by the Feynman graphs shown in Figure 3 and yield

$$Z_1 = 1 + \frac{g^2}{16\pi^2} \left(\frac{17}{6} - \frac{3\alpha}{2}\right) C_2(G) \ln\Lambda \tag{3.5}$$

A useful check on the above calculations is provided by the Ward-identity, Equation 2.10, which relates the vector meson and the ghost renormalization constants. The latter are much easier to calculate. The relevant graphs are shown in Figures 4 and 5 and result in

$$\tilde{Z}_3 = 1 + \frac{g^2}{16\pi^2} \left(\frac{3}{2} - \frac{\alpha}{2}\right) C_2(G) \ln\Lambda \tag{3.6}$$

$$\tilde{Z}_1 = 1 + \frac{g^2}{16\pi^2} (-\alpha) C_2(G) \ln\Lambda \tag{3.7}$$

The calculation of β and γ_v is then mere arithmetic. The result is:

$$\beta(g,\alpha) = -\frac{g^3}{16\pi^2} \frac{11}{3} C_2(G) + O(g^5) \tag{3.8}$$

$$\gamma_v(g,\alpha) = -\frac{g^2}{16\pi^2} \left(\frac{13}{3} - \alpha\right) C_2(G) \tag{3.9}$$

It is obvious from the above that for these gauge theories the origin is UV stable! If g^2 is small enough then the solution to 2.24 will approach zero, as $\frac{1}{t}$ for large t. We shall explore the consequences of this following the incorporation of fermions. We cannot provide a deeper understanding of why non-abelian gauge theories are so different from all other field theories in this respect. Perhaps the serious infrared singularities of Yang-Mills theories are reflected in the IR instability, and thus the UV stability of the origin.