For SU(3) singlet structure functions the analysis is more complicated,[5] and the results are weaker. Here one has contributions from the gluon operators in the light cone expansion. Their coefficients vanish to zeroth order in $\bar{g}$, but in order $\bar{g}^2$ we have to consider the graphs of Fig. 7. It turns out that only graph 7a gives a non vanishing contribution to $C_L^{(n)}$. In fact, the gluon contribution leads to

$$\frac{C_L^{(n)}(\text{gluon})}{C_2^{(n)}(\text{quark})} = \frac{\bar{g}^2}{16\pi^2} \cdot C_2(G) \cdot \frac{16}{(n+3)(n+4)} .$$

We see that for large n the gluon contributions are negligible compared to the purely quark contributions, Eq. (32). Thus the $\omega \to 1$ prediction of Eq. (34) applies for the singlet as well as the non singlet case. The $\omega \to \infty$ prediction is also unchanged, in form, but the coefficient K_1 is no longer determined.

V. CONCLUSIONS

Our discussion of deviations from scaling, for deep inelastic neutrino reactions in the context of asymptotically free theories, has been at two levels. Concerning the growth properties of the total ν and $\bar{\nu}$ cross sections, we could set lower and upper bounds without recourse to serious assumptions going beyond the basic features of asymptotic freedom. The bounds closely bracket a linear growth, so that in this respect deviations from scaling are predicted to be small.

In order to treat the structure functions in more detail, and thereby the differential cross sections, we had to invoke uniformity