A previous study on the population structure of some species of surface dwelling Collembola provided data on growth, longevity and reproductive activity of the species in the field (Joosse, 1969).

To obtain more detailed information about the growth structure, particularly in relation to moulting and reproduction, this was studied in the laboratory. As growth and reproduction are temperature dependent, investigations were carried out at different temperatures. The results of these laboratory experiments, together with the field data, provided a further insight into collembolan life-cycles.

II. MATERIALS AND METHODS

The species investigated were found in the surface litter layer of a pine forest (Joosse, 1970), situated in a dune landscape on Schiermonnikoog, one of the Dutch Wadden Islands. The species were: Tomocerus minor (Lubbock), Lepidocyrtus cyaneus Tullberg, Orchesella cincta (Linné), Entomobrya nivalis (Linné) and Isotoma viridis Bourlet.
Three hundred animals of each species, which were used in the laboratory experiments, were sampled on November 28, 1968, from the Schiermonnikoog populations. They were placed in glass boxes (Ø 5 cm), each box containing 10 animals of one species. The bottoms of the glass boxes were provided with a layer of plaster of Paris (2 cm), which was moistened, and this kept the humidity in the boxes high and fairly constant. The cultures were kept at 5°, 10° and 20° C. The animals were provided with *Pleurococcus* spec., growing on small twigs, and they grazed upon these algae. These conditions were favourable, since mortality and locomotory activity proved to be very low (Joosse & Groen, 1970).

During the period from November 28 until February 14 the body-lengths of individuals were measured at intervals of two weeks, using a stereo-microscope with a micrometer eyepiece. The animals collected in the field were of different sizes and consequently the growth data started at different stages. The very small animals (first instars) were bred from eggs. From these cultures data about the frequency of moultng were obtained by counting, every two weeks, the total number of exuvia produced by 100 animals of each species.

Although the mortality rate in cultures of isolated specimens proved to be high, some individuals had to be raised singly to obtain detailed data about the number and duration of the instars.

In the cultures the animals could be synchronized in their moultng rhythm by means of a 7-day period of starvation. In such cultures, containing 100 and 200 specimens of *T. minor* and *I. viridis* respectively, the relation of moultng to reproductive phenomena was studied.

Field data about growth phenomena were derived from monthly samples in the Schiermonnikoog area. Each month ten soil samples were taken, using a thin-walled steel cylinder with a diameter of 10 cm. The cores were extracted in a Tullgren apparatus (cf. Joosse, 1969). The animals were measured and the mean growth, over 50 days during winter (December until March) and 50 days during spring (March until May), was determined. The changes in mean length can be considered as growth, since in the period from December until April no reproduction, which would obscure the growth structure, occurs (Joosse, 1969). In May, juvenile animals were present, but these were easily distinguishable from adults. Only the adults were measured.

A comparison of the mean growth in the laboratory and the field was made with equivalent size-classes over a comparable growth period of 50 days.