In Figure 7.13 are shown profiles along Section A-A' for all four runs. The retarding effect of recharge on dewatering may be seen by comparing Run A with Run B and Run C with Run D. In evaluating the magnitude of the effect of lateral infiltration and recharge in the four cases, it should be noted that at a pumping rate of 0.5 feet per year in the project area, if no lateral infiltration or recharge occurred, the depth to the water table after 20 years would be $0.5(20)/0.25 = 40$ feet. With the higher pumping rate of 1.5 feet per year, the depth would be 120 feet. At the end of the twenty-year pumping period in all four runs the entire project area has water table depths larger than 10 feet which is approximately the depth required to halt the salt build-up process. In Run B, however, this has just occurred and so for this low rate of pumping it may be concluded that it would take at least a decade to eliminate waterlogging and to stop salination.

The large figure of 500,000 gpd/ft for transmissibility was selected to investigate the effects of high rates of lateral inflow, and thereby to determine what the worst effects might be in sites with high soil permeability. The results for Run D indicate that a satisfactory rate of lowering of the ground water table can be achieved with the pumping rates and the size of project areas recommended in our plan, even in areas with heavy recharge from rivers or large canals, and with permeable soils. Lateral infiltration into the project area would not be sufficient to inhibit agricultural production. Further investigations of lateral infiltration and the optimal size of project area are reported in a following section "Digital Computer Simulation of the Hydro-Agronomic Regime."

Problems in Regions Having Excessive Salinity in Soil and Ground Water

Of the total of 30 million acres of culturable land in the north Indus Plain, regions of extensive salinity damage, including areas of poor drainage, occupy about 7 million acres. The salt in the upper part of the soil profile which impairs agricultural productivity derives from three sources: (i) salt existing in the soil before the irrigation era; (ii) salt left as a residue in the upper layers of the soil from the evaporation of thinly applied irrigation water with no through-put to the water table; and (iii) salt residues from the evaporation of ground water in areas where the water table is near the ground surface. In discussing the problems of salinity management, it is worthwhile first to form rough estimates of the relative importance of these sources by calculating for a typical situation the contribution made by each in poorly drained farmlands that have been irrigated for say thirty years.

(i) From salt originally in the soil. Assume that the original salt concentration in the soil was less than 0.1 percent; this corresponds to concentrations of less than 2 tons per acre foot.