PART V
DWDM CURRENT ISSUES AND RESEARCH

Dense wavelength division multiplexing (DWDM) is a technology that promises to increase the bandwidth per fiber as the bit rate and the number of wavelengths increase. DWDM systems and networks are applicable in long-haul applications, in metropolitan and local-area networks, and in access networks. Systems with 40, 80, and 120 wavelengths exist, and at 10 Gb/s (or 40 Gb/s) per channel, their total bandwidth is at an amazing 400 Gb/s, 800 Gb/s, and 1.2 Tb/s, respectively. A bandwidth at 1 Tb/s could transmit the contents of most volumes of the largest library in only 1 second. In addition, DWDM promises long fiber spans ($\geq$100 km) without amplification. The significance of this is obvious if one considers that for every 40 km, a synchronous optical network (SONET) repeater, for example, may cost thousands of dollars per fiber, in addition to maintenance cost. Figure V.1 illustrates some DWDM experiments, giving the number of channels used, the total bandwidth, and fiber span, and the type of amplifier used. In addition, experiments have been conducted by various groups and consortia such as the "All-Optical Networking Consortium"

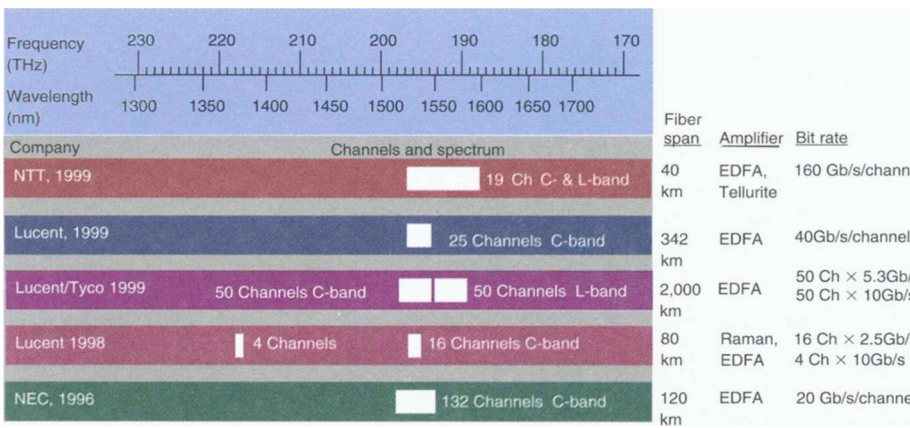

Figure V.1 DWDM experiments.

(www.ll.mit.edu/con), MONET (www.bell-labs.com/project/MONET), MTONC (www.ntonc.org), ACTS (www.intec.rug.ac.be.horizon/photonic/html), and Columbia University Lightwave Group (www.ctr.columbia.edu/~georgios/lightwave.html). Reports of transmitting over longer distances, more bandwidth and more wavelengths in a fiber are news items that do not go unnoticed.