I INTRODUCTION

The search for di-leptons (charged-charged or charged-neutral) in hadronic interactions has been one of the most rewarding strategies in High Energy Physics. Almost all important discoveries in hadron collisions in the last 25 years have been made in this mode (J, Υ, W, Z,...), and many others have been made in modes involving leptons (much of bottom and charm physics, top,...).

The Upsilon discovery in 1977 at Fermilab marked a major landmark in this progression. It initiated the beginning of precision muon searches (in contrast to the J discovery, based on precision electron searches), bringing muon physics to a parity with electrons.

The genesis of the muon searches in hadronic interactions began with ground-breaking experiments by groups headed by Leon Lederman, described in later sections. As a graduate student working at Brookhaven in the beam line next to Leon's BNL dimuon experiment, I remember thinking "Why would anyone be interested in that?" — I think that a lot of hadron-collision experimentalists shared that feeling at that time. (I prefer to forget that my thesis experiment turned out to be a Baryonium experiment — fortunately after-the-fact, so that I was not sucked into that quagmire!)[1]

II THE 1968 BROOKHAVEN DIMUON EXPERIMENT, PRECURSOR TO E288/CFS

In the mid-sixties, Leon Lederman and his collaborators initiated a series of experiments looking first at single muons, then dimuons. This came after Schwartz, Steinberger, and Leon's Nobel-prizewinning second neutrino experiment at Brookhaven (where they missed neutral currents, calling those events "Crapons" — Leon gets my vote for the physicist who missed the most discoveries, as well as one of the, or even THE physicist, after Einstein, making the most discoveries).

Leon was interested in finding the W and Z, at that time postulated particles which could have had masses as low as a few GeV, which would then be accessible at Brookhaven, with proton beam energy of 28 GeV. This was about a decade earlier than the establishment of the electro-weak theory.

The 1968 Brookhaven dimuon experimental setup was based on a novel idea — ranging. An intense extracted proton beam was steered into a Uranium beam dump, where all hadrons, electrons, and photons were absorbed. Only muons — directly produced or from decays — survived. By measuring the range and direction of each muon, one could reconstruct the mass of the dimuon, albeit with poor mass resolution (of order of 1 GeV at a mass

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1) "Never have so many HEP physicists toiled so hard for so little!"