diameter of 0.15 mm. and a length of about 100 mm. They are hair-like, and appear like small threads of algae or threads from the trawl (Fig. 1). But when they are seen in the microscope they are recognized at once, the structure being very characteristic (Fig. 2). The distribution of this species is probably wider than indicated by my finds. The animals seem to prefer cold water, as all the records in the world are from deep water with low temperatures. In the deep part of the Skagerrak the temperatures are about 5° C. throughout the year.

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British Pea-crabs (*Pinnotheres*)

THE adult male and female of *Pinnotheres pisum* (Pennant) are unlike in appearance, the male being thick-shelled, with a conspicuous colour pattern, the walking legs flattened and bearing fringes of long plumose hairs, enabling it to swim. The adult female is considerably larger, thin-shelled, generally without a colour pattern and without swimming hairs.

It was formerly considered that the males of *P. pisum*, young and adult, were normally of one form, although a few so-called abnormal crabs resembling the female in consistency and lack of colour had been found^{1,2}. Further work has made it clear that the male occurs in two main forms. The one which approaches the young stage-II female in appearance is seasonal in occurrence, being found mostly in the summer, June–August inclusive in south-west England, that is, during the moulting season of the male and when young crabs occur in mussels, and rarely at other times. It therefore appears that males occur in the thin-shelled form during periods of rapid growth.

Rearing of a number of males within *Mytilus*, and the moulting of others soon after their arrival in the laboratory, has shown that the male repeatedly changes from one form to the other. A curious fact is that not once did the thick-shelled male moult into the same form, one to three thin-shelled forms intervening. With few exceptions the crabs remained for a longer time in the thick-shelled than in the thin-shelled form: in the former condition they were restless, frequently leaving and re-entering their hosts, while in the latter they never did so, being unable to swim.

The thin-shelled male has a normal male abdomen, only slightly wider in relation to the width of the thorax than that of the thick-shelled male. Thick-shelled males have been found at a carapace width of 1.4–7.6 mm.; thin-shelled males 1.9–6.3 mm.

Males resembling the female in consistency and lack of colour have been recorded in *P. maculatus* by Rathbun³ and in *P. ostreum* by Stauber⁴. In *P. pinnotheres* (L.) (= *veterum* Bosc.), in which there is no comparable sexual dimorphism, I have found only one type of male, although eight have been reared in the laboratory—one for 22 months—through as many as five moults. In this species the young adult female is capable of swimming.

The juvenile females of *P. pisum* resembling hard-shelled males have been found to pass through several

growth-stages to reach the adult^{1,2}. These stages have now been followed in each of four crabs with initial carapace widths of 3–4 mm., which lived for up to two years before being killed: two spawned.

All male-like females were termed stage I: this did not imply that they are the first crab stage². The smallest *P. pisum*, a male, taken from *Mytilus*, had a carapace width of 1.4 mm. and this is probably not less than the third crab stage, for the megalopa has a carapace width of about 0.57 mm.⁶. Stage I females have been found with a carapace width of up to 4.9 mm., so it is evident that growth can occur with little or no widening of the abdomen. The smallest stage-II female with abdomen appreciably wider than that of the male had a carapace width of 2.1 mm. It appears that during growth, without or with only slight widening of the abdomen, the crab does not remain thick-shelled, but that one or more periods may intervene during which it is stage II in consistency, in lack of colour and of swimming hair, but with narrow abdomen. During this time the pleopods remain as little developed as in the thick-shelled stage I². That these crabs are not the result of laboratory conditions is proved by their occurrence in the wild. Those few reared had empty spermathecae.

In addition to the rearing of both *P. pisum* and *P. pinnotheres* in hosts in the laboratory, a population of *P. pisum* in the Camel Estuary, north Cornwall, was sampled approximately monthly for two years, and populations from other localities less frequently. It was found that the male *P. pisum* reaches sexual maturity at a carapace width of about 2.0 mm.: copulation is precocious, a female of 1.75 mm. carapace width being found with full spermathecae, while the smallest ovigerous female had a carapace width of 6.5 mm.

In *P. pisum* the main spawning months in south-west England are May–August; spawning can occur three days after hatching of the previous brood, and it is probable that a crab spawns several times during the season. The main moulting season of the male is June–August, that of the female June–October.

A full account of this work and of other aspects of the biology of *P. pisum* and *P. pinnotheres* will be published elsewhere.

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The Cromer Forest Bed: Preglacial or Interglacial?

Now that the detailed palaeobotanical account of the interglacial deposits at Bobbitshole, Ipswich, by Dr. R. G. West¹, of the University Sub-department of Quaternary Research, Cambridge, has appeared we are better able to appreciate the magnitude of our debt to him and to their finder, Mr. H. E. P. Spencer, of the Ipswich Museum. Correlation of East Anglian and Continental late Pleistocene events has been thereby substantially aided, but in the concluding section of