

workers in preparing the antigens. Fuerth⁷ and Conradi and Bieling⁸ have, however, described a 'spore' as well as a 'vegetative cycle' for *Cl. septicum* and *Cl. chauvoei*; and Kreuzer⁹ affirmed the presence of a common heat-stable antigen between them.

I am of the opinion that all classification within the genus *Clostridium* should be firmly based on antigenic characters. These are the most reliable, and the more stable, of all the criteria we now possess. The use of antigenic formulae comprising the *S*-, the *O*- and the *H*-antigens would simplify their identification, as well as overcome any difficulty of antigenic overlapping between the different species.

Similar investigations are now being made to extend the work to other *Clostridia*.

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An Improved Technique for Spot Testing, using a 'Cellophane' Membrane

If the coloured compound in a spot test is allowed to form within a 'Cellophane' membrane instead of on filter paper, the colour can be seen much more clearly, and colour comparison is greatly facilitated. The procedure is described below for the formation of salicyloylhydrazones by aldehydes and ketones¹, but is of general application.

A test-tube containing a few drops of the carbonyl compound (if it is volatile) is covered with a sheet of 'Cellophane' previously moistened with 5 per cent aqueous acetic acid, and the 'Cellophane' is firmly secured with a rubber band. A drop of a saturated solution of salicyloylhydrazide in 5 per cent acetic acid is put on the 'Cellophane', through which it permeates to meet the carbonyl compound penetrating from the other side by volatilization. Interference from non-volatile substances is avoided, and, since the volatile substance is virtually sealed in, contamination of neighbouring tests is prevented. Excess reagent can be removed by simply wiping the outer surface of the 'Cellophane' with a damp cloth.

The method can be used for non-volatile substances, for example, oxosteroids, by placing a 5 per cent aqueous acetic acid solution of them in the 'Cellophane'-capped tube. The test-tube is inverted so that the lower surface of the 'Cellophane' is wetted, and a drop of reagent put on the top surface as before.

The new technique can be applied to all colour reactions which take place in aqueous solution. Non-waterproofed 'Cellophane' must, of course, be used.

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Generation and Propagation of Impulses during Refractoriness in a Pacinian Corpuscle

DEFORMATION of mechano-receptors gives rise to generator potentials which in turn eventually set up propagated potentials. In order to analyse generator potentials it is desirable to block the propagated potential. In the Pacinian corpuscle this may be done by the aid of drugs, by changing the ionic environment of the receptor¹ or, as here reported, by taking advantage of differences in duration of the refractory period of generator and propagated events. Generator potentials alone are obtained when the deformation of the receptor occurs during the refractory period of the propagated potential.

Pacinian corpuscles of the cat's mesentery were isolated, together with a length of afferent axon^{2,3}, and set up in a bath containing an oxygenated Krebs's solution covered with mineral oil. The electric activity of the sense organ was led off between the Krebs's-oil interface, serving as fluid electrode, and a platinum electrode placed on the axon at some distance from the corpuscle. For recording of generator potentials, the interface was adjusted to lay at the site of the axon's emergence from the corpuscle. Graduable mechanical stimuli were provided by the deflexions of a piezo-electric crystal, applied to the corpuscle by a glass stylus⁴. The stylus's movements were followed photo-electrically, and were found to follow up to 1,000 pulses/s. with fidelity.

When two mechanical stimuli of threshold strength are successively delivered to the corpuscle at an interval longer than 10 msec. (relative refractory period), each stimulus causes the firing of a propagated potential. Upon progressive reduction of stimulus interval the threshold for setting up a propagated response rises⁵⁻⁸. At the same time, the propagated potential falls gradually to 75 per cent of its resting magnitude, and finally becomes abruptly blocked within the corpuscle. A non-propagated all-or-nothing potential, presumably corresponding to activity of the first intracorporeal node of Ranvier, is then detected. This potential declines gradually as the interval is progressively shortened, and finally vanishes leaving a graded potential (generator potential) as the only response to mechanical stimuli. This potential increases as a function of stimulus strength, without changes in latency.

A generator potential leaves a refractory state behind, so that the amplitude of a second generator potential falling on its refractory trail is directly related to the time elapsed after the first. Unlike the propagated potential, the generator potential decreases gradually to zero as the stimulus interval is progressively shortened, revealing no sign of absolute refractoriness. Furthermore, the amplitude of a refractory generator potential is inversely related to the magnitude of the preceding generator response¹. However, the size of the generator potential is independent of the refractory state left by a preceding propagated potential. For example, the amplitude of a generator potential in response to the second stimulus belonging to a pair of stimuli, remains the same whether preceded by a generator potential or a four times greater propagated potential. Had the latter been an equally large generator potential, the second generator potential would have become considerably reduced. This independence between generator and propagated