PROCEEDINGS OF THE BIOCHEMICAL SOCIETY

The **494th Meeting** *of the Society was held at the Shell Centre, London S.E.*1, *on Friday,* 16 *May* 1969, *when the following papers were presented:*

COLLOQUIUM ON 'NATURALLY OCCURRING MATERIALS OF POTENTIAL USE FOR CONTROL OF PLANTS AND ANIMALS'

Some Chemical and Biological Studies on an Exotoxin from *Bacillus thuringiensis* var. *thuringiensis* Berliner

By R. P. M. Bond, C. B. C. Boyce, V. K. Brown and J. D. Tipton. (*'Shell' Research Ltd., Milstead Laboratory of Chemical Enzymology, Sittingbourne, Kent*)

Bacillus thuringiensis exerts its pathogenic effect on insects with two well defined toxins: a crystal protein endotoxin and an exotoxin whose activity survives brief autoclaving. Other toxins may well be produced by the bacterium (Heimpel, 1967). The adjective 'thermostable' normally applied to the exotoxin can be justified because no detectable change of activity occurs when the bacterial supernatant is heated at 110° for 4hr. However, heating at 110° for 24hr. destroyed approximately 80% of the activity. The toxin is effective against many insects. It is usually lethal to juvenile forms between instars or at pupation, but high doses can kill adult houseflies (*Musca domestica*). The method of administration of the toxin can be important. In some insects, the toxin is much more potent when given parenterally than when given orally. This difference has been investigated in detail for the case of the wax moth (*Galleria mellonella*) by Benz & Schmid (1969).

The exotoxin is also toxic to mice when given by intraperitoneal injection. Male mice are more susceptible to the toxin than are females.

The toxin is an adenine nucleotide inasmuch as it contains adenine and phosphate in a molar ratio of 1:1. The phosphate is removed by treatment with acid or alkaline phosphatase or by chemical hydrolysis at pH4, and so is taken to be bound as a phosphomonoester. Spectroscopic evidence establishes that the adenine is substituted at position 9 and suggests that the substitution is by a β-ribofuranosyl moiety. Glucose and allomucic acid (Bond, 1969) have been identified as hydrolysis products of the exotoxin.

There are many points of similarity and some of difference between these results and those of de Barjac & Dedonder (1968) and, more particularly, those of Sebesta and his associates (Sebesta, Horska & Vankova, 1969*a*,*b*; Farkas *et al.* 1969).

Benz, G. & Schmid, E. (1969). *Experientia*, **25**, 96.
Bond, R. P. M. (1969). *Chem. Commun.* p. 338.
de Barjac, H. & Dedonder, R. (1968). *Bull. Soc. Chim. biol., Paris*, **50**, 904.
Farkas, J., Sebesta, K., Horska, K., Samek, Z., Dolejs, L. & Šorm, F. (1969). *Coll. Czech. chem. Commun.* (*Engl. Ed.*), **34**, 1118.
Heimpel, A. M. (1967). *Annu. Rev. Ent.* **12**, 287.
Sebesta, K., Horska, K. & Vankova, J. (1969*a*). *Coll. Czech. chem. Commun.* (*Engl. Ed.*), **34**, 891.
Sebesta, K., Horska, K. & Vankova, J. (1969*b*). *Coll. Czech. chem. Commun.* (*Engl. Ed.*), (in the Press).

Current Research on Abscisic Acid

By B. V. Milborrow. (*'Shell' Research Ltd., Milstead Laboratory of Chemical Enzymology, Sittingbourne, Kent*)

The plant hormone abscisic acid (ABA) was characterized (Ohkuma, Addicott, Smith & Thiessen, 1965) and synthesized (Cornforth, Milborrow & Ryback, 1965) in 1965 and since that time the availability of the synthetic compound and its intrinsic interest have ensured that it is the subject of research in a large number of laboratories.

It has been isolated in crystalline form from cotton (Ohkuma, Lyon, Addicott & Smith, 1963), sycamore (Cornforth, Milborrow, Ryback & Wareing, 1965), yellow lupin (Rothwell & Wain, 1964; Cornforth, Milborrow, Ryback, Rothwell & Wain, 1966), pea (Isogai, Okamoto & Komoda, 1967) and yam (Hashimoto, Ikai & Tamura, 1968) and identified in extracts of some thirty other species of plant (Milborrow, 1967a). Most of these identifications have relied on four criteria: (i) general physical properties; (ii) co-chromatography with authentic material; (iii) production of the same physiological responses in test plants; (iv) demonstration of the characteristic optical-rotatory-dispersion spectrum. In addition, gas–liquid chromatography of methylated (Lenton, Bowen & Saunders, 1968) and trimethylsilylated (Davis,