surface and the lid of the desiccator replaced immediately. When quite hard (10–15 min.) the transparent secondary replica may be separated and mounted between two thin, polished microscope slides, the edges of which are afterwards bound together with adhesive tape.

The stripping process may present some difficulty owing to the tendency of the replica to curl. The transparent layer should be lifted slowly and, as soon as it is free, transferred swiftly to a slide and sandwiched flat. When the mount is viewed by eye the back, that is, the unreplicated surface, should be clear. Unsatisfactory replicas look cloudy and the fault almost invariably lies in the failure to dry the primary replica.

On microscopic examination the replicas are seen to their best advantage if the sub-stage mirror is tilted to one side so that the incident light strikes the specimen obliquely.

This method is a simple, quick and reliable way of obtaining permanent records of a variety of surfaces suitable for examination by light microscopy (Figs. 1 and 2). It can be used for living tissues and, since the rubber appears to be non-toxic, serial impressions from the same region can be made provided care is taken not to damage the surface when removing the rubber.

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ENTOMOLOGY

Distribution of *Acarapis woodi* (Rennie)

A. R. Brimblecombe and C. Roff state in *Nature* of May 6, p. 561, that "Mites determined as *Acarapis woodi* (Rennie) were found recently on one of the escorts with a queen bee (*Apis mellifera* L.) from California". They also report that subsequent surveys indicated that this particular mite was found on bees from other States of the United States, and was widespread in Queensland.

The queen shipment in question was sent to Brisbane in June of 1959, and the identification was made a short time later. In subsequent letters with the British Museum and with Canberra, it was determined that no evidence of the internal mite was found in the tracheæ of the bee, but only forms on the outside of the thorax. The California State Department of Agriculture and the University of California made extensive surveys of bees in California, and other apicultural workers made surveys in other States and in different Provinces of Canada, examining thousands of bees for the internal mite, *Acarapis woodi*, with entirely negative results. No specimens of *A. woodi* have ever been found in the United States or Canada.

External acarapis mites were found widely scattered in both the United States and in Canada, and these were identified as *Acarapis dorsalis* and *A. externus*. These mites are innocuous forms that apparently have a world-wide distribution and cause no noticeable damage. They have never been found to invade the tracheæ of bees and can be distinguished from *Acarapis woodi*, the internal species, by several distinct morphological as well as ecological characteristics, which are now known to the acaralogists of the British Museum (Natural History) and to the National Museum in Washington. I personally have sent slides of the external mites to both museums and to various places in Australia, including Canberra and Adelaide.

If there is any doubt still in the minds of the acaralogists as to whether the external acarapis mites are distinct species or merely 'strains' of one mite, then for scientific as well as economic reasons they should identify the external forms as *A. woodi dorsalis*, or *A. woodi externus*, or *A. woodi vagans*, whichever they chance to be. It is certainly not by chance that the external acarapis mites have distinctly different physical characters from the internal mite, or that they have never been found to invade the tracheæ of their host.

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Brain Hormone of the Silkworm, *Bombyx mori*

IT is generally accepted that the neurosecretory cells concerning the metamorphosis of insects contain a small amount of a secretory substance at any time of development[1,2], notwithstanding a marked effect which they exert when implanted or transplanted. This means that accumulation of the secretory substance released continuously from the cells in the brain is necessary to become effective. This is the reason why a great many brains were used to extract a sufficient amount of the active principle[3]. However, we have found that only several devitalized brains of *Bombyx mori* could cause adult differentiation when inserted into the non-diapausing pupæ of *Philosamia cynthia ricini* caused to diapause by prompt removal of their brains just after pupation. Devitalization was brought about by various ways such as subjecting brains to freezing in a deep-freezer at $-18°$ C. for 21 days, desiccating them over silica gel for one day, or heating them at 90° C. for 90 min. After being treated, the brains were all proved to be as effective as live ones, so far as they were tested by five for each test pupa. Needless to say that in this case the brain hormone, enough to stimulate adult differentiation of the recipient, had to be present in the five inserted brains. The possibility that the adult differentiation was caused by the prothoracic gland hormone which contaminated the inserted brains can be ruled out, since neither the same amount of fatty tissue nor blood similarly treated exerted any perceptible effect on the dormant pupæ. It seems, however, worthy of mentioning that after treatment brains of *Philosamia* were inferior to brains of *Bombyx* in their effectiveness. This presumably indicates that the situation at a given moment is different between the two species, a larger amount of the hormone being contained in the latter.

Kobayashi and Kirimura[3] reported first the preparation of the brain hormone. In their case, however, an extract from some 400 brains was necessary to let each pupa develop into an adult. By contrast, our finding stated above may suggest that the extraction from only five brains would yield sufficient quantity of the active principle, if the procedures of extraction are successfully manœuvred.

Thus we started work on the chemical properties of the brain hormone after Kobayashi and