measurement of $\mathcal{A}$ for polarized Co^{60} nuclei[5] and the numerous measurements[6] of the longitudinal polarization of beta rays show that $C'_{S,T} \approx -C_{S,T}$ and $C'_{V,A} \approx C_{V,A}$. With these restrictions on the interaction coefficients, the values of $\mathcal{A}$ and $\mathcal{B}$ show that the interaction is predominantly $V-A$. The other interaction combinations give greatly different values. Thus $S+T$ and $V+A$ give $\mathcal{A}=-1$ and $\mathcal{B}\approx 0$, and $S-T$ gives $\mathcal{A}\approx 0$ but $\mathcal{B}=-1$. It must be borne in mind, of course, that the limited accuracy of our data would not enable one to exclude small departures from assumptions (1) and (2) nor even fairly large violations of (3).

Recent experiments with positron emission in A^{35} and K capture in Eu^{152} have also shown that the Fermi interaction[7] is predominantly V and the Gamow-Teller interaction[7,8] is predominantly A. These results are in disagreement with the published analysis[9] of the He^6 experiment which indicate the presence of T.

The $V-A$ interaction is also in agreement with several recent treatments of the theory of beta decay.[10]

* Work performed under the auspices of the U. S. Atomic Energy Commission.
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Beta Decay of the Pion

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(Received April 9, 1958)

LET us assume that the hypothesis of a universal (V,A) Fermi interaction, in the form suggested by Feynman and Gell-Mann,[1] will prove to be correct. Then baryons (and perhaps mesons) are coupled to electrons and neutrinos through a current, $j_\mu{}^A+j_\mu{}^V$, consisting of equal amounts of vector and axial vector parts. Feynman and Gell-Mann point out that if $\partial_\mu j_\mu{}^V=0$, then the close equality between the muon decay coupling constant and the Fermi part of the observed beta-decay constant can be understood. They further remark that if the difference (at present small experimentally) between the Fermi and Gamow-Teller beta-decay couplings should turn out to be zero, then $\partial_\mu j_\mu{}^A=0$ would be required for similar reasons. It is not known yet whether such a divergenceless axial vector can be constructed, but some preliminary attempts have been reported by Polkinghorne.[2]

This note is to remark that the relation $\partial_\mu j_\mu{}^A=0$, if it is true, has the additional consequence that $\pi\rightarrow e+\nu$ is forbidden. To see this, note that, if one neglects electromagnetic interactions, the amplitude for this decay must have the form

$$C(k^2)k_\mu l_\mu,$$

where

$$l_\mu=\bar{e}\gamma_\mu(1+\gamma_5)\nu,$$

and k_μ is the pion momentum. Thus, kinematically, only the component of the lepton current l_μ parallel to k_μ contributes to the decay. But in the fundamental interaction $j_\mu{}^A l_\mu$, this longitudinal component of l_μ gives no contribution, because $k_\mu j_\mu{}^A=0$. Thus the amplitude itself must be zero.

The anomalous slowness of π_e decay could be thus explained. But the problem then becomes to explain why π_μ decay *is* seen. Obviously the muon would have to be exempted from at least one of the postulates of the Feynman–Gell-Mann scheme. Certainly the experimental situation on muon capture is not yet such as to prove much similarity to beta decay. Also, it is perhaps an advance to have the point of difficulty shifted from the electron to the (already mysterious) muon.

The author is indebted to T. W. B. Kibble and J. C. Polkinghorne for discussions out of which this note arose.

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Single-Particle Interpretation of Proton Spectra from (d,p) Reactions*

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WHEN the Butler formalism[1] for the deuteron stripping reaction is applied to a (d,p) reaction, it predicts that the amplitude with which a given state of the final nucleus is populated should be proportional to the neutron reduced width $\gamma_n{}^2$ of that state with respect to the ground state of the target nucleus. Utilizing this feature of (d,p) reactions, we have undertaken a study of average reduced neutron widths of bound states. This should be analogous to studies of the