At the present time, with a quasi-equilibrium obtaining between evapotranspiration, recharge, and drainage, an exact water balance cannot be struck. We shall later present an estimated balance, calculated from our mathematical model for computer simulation, which incorporates the effect on the water table of canal leakage, irrigation, rainfall, evapotranspiration, pumping, and drainage. The model was calibrated so as to reproduce the historic rise and stabilization process.

Since it is not possible to delimit precisely the present rate of recharge of the ground water and the potential for recharge in the future, and since this is an important feature of the water economy of West Pakistan, it is relevant to discuss briefly some of the factors that have operated in the past and will affect future development.

1. Canals and waterways usually leak at much greater rates when they are new than when they are old. After 10 or 15 years a canal becomes "aged". With the passage of time, silts and mineral and organic colloids tend to clog the pores in the soil surrounding the canal, thus slowing down the rate of infiltration. Cleaning destroys this seal; hence, canals leak at greater rates after cleaning. Cleaning may be accomplished by dredging or by operating the canals with water flowing at sufficiently high velocities to cause scouring of the bottom deposits.

2. Movement of water from the canal to the water table may be controlled either by the permeability of the canal boundary or by the rate at which the water can move through the aquifer itself. The latter is affected by the following factors:

   (a) Permeability of the aquifer: Permeability has directional characteristics. In alluvial formations it is greater for horizontal movement than for downward. Horizontal lenses of material of low permeability, such as clays, have little influence on the lateral movement of water, but will greatly slow its downward movement. The permeability of a saturated aquifer is a permanent characteristic, and changes slowly, or not at all.

   (b) Degree of saturation of the aquifer: When leakage from a canal first begins into an unsaturated soil, the initial rapid downward movement is controlled by capillarity and in some cases by entrapped air. As the soil moisture content approaches saturation, the flow is controlled by the permeability of the soil.