b. Fe^{3+}: *a* and *d* sites

See the numerous examples in Tables 3—5 and throughout th survey.

c. Fe^{4+}: *d* sites [91]

$\{Y_{2.9}Ca_{0.1}\}[Fe_2](Fe^{3+}_{2.9}Fe^{4+}_{0.1})O_{12}$ [45] $a = 12.378$ Å

Magnetic measurements have not as yet been made on th material. The formula is written in accord with the Tcherne paper.

32. Ru^{4+}: probably *a* sites

$\{Y_{2.8}Ca_{0.2}\}[Ru_{0.2}Fe_{1.8}](Fe_3)O_{12}$ [82] $a = 12.383$ Å

33a. Co^{2+}: *c*, *a* and *d* sites

$\{MnGd_2\}[CoMn](Ge_3)O_{12}$ [43]	$a = 12.437$ Å
$\{CoGd_2\}[Co_2](Ge_3)O_{12}$ [43]	12.402
$\{CoY_2\}[Co_2](Ge_3)O_{12}$ [43]	12.300
$\{Gd_3\}[Co_2](GaGe_2)O_{12}$ [43]	12.446
$\{Ca_3\}ZrCoGe_3O_{12}$	12.54 [43], 12.528 [45]
$\{Ca_3\}[SnCo](Ge_3)O_{12}$ [43]	12.47
$Y_2MgCo_2Ge_3O_{12}$ [95]	12.23
$\{CaY_2\}[Co_2](Ge_3)O_{12}$ [95]	12.35
$\{Ca_3\}[Zr_{0.4}Sc_{1.6}](Co_{0.2}Ge_{2.8})O_{12}$ [45]	12.533
$\{Y_3\}Fe_{5-2x}Co_xSi_xO_{12}$ [96,97]	
$\{Y_3\}Fe_{5-2x}Co_xGe_xO_{12}$ [97]	

See also 1, 16, Table 3, and discussion section on ionic-si preference.

b. Co^{3+} *a* and *d* sites

$\{Ca_3\}[Sc_{1.8}Co_{0.2}](Ge_3)O_{12}$ [45]	$a = 12.501$ Å
$\{Ca_3\}[Sc_{1.8}Zr_{0.2}](Co_{0.2}Ge_{2.8})O_{12}$ [45]	12.518

[94] D. I. TCHERNEV, Frequency-dependent anisotropy in Si- and Co-dop YIG and LuIG. J. Appl. Physics 37 (1966) 1318—1320. See also D. L. WOOD a J. P. REMEIKA, Optical transparency of rare-earth iron garnets. J. Ap Physics 37 (1966) 1232—1233.

[95] D. REINEN, Die Lichtabsorption des Co^{2+} und Ni^{2+} in oxidischen Fe körpern mit Granatstruktur I. Z. anorg. allg. Chem. 327 (1964) 238—252.

[96] S. GELLER, H. J. WILLIAMS, R. C. SHERWOOD and G. P. ESPINOSA, Su stitutions of divalent transition metal ions in yttrium iron garnet. J. Ap Physics 33 (1962) 1195—1196.

[97] S. GELLER, H. J. WILLIAMS, G. P. ESPINOSA and R. C. SHERWOOD, Su stitution of divalent cobalt in yttrium iron garnet. Physic. Rev. 136 (19 A1650—A1656.

After calcining these specimens for half an hour at 1215 °C in oxygen, the first was fired at 1200 °C for 24 hours in O_2 then quenched. The second was fired at 1220 °C for 2 hours in O_2, then reground, recompacted and refired at 1225 °C for 16 hours in O_2. The first specimen, i.e. with the Co^{3+} ions presumably in octahedral sites is canary yellow; the second is yellow-green.

34. Rh^{3+}: *a* sites

See Table 4 for end-members.

35. Ni^{2}: *a* sites

$\{MnGd_2\}[MnNi](Ge_2)O_{12}$ [43]	$a = 12.413$ Å
$\{Gd_3\}[Ni_2](GaGe_2)O_{12}$ [43]	12.401
$\{Ca_3\}[ZrNi](Ge_3)O_{12}$ [43,45]	12.50
$\{Y_3\}[Fe_{2-x}Ni_x](Fe_{3-x}Si_x)O_{12}$ [55]	
$\{Y_3\}[Fe_{2-x}Ni_x](Fe_{3-x}Ge_x)O_{12}$ [55]	

See also 1 and 16.

Note: Wherever a system is given in the above survey, lattice constants for various compositions are given in the references.

Ionic site preference

In our earlier work on the garnets, it *appeared* that the octahedral and tetrahedral sites preferred cations with spherical or pseudospherical ground-state electronic configurations. I should emphasize that we did not assert this rule; rather we indicated that experiments designed to synthesize garnets with ions not satisfying this rule were unsuccessful. However, even though we were aware of the paper (see Ref. [8]), we somehow missed the synthesis by DURIF [74] of the garnet $\{NaCa_2\}[Cu_2](V_3)O_{12}$ in 1958. This alone would be enough to negate this rule because the Cu^{2+} ion has one of the largest Jahn-Teller distortions. But subsequently [55] we managed to replace a small amount of Fe^{3+} by Mn^{3+} ion in YFe garnet. Because it was only about 2% replacement, we could not be *absolutely* sure of it, even though the powder photograph indicated a single-phase material and the moment per formula unit was significantly higher than that of pure YFe garnet as it should have been.

More recently, garnets in which Mn^{3+} ions fill the *a* sites have been synthesized [17]. The Mn^{3+} ion, of course, is the other 3*d* ion with a very large Jahn-Teller distortion. Further, a silicate garnet (goldmanite)