zero from above as $P^2 \to -\infty$ (see Figure 13). Another possibility is to include Yukawa like couplings between the scalars and the fermions. In the absence of gauge fields Yukawa couplings are never asymptotically free,[28] but it is easy to see that this is no longer true in gauge theories. We have not explored this possibility in detail.

In conclusion it appears to be very difficulty, if not impossible, to construct theories which are both asymptotically free and which contain no massless vector mesons in perturbation theory. Such a model would be of great interest in providing a theory which possesses an S-matrix in perturbation theory and is asymptotically free. However we do not believe that it would be of physical interest. First if such a model exists it must be rather complicated and almost unique. Second, as we have seen above, in order to achieve asymptotic freedom it is necessary to incorporate many fermions and render β_g very small. This might imply that β_g has an IR stable fixed point at a small value of g^2, thus restricting the physical coupling constant $\bar{g}(o,g)$ to be small if we are to remain within the domain of attraction of the origin. Such a model would probably not be useful as a theory of the strong interactions. Furthermore if β_g is small, for small g, then the approach to scaling, according to Equation 4.16, is very slow. This is clearly not a desirable feature. Therefore, to construct a physically meaningful model of the strong interactions one probably must pin one's hopes on the possibility of dynamical symmetry breaking.