in the SU(2) × U(1) framework discussed here but more generally, is the appearance of at least one new quark going beyond the usual triplet p, n, λ. This implies the existence of hadronic states with new quantum numbers. On this view the unravelling of the weak (and strong) interactions will rest on discovery of these new particles and detailed measurements of their production and decay properties. The GIM scheme (model A) represents the simplest and perhaps most attractive possibility that accords with standard weak interaction phenomenology. This scheme introduces a single new quantum number, charm (C). The weak interaction structure is marked by charged currents that are exclusively left-handed and a neutral current that is diagonal ($\Delta S = 0$, $\Delta C = 0$). The weak charm-changing nonleptonic interactions are dominated by $\Delta C = \Delta S$ couplings; the mixing effects discussed in Sec. II are expected to be small ($r \lesssim 10^{-3}$); and with respect to SU(3) structure, these interactions are expected to be dominated by terms belonging to the $6 + \underline{6}$ representation.

Let us now turn to several rather gross phenomenological signatures that might serve as tests for this model and the other, alternative possibilities that we have been considering. We focus especially on inclusive neutrino reactions.

a) Right-handed current coupling to n quarks and dimuon production: In the usual GIM charm model, production of p′ quarks requires either a $\sin^2\theta_c$ (for production off n quarks) or production off 'sea' quarks (λ), which is expected to be small. The observed number of $\mu^+\mu^-$ events[26] would