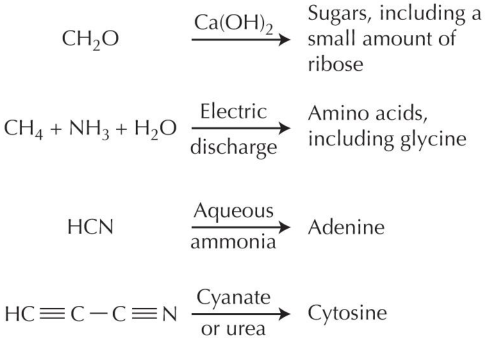

FIGURE 4.8. Schematic diagram of pathways for the synthesis of some key molecules required for the origin of life. Formaldehyde (CH_2O) can polymerize to produce various sugars (i.e., the formose reaction; Fig. 4.7). This polymerization is aided by the availability of reactive groups like $Ca(OH)_2$. Methane (CH_4), ammonia (NH_3), and water (H_2O) if mixed in the presence of electrical discharges (in Miller–Urey-like settings) can lead to the production of amino acids (and other compounds). Hydrogen cyanide (HCN) when in the presence of aqueous ammonia can produce adenine. Finally cytosine can be produced from cyanoacetylene when mixed with urea.