(1) Single out in $X(t)$ all the names whose age $c(e)$ is greater than zero. In other words, we do not take into account the new ones, appearing in this chapter for the first time. It is clear that all new names are of age zero, since $c(e) = t - t = 0$; here $t = t_0$. Calculate now the mean age of all old names, i.e., of positive age, mentioned in $X(t)$. Denote the obtained value by $c(t)$. It is clear that

$$c(t) = \frac{\sum_{t_0=1}^{t-1} (t - t_0)K(t_0, t)}{\sum_{t_0=1}^{t-1} K(t_0, t)}.$$

(2) Consider all the names mentioned in $X(t)$, i.e., both old and new names of non-negative age. In other words, we consider now the names of non-negative age, $c(e) \geqslant 0$. Let us find the mean age $a(t)$ of all names in $X(t)$. It is obvious that

$$a(t) = \frac{\sum_{t_0=1}^{t} (t - t_0)K(t_0, t)}{\sum_{t_0=1}^{t} K(t_0, t)},$$

where $\sum_{t_0=1}^{t} K(t_0, t)$ is the total number of all repeated names in $X(t)$. It is evident that $a(t) \leqslant c(t)$. The greater the mean age, the earlier the names mentioned in $X(t)$ appeared in the text X, and the more ancient they are. We formulate the following model, viz., for chapter generations ordered chronologically correctly, and with the absence of duplicates among them, the graph of $a(t)$ as well as of $c(t)$, where $1 \leqslant t \leqslant n$ must be of the approximate form shown in Fig. 70, where the mean age increases at the beginning of the text X, then the curve becomes stable, and, finally, an almost horizontal straight line.

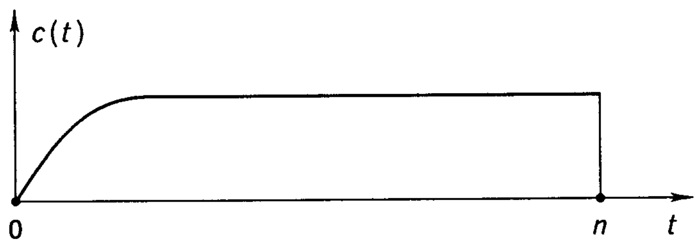

Figure 70. Mean age of all old names of positive age, mentioned in $X(t)$

In other words, the mean age $a(t)$ (and $c(t)$) must oscillate about some constant which is the same for all chapter generations, and, at any rate, bounded above by c. 100 years. It means that the bulk of names, with the exception of, possibly, certain rare ones whose number is extremely small, vanish after approximately the same