The chemical characteristics of the sectors are as follows: [001] has relatively high Al and relative low Si, Ti, and Mg (analysis 1); [010] and [110] have relatively low Al and relatively high Si, Ti, and Mg (analyses 2 and 3). [110] differs from [010] in having Ti increase continuously from the center to the edge, whereas in [010] (and [001]) Ti is nearly constant throughout the sector. Mg decreases from center to edge, and Al, Si, and Fe are nearly constant within each sector. The [010] sector has higher optical absorption than [110] and [010]. Trace amounts of Cr are present at the edge of the [010] sector but nowhere else in the crystal. The analyses are based on correction factors of Bence and Albee.

	#1 [001] sector	#2 [010] sector	#3 [110] sector
SiO_2	25.96	27.66	27.50
TiO_2	0.32	0.64	0.46
Al_2O_3	55.93	53.57	53.82
FeO	14.07	13.98	13.84
MnO	0.19	0.17	0.16
MgO	1.99	2.11	2.13
ZnO	0.2	0.2	0.2
Total weight % (less H_2O)	98.66	98.33	98.11

Several important petrologic conclusions can be made from the observations: (1) crystallographic growth directions in a rock-forming mineral, even in a metamorphic environment, can produce compositional differences within a single crystal. (2) Si–Al substitution in the tetrahedral site is present. (3) Charge inconsistencies between one sector and another suggest that hydrogen may also be sector-zoned in the staurolite.

Analyses of other staurolite crystals from the Kwoiek area and at least one staurolite crystal from New Hampshire indicate the observed compositional phenomenon is not unique to the investigated crystal. Similar sector zoning has aso been recognized in andalusite from the Kwoiek area.

BERYLLIUM IN A GRANITISATION CYCLE

C. J. HUGHES

Department of Geology, Memorial University, St. John's, Newfoundland

During prospecting of berylliferous pegmatites near a granite contact, analytical determination of Be was extended from ore to country rocks, granites, pegmatites, and pegmatite minerals. Granite contained 2¾ ppm Be. Country rock schist—greywackes, siltstones, and shales metamorphosed up to staurolite grade—contained 5 ppm Be. Both schist and granite Be contents varied within narrow limits only. However, the granite, a late-orogenic concordant batholith, is itself composed in large part of granitised schist from the same formation as the country rock schist. The problem of what happened to half of the Be content leads to the idea of a "balance sheet". Complementary higher values of Be up to 12 ppm are found in several relatively small discordant granite, bosses (not included in the average granite) and values up to several hundred ppm Be in the berylliferous pegmatites. Abundant pegmatites near the granite-schist contact are simple in their mineralogy and contain around 5 ppm Be. In the rarer complex pegmatites farther away from the granite contact, Be was concentrated both in silicate melt and succeeding metasomatising solutions. Only in beryl-bearing pegmatites is the content of Be in other minerals, particularly muscovite and albite, significantly increased—a feature that can be utilized in reconnaissance exploration. Further work of the type outlined in this paper could usefully be done on other elements to extend the "granitisation balance sheet".