

In 1949, the Trans-Canada Telephone System acquired a new member, the Canadian Overseas Telecommunication Corporation (COTC), a Crown Corporation established to assume control and operation of all *overseas* communications involving Canada. The COTC operates the Canadian terminals of overseas circuits and is a partner with appropriate foreign administrations in the construction and operation of the necessary transmission facilities such as trans-oceanic cables (see pp. 873-874).

The need for co-operation between operating agencies extends from the national to the international sphere. Following the setting up of the International Telegraph Convention of 1865 and the International Radio Telegraph Convention of 1906, the International Telegraph Union was formed because, in its own words, "telecommunications could span vast distances, but not national boundaries" That Union grew into the International Telecommunication Union (ITU), with headquarters in Geneva, and is the recognized special agency of the United Nations in all matters related to telecommunications.

The Canadian telecommunications industry participates actively in the affairs of the ITU, which include the planned development of international circuits, the study of related technical and operating problems and also assistance to developing countries (see also p. 174). The Telephone Association of Canada and the telecommunications departments of the railways have membership as operating companies. Most of the Canadian manufacturers of telecommunications equipment, in whose laboratories originate the new devices and technology, have joined the ITU as scientific members. This massive contribution from Canadian industry is co-ordinated by the Department of Transport, which is the senior government regulatory body for telecommunications in Canada and is naturally the official voice of Canada in the ratification of international commitments.

In commenting on the people and organizations involved in telecommunications it should be mentioned that the industry, in operating and manufacturing, employs more than 100,000 people and directly supports over 400,000 people, which is about 2 p.c. of the total population of Canada.

### Recent Developments

It is apparent that the rate of telecommunications development has been accelerating, particularly over the past 15 years, and the contributing factors are undoubtedly the increase in population coupled with rising standards of living, the need to communicate leading to the information explosion, and advances in the art of telecommunications itself.

It is interesting to note that many recent technological advances, such as communication via satellites and Pulse Code Modulation, were predicted and reasonably well understood more than 20 years ago but the necessary components were lacking. This situation changed when a completely new generation of components was introduced in the 1950s, stemming from the invention of the transistor at the Bell Laboratories in 1948. At first, transistors were produced as individual components and were smaller, cheaper, more reliable and dissipated less heat than the electron tubes they replaced. But further developments came rapidly as manufacturers around the world saw the many advantages of the new devices. The single transistor gave way to integrated and thin film circuits produced by micro-photography. From a wafer-thin slice of silicon the size of a 25-cent piece, about 600 Monolithic Integrated Circuits can be made, each containing perhaps a hundred components. Theoretically, 9,000 of these components, enough to make a modest computer, could be contained in a thimble. However, the mechanical problems of mounting and connecting the components and allowing for heat dissipation mean that the optimum packing density is beyond reach at the moment. Another point to note is that, contrary to previous experience, integrated circuits have proved to be cheaper and are more reliable than the equivalent individual components.