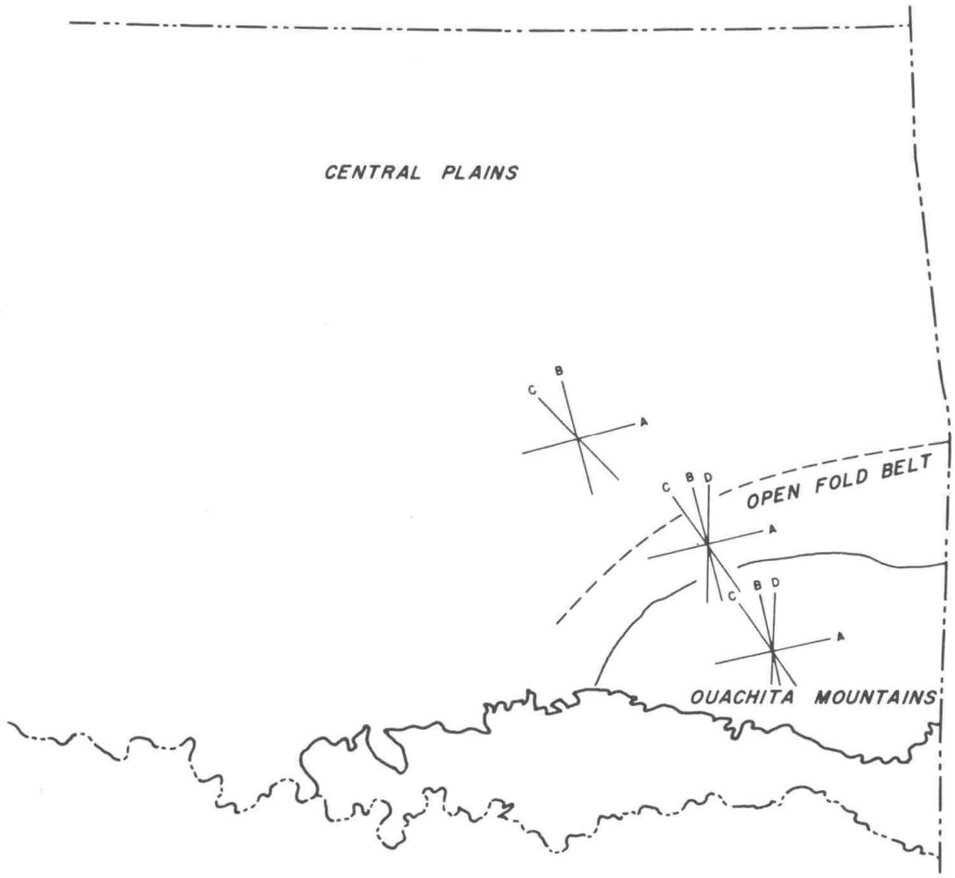

Fig. 17—The average fracture patterns in the Central Plains, Open Fold zone, and Ouachita Mountains (obtained from Melton, Ref. 87, Figs. 6, 8, and 10, respectively).

all four sets are rarely developed at any one station. Moreover, the pattern tends to rotate with the change in strike of the beds in the Ouachita Mountains and Open Fold zone. Each set is oriented normal to bedding. When beds in the Ouachita Mountains and Open Fold zone are unfolded, the fracture-fault sets become congruent with those in the Central Plains. Sets A and B (Fig. 17) intersect at 90 degrees. Sets C and D intersect at about 40 degrees and are about equally disposed on either side of set B. Set C is the best developed of the four. The configurations of sets B, C, and D suggest that they represent an extension fracture and two conjugate shear fractures, respectively. From this pattern, σ_1 is placed horizontal and everywhere normal to the strike of the Ouachita Mountain trend, σ_2 is vertical (normal to bedding), and σ_3 is horizontal and normal to σ_1.* The fourth element of the pattern (set A) needs further explanation. In the Ouachita Mountains and Open Fold zone it tends to parallel the strike of the beds (Ref. 87, p. 741) and therefore occupies an orientation similar to that of the often mentioned "tension" fractures that develop during folding (Fig. 8(c), and Ref. 80, p. 100; Ref. 82, p. 185; Ref. 88, p. 150; Ref. 89, p. 102; and Ref. 90, p. 118). It is unreasonable to extend this explanation for set A into the unfolded strata of the Central Plains. In the writer's view set A is there a relaxation fracture (Fig. 8(b)), i.e., an extension (or tensile) fracture formed upon release of stored elastic strain energy. Finally, the belts of en echelon faults (Fig. 15) are interpreted as near surface features related to wrench faults at depth, which would be left-lateral and would trend N-10-15°-E. The principal stress directions derived from these wrench faults are in good agreement with those derived from the regional joint pattern. It is significant that the fracture-fault pattern giving rise to these dynamic interpretations extends more than 100 mi into the Central Plains from the Ouachita Mountains.

An even-larger-scale example is afforded by the fault trends in the Great Basin of the western United States. Donath[86] compiled fault-strike frequency diagrams (Figs. 18(a) and 18(b)) for a 420-sq-mi area in south-central Oregon. The faults tend to strike in two main directions (N-35°-W and N-20°-E). The evidence indicates that the first movement on these faults was strike-slip and that this was followed by dip-slip displacement. Donath (Ref. 86, p. 1) states "... the intersection angle of approximately 55° and the nearly vertical dips indicate that the faults originally developed as conjugate strike-slip shears in a stress system characterized by a north-south maximum principal stress and an east-west minimum principal stress." The subsequent dip-slip movements on these planes reflect a redistribution of the surface forces acting on the individual fault blocks.

This same fabric is even more strikingly demonstrated by range-edge trends in a 50,000-sq-mi area in Nevada. On the assumption that

---

*Dynamic inferences by Friedman.