neutron-diffraction techniques in the range $1.3 \leq x \leq 4.00$. T
authors obtain a P (our f_t) (which is the fraction of Ga^{3+} ions
tetrahedral sites) with $a \pm \Delta$ where Δ is only a probable error. If th
are using the proper terminology, their Δ is $0.6745\ \sigma$ which is at t
50% confidence level. Thus, all the probable errors should be mult
plied by 4.5 to obtain limits of error (i.e. for a 99% confidence leve
When this is done, the values $\pm$ 0.06 become $\pm$ 0.27; 0.03 becom
0.14 and 0.02 becomes 0.09. This says that the methods give, at be
compatibility with our results.

Even if the probable errors were the actual limits of error, let
see what this would mean as far as the 0°K magnetic moment
concerned. Consider the garnet with the authors' c (our x) = 2.
They get $f_t = 0.80 \pm 0.03$ (it should be 0.80 ± 0.14). For the low
value 0.77 the garnet formula is

$$\{Y_3\}[Fe_{1.54}Ga_{0.46}](Fe_{1.46}Ga_{1.54})O_{12}$$

while for the upper limit 0.83, it is

$$\{Y_3\}[Fe_{1.66}Ga_{0.34}](Fe_{1.34}Ga_{1.66})O_{12}.$$

The 0°K moments for these, based on our model, would be $-0.$
and $-1.58\ \mu_B$, respectively, per formula unit. The difference
extremely large. For our specimen, we obtained a (nominally) 0°
moment of $-1.17\ \mu_B$ from which we arrive at an f_t of 0.805. But wh
the agreement of the authors' average value, 0.80, with ours, 0.80
is very good, the confidence in their value is very low indeed. Th
have only a 50% probability that f_t will lie between 0.77 and 0.
and that the expected 0°K moment per formula unit will be betwe
-0.60 and $-1.58\ \mu_B$.

The average values of f_t obtained by FISCHER *et al.* for $x = 2.5$ a
3.0 are not in agreement with our values. Because the limits of err
on the FISCHER *et al.* values are so high, there is no point in discussi
these differences further. I will assert that powder-diffraction metho
are unsuitable to make a physically significant determination of t
distribution of cations in the system $Y_3Fe_{5-x}Ga_xO_{12}$. I am skepti
of the applicability to single crystals in this system, of the x-r
diffraction technique for ionic distribution determination, even
there were assurance that the composition were everywhere unifor

We can look at this in the following way. Take the case of $x =$
again: using the *limits of error* on the value of $f_t = 0.80$ found

FISCHER *et al.*, namely $\pm$ 0.14, we have for the low limit, average and
high limit formulas, respectively:

1) $\{Y_3\}[Fe_{1.32}Ga_{0.68}](Fe_{1.68}Ga_{1.32})O_{12}$
2) $\{Y_3\}[Fe_{1.60}Ga_{0.40}](Fe_{1.40}Ga_{1.60})O_{12}$
3) $\{Y_3\}[Fe_{1.88}Ga_{0.12}](Fe_{1.12}Ga_{1.88})O_{12}$.

Then the average Z per atom in octahedral and tetrahedral sites,
respectively, are:

	octahedral	tetrahedral
1)	25.04	25.64
2)	24.20	26.20
3)	23.36	26.76

The coherent x-rays "see" only these averages and these are fitted by
the least-squares calculation. These values, incidentally, will give
the largest differences; for higher $(\sin\theta)/\lambda$, the differences (neglecting
thermal motions) are smaller. Also, it should be kept in mind that
the first and third cases are for the *limits* of error not the probable error.

We must find the cases for which we would expect the largest
percentage differences in intensity. For the reflection 800, for example,
there would be no difference at all because all cations contribute
constructively to it. If the standard errors in the measurements were
uniform from specimen to specimen, then the authors' Table 3 indi-
cates a standard error of 15.5% in the intensity of this reflection and
a calculated difference from the observed intensity of 7.1%.

There are reflections to which $16a$, $8c$ and $8d$ site atoms contri-
bute. (The Y^{3+} ions in c sites make the same contribution to each of
the sums.) The sums are:

1) 894, 2) 885, 3) 876.

The *largest* difference corresponding to the range of 0.28 (not 0.06)
is only 18 electrons, about 2%. The oxygen contribution, if any,
would reduce or increase this value but probably not by much; so
the difference in intensity in this range is about 4%. There is no
measured value in Table 3 which has so small a standard error.

There are reflections to which the contributions are $+16f_a - 8f_d -$
$8f_c$. These give

1) 93, 2) 111, 3) 128.