Now assume we have

$$G \sim DP(\alpha, H) = DP_{\alpha H}$$

αH is base measure $H(A) = 1$ is prob. dist.

we know $G | X_1 \cdots X_n \sim DP\left(\alpha + n, \dfrac{\alpha H + \sum_i \delta X_i}{\alpha + n}\right)$

from earlier arguments.

<u>Another representation</u>:

consider $G|_{X_1 \cdots X_n} = P$

~~$P(X_1)$~~ there are K unique X_i, $K < n$

call these $X_1^* \cdots X_K^*$

then $P(X_1^*), P(X_2^*), \ldots P(X_K^*), P(A - \sum_i X_i^*)$

$$\sim Dir\left(n_1, \ldots n_K, \left[\frac{\alpha H(A - \sum_i X_i^*)}{\alpha + n}\right] \alpha + n\right)$$

$$= Dir(n_1, \ldots n_K, \alpha).$$

This means we can represent

$$G|_{X_1 \dots X_n} \quad \text{as}$$

$$\sum_{i=1}^{K} p_i \, \delta X_i^* \; + \; p_{K+1} G^*$$

where

$$(p_1 \; . \; . \; . \; p_{K+1}) \sim \mathrm{Dir}(n_1 \, \dots \, n_K, \alpha)$$

and $\quad G' \sim DP(\alpha, H)$.