Do Cockroaches eat Bed Bugs?

HOWLETT, writing on bed bugs in Lefroy's book on "Indian Insect Life", states: "In America cockroaches and small red ants are mentioned by Marlatt (*U.S. Ent. Circular*, No. 47) as being fond of eating bugs, the ants in particular being effective checks." In the account of cockroaches, however, Lefroy himself writes, "these insects are 'scavengers', and *none is known to feed on living plant tissue or to attack living insects*". In view of the contradictory nature of the two statements, my experience with these insects at Bombay is perhaps worth recording.

(1) It was observed that cockroaches generally frequented bug-infested bedsteads at night, although they were sometimes seen under the mattresses in the daytime also.

(2) The presence of cockroaches in very large numbers on a bug-infested cot was once noted to be associated with the complete disappearance of bugs, in a fortnight, after the cot was discarded from use.

In order to exclude alternative explanations for the presence of cockroaches and disappearance of bed bugs in the second case, direct experimental evidence was sought to discover if the cockroaches were really capable of eating bed bugs. Cockroaches were kept singly with one or more living bed bugs, in glass jars, each guarded at the mouth by a fine piece of muslin, tightly tied by means of a string. It was found that at least *Periplaneta americana* ate bed bugs, but preferably those young ones which had soft blood-gorged abdomens. Adult bugs with comparatively harder exoskeleton were sometimes rejected. The maximum number of bed bugs eaten by a cockroach was three out of twelve supplied to it in forty-eight hours, after which, during the following twenty-four hours, the cockroach preferred to starve. The repetition of the above experiments confirmed Marlatt's observation that cockroaches of this species will eat bed bugs.

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April 18.

Band Spectrum of Sulphur.

THE absorption spectrum of S_2 vapour has been investigated by Henri and his pupils (NATURE, **114**, 894; 1924; *C. R.*, **179**, 1156; 1924; *Jour. de phys.*, **8**, 289; 1927) and by Rosen (*Zeit. f. Phys.*, **43**, 69; 1927; **48**, 545; 1928). They found a band system leading from the vibrational levels of the normal electronic state of the molecule to the vibrational levels of an excited electronic state. They also found that those bands for which the upper states lie above a certain energy value are diffuse, a fact which can be explained if one assumes that in these states the molecule has the possibility of dissociating spontaneously into separate atoms, a phenomenon called predissociation by Henri (see, for example, Kronig, *Zeit. f. Phys.*, **50**; 347, 1928).

At the suggestion of Dr. Kronig, I investigated the spectra obtained by passing a high voltage discharge through hydrogen sulphide at a pressure of a few millimetres. It showed that the same band system obtained by the observers mentioned above in absorption appeared here in emission, with the one difference that the bands which in their investigations were diffuse are here entirely absent. After the current had been passed through the discharge tube for some time, a deposit of sulphur appeared on the walls.

These facts can be understood if it be remembered that the S_2-molecules produced by the discharge and raised to the levels in question have a very short lifetime. They will hence dissociate before they have a chance to fall back to the normal state under emission of radiation, so that the emission bands starting from them are very faint or entirely absent.

Besides the band system just discussed, the photographic plates showed another band system with its maximum intensity in the region of 2570 A. To judge from its appearance, it is also due to S_2. It is hoped to investigate in greater detail the structure of these bands, particularly with regard to a possible intensity alternation.

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Natuurkundig Laboratorium der
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May 9.

Water-meadows and River-flow.

I AM glad to see from Dr. Vaughan Cornish's review on pp. 737-8 of NATURE for May 17 that the Council for the Preservation of Rural England is directing attention to the unsuitability of water meadows for dwellings and to the fact that they serve as safety overflows for inhabited districts lower down the river in times of heavy flooding. The æsthetic advantage of these flats is also accentuated.

A point which does not seem to have been made is that water-meadows are essential for the existence of the river itself. If recent proposals for measures to ensure the rapid passage seaward of winter rainfall are adopted, the summer flow of such rivers as the Thames is likely to become negligible. In winter as much as 10,000 million gallons may pass over Teddington Weir in twenty-four hours; in summer as little as 100 million gallons. If the water now stored in the land around the upper reaches during winter floods is not allowed to collect in the future, then it is difficult to see how the summer flow can be maintained even at its present level or how flooding near London can be prevented in winter. The question affects navigation, sewage treatment, and water supply not only in the Thames but also in all such rivers. Lord Desborough has directed attention to the doubtful future of the water supply of many districts.

J. H. COSTE.

Teddington, May 23.

Flint Implements of Lower Palæolithic Age from the Mammaliferous Gravels of Yorkshire.

ON Feb. 15 last there appeared in NATURE the announcement of my discovery in Yorkshire of Upper Palæolithic implements, *in situ*, at the base of a glacial deposit of Pleistocene age.

Messrs. Dewey and Bromehead, of H.M. Geological Survey, have just completed an official examination of the sites under consideration, and, from the sections north of Bridlington, they have removed, with their own hands, numerous implements from the base of what they, also, consider to be a deposit of late Pleistocene age. A detailed report of these investigations will be issued in due course.

On Saturday, May 17, whilst examining, in their company, the mammaliferous gravels at Burstwick, in Holderness, I recovered therefrom a Levallois-flake, which, from its stratigraphical position, cannot be later in date than the Early Mousterian period. Last year, I found in this same deposit a small hand-axe, flaked on one face only; both these specimens will be described and figured at a later date.

J. P. T. BURCHELL.

30 Southwick Street,
Hyde Park, W.2, May 19.