will amplify the former and reject the latter.   Third, PCM introduces the principle of Time Division Multiplexing as an alternative to Frequency Division Multiplexing.   Fourth, and perhaps most important, the rapid sampling of different voice circuits with PCM is really a form of electronic switching.   Switching and transmission have now become integrated rather than closely related disciplines.

Telecommunications in Transition

The previous paragraphs have covered various aspects of the changing role of telecommunications in Canada and elsewhere in the world and indicated that developments are now coming at a prodigious rate.   The industry has entered the most dramatic period of transition of its existence, both in its impact on the lives of all of us and in its own composition.   It is no longer possible to think of telecommunications merely in terms of telegrams and telephone calls when the existing networks are already carrying data, drawings and television.   Telecommunications today must be defined as "the electrical transmission of intelligence" and its potential impact is still a matter of speculation, although recent applications may give some clues.

In our homes and at work we are aware of a more flexible, personalized and capable telephone service and this trend will certainly continue as new developments become available.   The transmission of data and pictures is already revolutionizing many aspects of business including inventory control, the scheduling and loading of transportation facilities and discussions between suppliers and customers of technical specifications. Some firms have used private voice-video facilities to conduct personnel interviews where long distances separated the participants.   But it may well be that the new telecommunications will have its greatest impact in the field of education.   Regular television programs have included educational material for many years and the soundness of the techniques has been demonstrated in many countries.   More recently, lectures without pictures were conducted over regular telephone lines and it was found that lecturers and students adapted rapidly to the changed environment.   For many subjects the "tele-lecture" has proved to be more effective than one-way television because the student can participate over the telephone circuit.   An ambitious Canadian venture in this field is being conducted jointly by the University of Saskatchewan and Saskatchewan Government Telephones.   An instructor in Regina lectures in mathematics to classes in several other cities.   His notes and sketches are also transmitted via a Visual Electronic Remote Blackboard (VERB) and projected onto screens in the classrooms.

The impact of telecommunications on education will also affect adults.   Many jobs are disappearing and people have to be re-trained for completely new work.   Other jobs have been altered by technological advances so that the educational requirements to perform the jobs satisfactorily have also changed.   This applies not only to professional employment but also to the so-called "unskilled" workers.   Although all levels of government are becoming increasingly involved in this type of re-training and education, much of the responsibility for it falls on industry.

Today there is more need for education of all kinds but at the same time there is a shortage of teachers.   Telecommunications is one possible solution that has attracted the attention of many companies and individual teachers, scientists and engineers.   The man-machine interface is being studied.   Even the learning process itself has been re-examined and this has lead to programmed learning and teaching machines.

Society's present methods of storing information for reference purposes in libraries, in correspondence files and in technical drawings are also being challenged. What can be stored on paper can also be stored electronically, regardless of whether the information consists of business records or is of a purely educational nature.   The combination of modern computers and telecommunications make the storage, retrieval and processing of information at large centralized information centres easy and convenient.   Computer time