It is scarcely likely therefore that the relative size of cephalothorax and legs has much to do with the problem. Moreover the palpi which, especially in the male spider, are of the greatest use, are sometimes not replaced, and they are comparatively small compared with the cephalothorax.

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[2] P. Bonnet, *Bull. Soc. d'Hist. Nat. Toulouse*, ii, **59**, 237–700 (1930).
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The Common Stick Insect

SINCE 1910, we have bred a continuous supply of the common stick insect (*Carausius*). These are lodged in a glass rectangular case 18½ in. × 9 in. × 15½ in. fitted with a movable glass front. Two glass vases holding ivy leaves in water furnish food and moisture for the insects. The debris is removed from the case once a fortnight, when fresh food and water are supplied. The eggs which lie about in the debris are picked out and placed in a small box which is kept inside the cage, so that they are subject to the same temperature and moisture conditions as the adults. There is always a mixed population of insects in the cage, ranging from newly hatched individuals to one year old adults.

We found that during the very sunny months of the year, the excessive transpiration of the ivy leaves made the air in the chamber too damp and so favoured the growth of mould over debris and elsewhere. To afford more efficient ventilation, we removed the glass sliding door and replaced this by a piece of cotton veiling of 1/16 in. hexagonal mesh. This was not new material. It had been washed several times, but it was quite strong. The adults particularly made their way to the netting and clung to it.

On account of the exigencies of vacation in 1936, the stick insects had been left unattended for three weeks. At the end of that time, all the ivy had been consumed. Small holes were noted in the net when the food supplies were renewed. The netting was replaced. At the end of another three weeks, the food supplies were all eaten and the netting had been attacked more vigorously. On this occasion several holes were ½ in. in diameter, and the smaller holes ¼ in. in diameter were evenly disposed all over its area. Judging by the absence of fibrous material around these holes, it seems certain that the cellulose is eaten by the insects. (A specimen of the netting was kindly examined in the Textile Research Laboratory of Leeds and pronounced to be cellulose.) This experiment slightly modified was repeated, one isolated adult making a hole of diameter 1 in. The insects make no attempt to escape by these holes, whether or no because of anatomical impossibility we have not been able to decide.

Younger adults were then used for the experiment. They similarly attacked the material greedily.

Lastly, a piece of twill calico well washed was placed in front of the cage and the insects were given sufficient food. This also has been attacked, though as one would expect, the holes are smaller and are not produced so quickly.

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Raman Effect in Absolute Perchloric Acid

ACCORDING to recent views, hundred per cent liquid oxacids are pseudo-homogeneous substances, composed of covalent hydroxyl compounds partly associated by means of the unsaturated hydroxyl group. In a few cases, some of the acid molecules may act as proton acceptors, thus forming an acidium salt, accounting for the electroconductivity of the pure acid.

Thus in the case of pure perchloric acid, we have following equilibria:

$$2HOClO_3 \rightleftarrows (HOClO_3)_2 \rightleftarrows [(HO)_2ClO_2]^+ + [ClO_4]^-$$

If a little water be added, there is competition for protons between $HOClO_3$ and H_2O molecules, with water being successful, since it is a stronger acceptor than perchloric acid. In this way, a solid hydronium salt may be formed, the X-ray diffraction pattern of which is, according to Volmer[1], the same as that of ammonium perchlorate. If further water be added, it is used for the hydration of the hydronium and perchloric ions.

$$\underbrace{HOClO_3 + H_2O}_{H^+} \rightarrow [H_3O]^+[ClO_4]^- \rightarrow [H(H_2O)_x]^+[ClO_4(H_2O)_y]^-$$

If this be true, the Raman spectrum of absolute perchloric acid must be quite different from that of perchloric acid in solution, and some information regarding the nature of the molecules and ions present may be obtained.

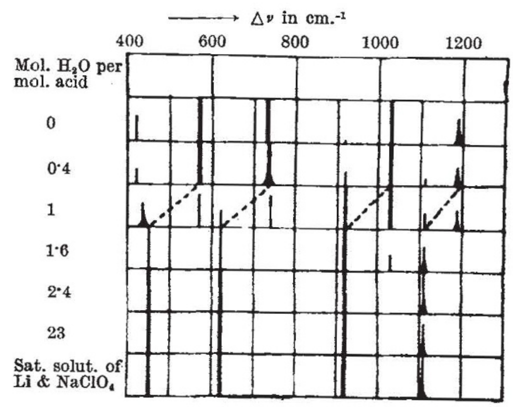

FIG. 1.

Fig. 1 represents the results of our examination of perchloric acid solutions: molten monohydrate (at 50° C.), pure perchloric acid and saturated solutions of lithium and sodium perchlorates. The figures clearly show that perchloric acid solutions up to 70 per cent (2·4 mols. of water) produce exactly the same Raman lines ($\Delta\nu$ = 450, 620, 922, 1110 cm.$^{-1}$) as the salt solutions. The nature of the radical corresponding to these lines, which is the ClO_4^- ion, is consequently identical in both cases. When the concentration of perchloric acid becomes higher, all these lines diminish in intensity, while other new lines appear and increase in intensity. The spectrum of pure perchloric acid shows four main lines of frequency number 570, 730, 1026, 1190 cm.$^{-1}$, which have the same aspect and relative intensity as the corresponding lines of the ClO_4^- ion. Therefore, the structure of the perchloric acid molecule cannot be