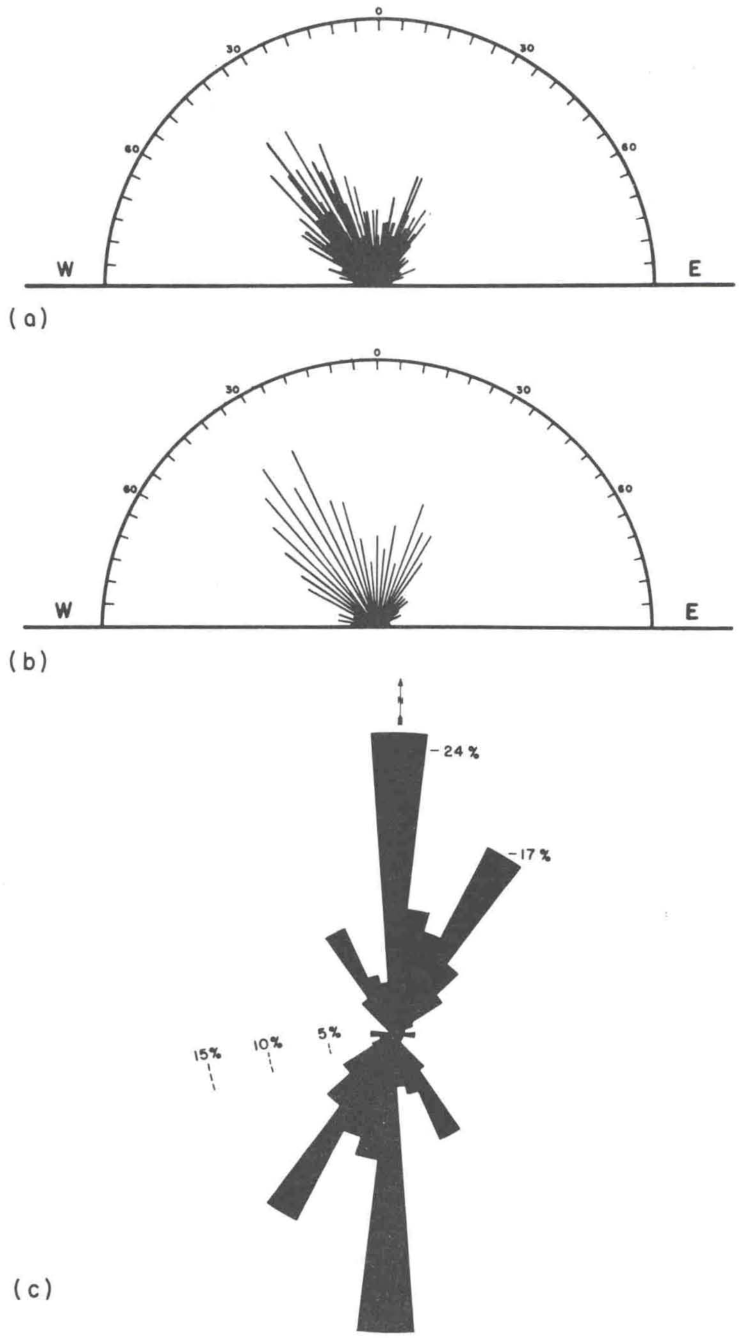

Fig. 18—Fault-strike frequency diagrams for areas in the Great Basin of western United States. (a) Strikes of 625 faults or fault segments plotted at 1-degree intervals. Radius of diagram equals 18 faults or fault segments. (b) Same data replotted for 5-degree class intervals. Radius of diagram equals 62 faults or fault segments (from Donath, Ref. 86, Fig. 4). (c) Strikes of 410 range-edges in over 50,000 sq mi in Nevada, as measured from 1:250,000 USGS topographic sheets (from Conger, Ref. 91).

these are delineated by faults, Conger[91] compiled the trends of 410 segments (Fig. 18(c)). North-south, N-30°-E, and N-30°-W trends are prominent, and comparison with Fig. 8(a) suggests a north-south greatest principal stress and an east-west least principal stress. Donath's explanation would seem to apply to Conger's data, with the exception that the initial movement on Conger's north-south set would have to have been normal to the walls of the fracture. The same stress orientations derived from these faults are also appropriate for the right-lateral strike-slip movement associated with the San Andreas wrench fault system in California.

The consistent fracture fault patterns in Oklahoma and in the Great Basin serve to illustrate that macroscopically uniform states of stress can be transmitted through large portions of the earth's crust.

Intracrystalline Gliding

General. Intracrystalline gliding flow (the "plastic" flow of metallurgy) takes place by the relative displacement of atomic or ionic layers over one another. The true nature of gliding seems to have been first recognized by Reusch[92] in halite and calcite. During the late nineteenth and early twentieth centuries mineralogists worked out the morphology of most of the known gliding systems. Since then metallurgists have much improved our physical understanding of the gliding (= slip) process.

In gliding, the strain can be regarded as a simple shear with no volume change. Displacement is restricted to a gliding (or slip) plane (T), a definite gliding direction (t) within that plane, and sometimes to a particular sense of shear parallel to the gliding line. These constitute the gliding system, which is determined by the crystal structure and is independent of the loading condition. Gliding is initiated when the shear stress along t exceeds some critical value (τ_c), which is essentially independent of the normal stress across the gliding plane[93-95] and of the orientation of the load relative to the gliding system. Accordingly in an aggregate or in a single crystal, gliding takes place most readily for systems of low τ_c and high resolved shear stress coefficient (S_o). (See Fig. 19.)