locations). Alteration in the Meers area is most likely due to the Mount Sheridan Gabbro Member of the Roosevelt Gabbros, although the Mount Scott Granite cannot be discounted. In the wildlife refuge occurrence, the cause of alteration is not immediately obvious, but Mount Scott Granite and (or) Quanah Granite are the most likely agents (fig. 2).

Similar rocks occur in association with the Glen Creek Gabbro in the Glen Mountains. Such textures are found here in the Glen Creek Gabbro itself, next to small granitic intrusions, and also in rocks that *may* belong to the Glen Mountains Layered Complex (uncertain at present). In the latter case, the Glen Creek Gabbro could have been responsible for the alteration, although this interpretation is problematic because elsewhere the Glen Creek Gabbro exhibits sharp intrusive contacts against the older Glen Mountains Layered Complex, with no visible alteration in the latter.

Clearly, alteration in the Wichita province is complex and arises from more than one source. Such a situation should be expected, of course, where multiple magmatic episodes have occurred. An important caveat offered here is that similar (but not necessarily identical) alteration processes acting on similar (but not necessarily identical) precursor rock types can produce very similar results. This must be borne in mind when mapping in complex magmatic terranes like the Wichita Mountains. A definitive study of alteration—genetic as well as descriptive and focused on causes and effects—in the Wichita province would be very challenging, with excellent prospects for important contributions.

One must also be aware in studying Wichita geology that various "intermediate" rocks in contact zones between basic rocks of the Raggedy Mountain Gabbro Group and the Wichita Granite probably have a variety of origins with different detailed pet-

TABLE 29.—REPRESENTATIVE PYROXENE COMPOSITIONS FROM SANDY CREEK GABBRO

(Microprobe analyses in weight %)

	1	2	3	4	5	6	7	8
SiO_2	51.6	55.1	50.0	53.6	52.5	52.9	52.9	51.9
TiO_2	1.48	0.48	1.29	0.04	0.34	0.40	0.22	0.29
Al_2O_3	3.78	1.31	3.48	0.96	1.05	0.81	0.61	0.55
FeO*	9.25	16.4	10.2	19.4	11.5	24.7	12.8	27.2
MnO	0.25	0.44	0.22	0.46	N.D.	N.D.	N.D.	N.D.
MgO	15.7	23.4	14.3	25.5	12.9	19.8	13.0	18.4
CaO	18.4	1.63	20.1	0.63	21.3	1.60	20.1	1.44
Na_2O	N.D.	N.D.	0.21	0.00	0.23	0.19	0.36	0.00
Total	100.46	98.76	99.80	100.59	99.82	100.40	99.99	99.78
Wo (mol %)	38.8	3.5	42.0	1.2	44.1	3.3	41.8	3.0
En (mol %)	46.0	69.3	41.4	69.2	37.3	56.9	37.5	53.5
Fs (mol %)	15.2	27.2	16.6	29.6	18.6	39.8	20.7	44.0
Atomic Mg/(Mg+Fe)	0.752	0.718	0.714	0.700	0.667	0.589	0.644	0.547
*Average Mg/(Mg+Fe)	0.757	0.726	0.751	0.708	0.669	0.595	0.641	0.561

*Note: Averages are for several grains in the indicated sample. Total Fe is expressed as FeO.

Samples:

1. Augite, olivine-gabbro, NE¼NW¼ sec. 9, T. 3 N., R. 15 W., Comanche County (WM-152).
2. Bronzite coexisting with augite no. 1 this table (WM-152).
3. Augite, olivine-gabbro, SE¼NE¼ sec. 4, T. 3 N., R. 15 W., Comanche County (WM-309).
4. Bronzite coexisting with augite no. 3 this table (WM-309).
5. Augite, gabbro with neither olivine nor quartz, SE¼NW¼ sec. 3, T. 3 N., R. 15 W., Comanche County (WM-359).
6. Hypersthene coexisting with augite no. 5 this table (WM-359).
7. Augite, gabbro with "granophyre" in the mesostasis, SW¼NE¼ sec. 3, T. 3 N., R. 15 W., Comanche County (WM-360).
8. Hypersthene coexisting with augite no. 7 this table (WM-360).