring an exceptionally broad band of frequencies, such as data from advanced computers and high-speed facsimile equipment. It may also be used to carry simultaneously many smaller loads of information, such as voice calls and teletypewriter messages, which require relatively narrow bands of frequencies.

In 1963, the scope and value of Dial Teletypewriter Exchange Service was enhanced when arrangements were made to interconnect TWX subscribers in Canada with TWX users in the United States. This makes it possible for 60,000 TWX users to exchange typewritten information and certain low-speed data over the regular telephone network. Handwritten messages or sketches can be transmitted over private lines, or over the regular telephone network, in conjunction with Data-Phone data sets. The industry also offers an electronic facsimile service which transmits and receives letter-size handwritten or printed messages, charts or drawings over the regular network or private lines.

A recent product of Canadian telephone research which has been quickly accepted by business customers is known as Business Interphone, a versatile, hands-free intercommunication system and regular telephone service in a single instrument. Centrex, designed for large private telephone systems, permits incoming calls to be dialed straight through to an extension without being relayed at the switchboard of private branch exchanges. A complete intercommunication system is available for use in the home and in small businesses. A special type of telephone has been introduced for hard-of-hearing users. Another new service is an automatic dialer which can retain up to 290 telephone numbers in its electronic memory. Canadian telephone research laboratories are working on basic research in such fields as electronic circuitry, microminiaturization, solid state physics and ferrites. Applied research has concentrated on meeting the needs of Canadian subscribers for modern data communication and telephone service. Touch-tone service, featuring a telephone with push-buttons instead of a dial, was introduced in four communities in 1964.

The northward extension of industry in Canada has, of course, required the northward expansion of telephone communications. The British Columbia Telephone Company operates a tropospheric scatter system from Port Hardy to Annette Island. Alberta Government Telephones, in conjunction with Saskatchewan Government Telephones, operates a tropospheric scatter transmission system from Uranium City in Saskatchewan to Fort Smith in the Northwest Territories. In Manitoba, radiotelephone service reaches out to a large number of isolated settlements and bush camps and provides communication for aircraft and for boats plying Lake Winnipeg. In northern and northwestern Ontario, Fringe Radio Service extends telephone communication beyond wire and cable facilities. A radio unit on the customer's premises permits two-way calling between subscribers in