Growth-lines on the shells are of some significance in the interpretation of the histograms. Growth-lines are clearly due to temporary cessations of shell-growth (more accurately, of growth in the length and breadth of the shells), affecting both valves simultaneously. Some of them are almost certainly formed at irregular intervals, perhaps during short periods of unfavourable conditions. But on many of the shells the more conspicuous growth-lines are rather regularly spaced on the surfaces of the valves, and often coincide with narrow zones of darker pigmentation. This strongly suggests that shell-growth is halted at regular intervals, possibly seasonally though not necessarily annually. Such regular halts cannot be due to seasonal breeding activities, for the first of these regular growth-lines often occurs near the umbo of each valve and therefore dates from a period when the shell was well below the minimum size for sexual maturity. If the intervals between these growth-lines do in fact represent regular periods of time (the actual duration of the period is irrelevant here), they give some indication of changes in the rate of growth during ontogeny. On most of the larger shells the strong growth-lines tend to become more closely spaced towards the valve edges (cf. Vogel, 1959). On some, but not all, this tendency reaches an extreme, with many strong growth-lines closely crowded together near the valve edges. This suggests that the rate of growth (in length and breadth) slows down progressively in the final stages of the life-history. Other lines of evidence point to the same conclusion. During the phase of growth represented by the crowded growth-lines, the vertical component (Rudwick, 1959) of the growth increases, so that the shell becomes more obese. These obese shells are also more densely covered with encrusting organisms, and more "tanned" in appearance, than other large shells which lack this peripheral zone of crowded growth-lines (cf. Text-fig. 3 *d*); and they sometimes have attached to them shells which are almost equally large but necessarily derived from a later spatfall (Text-fig. 3 *a*). A diminishing rate of growth in the later stages of the life-history implies that the peak of large shells on the histograms probably includes representatives of several different year-classes.

There are two alternative interpretations of the peak of smaller shells and of the trough between the two peaks on the histograms. Percival gave good reasons for interpreting his peak at 2 mm breadth as the product of the previous year's spatfall. It is possible that the peak of small shells in the rock-pool samples likewise represents the most recent spatfall (1959) before collection, and that the previous year-class (1958) is represented within the peak of large shells. This would mean that the brachiopods reach sexual maturity, and virtually full size, at the age of two years. But this interpretation involves the postulate of a very high growth rate. The shells would have had to grow, during the first year of life, about twice as fast as Percival's sample (to a mean breadth of 3 mm or 4 mm in less time than Percival's sample took to reach 2 mm.); and even more rapidly during the second year of life (in sample B, Text-fig. 2 *d*, from 3 mm to 14 mm in mean breadth). Such a high rate of growth is very improbable, for specimens kept in aquaria at Portobello grew in breadth only 0.7 to 1.3 mm during four summer months, and there is no reason to suppose that this rate was abnormally slow.

If this much lower growth rate approximates to that which operates under natural conditions, an alternative interpretation of the histograms is indicated. If certain year-classes are poorly represented in a sample—for whatever reason—the histogram will tend to show troughs at those points. Thus in the samples A and B from the rock-pool the one-year-old shells (which are so abundant in Percival's sample) may be very poorly represented; and the peak at 3 mm or 4 mm breadth may be composed chiefly of two-year-old shells (1958 spatfall), perhaps with the elision of a group of slightly larger shells from the 1957 spat-