The setæ comprising all these brushes point somewhat forwards and practically occlude the lumen of the tube, the dorsal space being filled by a transverse row of pinnate setæ on the frons.

The feeding of the nymphs was observed by encouraging them to enter short lengths of glass-tubing in Petri dishes full of water placed under a binocular microscope. When entering a new tube the nymphs usually spin a silken lining to the tube. The silk is produced from the oral region and drawn out by flicking movements of one of the forelegs. The presence of this lining in the natural burrows of the nymphs was first noted by Arndt[1], but further work remains to be done on this aspect of the insect's biology. In glass tubes and possibly also in burrows in wood, this lining of silk enables the animal to hold itself firmly in position by means of the short stout setæ on the outer sides of the hind femora, which are pressed against the walls of the tube.

During feeding, the gills, which are borne in pairs on the first seven abdominal segments, beat rhythmically for a few seconds at frequent intervals, producing an intermittent current of water from the anterior end. Any floating organisms or pieces of debris which are large enough are caught on one or other of the filtering brushes, from which they are removed by the palps. Food is transferred from the brushes to the mouth by two distinct series of movements. The transfer of particles from the brushes to the palps is accomplished by simultaneous wide sweeping movements: (1) by the maxillary palp of one side, removing food from the mandibular brush of that side; (2) by the maxillary and labial palps of the opposite side, collecting food from the tibial and femoral brushes respectively; this action is accompanied by an inward flick of the leg which brings the brushes within reach of the palps.

These movements alternate from side to side and are separated by the second type of movement of the palps which brings the food to the mouth. Here the maxillary palps move in a transverse plane and push food towards the apices of the labial palps. The latter, swinging up and down on the basal joint, push the particles of food backwards and upwards to the mouth. By these means food is collected from either side of the body according to the following scheme: (1) mandibular brush to maxillary palp; (2) palps to mouth; (3) leg brushes to maxillary and labial palps; (4) palps to mouth.

The only pinnate setæ which are not swept by the palps are those on the frons, and these appear to be neglected. Possibly they serve to deflect the water current towards the other more ventral filtering brushes.

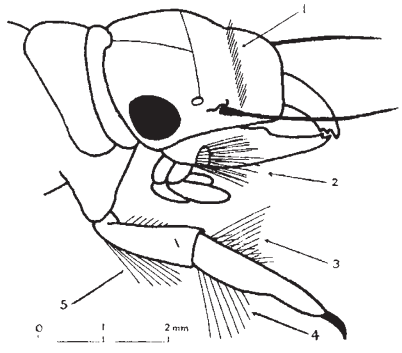

Fig. 1. Positions of filtering brushes in *Povilla adusta*. 1, Frontal brush; 2, mandibular brush; 3, dorsal tibial brush; 4, ventral tibial brush; 5, femoral brush

Further details of this work will be published elsewhere, together with results of studies of other aspects of the biology of this species. I wish to thank Prof. L. C. Beadle for his encouragement and advice, and also Mr. D. E. Kimmins for identifying the species for me.

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Chemical Examination of the Piltdown Implements

In the report[1] on the main results of our re-examination of the Piltdown material, we gave reasons for regarding the chromate staining of the *mandible* as indicating a deliberate attempt to match a modern bone with the mineralized cranial fragments. The actual composition of this bone (3·9 per cent nitrogen, less than 0·03 per cent fluorine) suffices to prove its modernity; but the chromate staining, combined with the artificially abraded appearance of the molars, indicates that it is not only modern but also fraudulent.

In case there is any lingering doubt that the Piltdown finds are in part fraudulent, we think that one other fact now brought to light should be published immediately. Suspecting that some of the so-called implements[2] reported from the site might have been 'doctored', we asked Mr. E. T. Hall, of the Clarendon Laboratory, Oxford, to test the composition of their surface stains by means of his X-ray spectrographic method of analysis. He has reported to us that the stains on these flints are entirely ferruginous, with one notable exception. The triangular flint (Reg. No. E.606) recovered *in situ* from the layer immediately overlying the skull horizon[3] is chromate stained. When this stain is removed in acid the flint appears greyish-white. It is indistinguishable from a mechanically broken piece of flint such as one might encounter on the surface of any ploughed field in 'Chalk-land'.

Whereas a bone might have been dipped in a solution of potassium dichromate with the sole purpose of trying to harden it, a flint would only have been treated in that way by a forger requiring it to be of a certain colour.

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