Proof of the Theorem: If we are given a Cauchy net in the product, its projection to each of the factors is a Cauchy net. If each factor is complete, then each of these nets converges, say to x_α. ~~Now the~~ The net in the product converges to (x_α).

Conversely, if we are given a Cauchy net in a factor X_α, we can get a Cauchy net in the product by taking the other components as fixed (we can arbitrarily fix the others). The result should now be clear. QED.

Theorem: Let f be a fn whose domain is a subset A of a uniform space $(X, \mathcal{U})$ and whose values lie in a complete Hdf space $(Y, \mathcal{V})$. If f is uniformly continuous on A, then there exists a unique uniformly continuous ext. f^- of f whose domain is the closure of A.