A Polysaccharide from Hydatid Cyst Fluid

A SEROLOGICALLY active polysaccharide has been isolated from hydatid cyst fluid from an infested sheep. A positive precipitin reaction was obtained with the serum from a patient suffering from pulmonary hydatid disease, when dilute solutions of this polysaccharide were used as an antigen. Serum giving positive and negative Wassermann results showed no precipitin reaction with this same antigen.

It is considered that this polysaccharide fraction of the hydatid cyst fluid is probably the specific antigenic factor.

A detailed report of the preparation of this fraction together with its properties will be submitted for publication at a later date.

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Gas Discharges at Centimetre Wave-lengths

EXPERIMENTS have recently been described[1] showing that at frequencies of 2,800 Mc./sec. and 9,800 Mc./sec. the breakdown of air takes place at stresses some 30 per cent lower than the breakdown values for steady voltages, for gaps of a few millimetres. In order to extend the observations to longer gaps, experiments are in progress on discharges in cavity resonators, where the necessary stress can be built up over longer gaps. Power is obtained from a magnetron excited by 1 microsecond pulses applied either individually or at the rate of 400 per second.

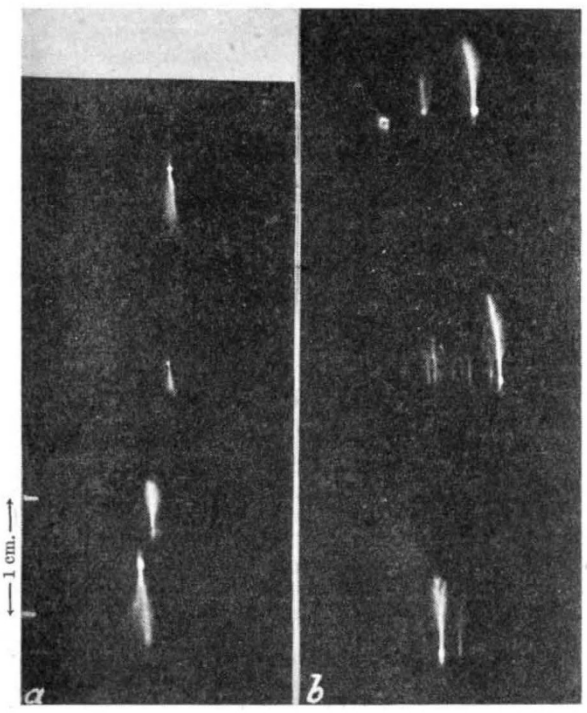

Fig. 1. PHOTOGRAPHS OF DISCHARGES IN A RESONATOR (*a*) WITHOUT IRRADIATION; (*b*) ONE ELECTRODE IRRADIATED WITH ULTRA-VIOLET LIGHT

The film was moved between successive discharges. Note that in (*b*) the discharge always starts from the same electrode and that subsidiary streamers are present. Electrode separation 1·44 cm.

The form of discharge obtained at atmospheric pressure is shown in Fig. 1, where it will be seen that the chief component consists of a bright spot on the electrode, together with a less intense tail across part of the gap. With repetitive operation, the gap is filled with a faintly luminous haze in addition. Occasional mid-gap streamers are observed for both individual and repeated pulses. Spectrographic observations show that the tail emits a nitrogen band spectrum, while the spot emits lines characteristic of the electrode material.

With 400-cycle pulses, as the pulse voltage is lowered, the time-interval between bursts of discharge increases and it is possible to determine graphically the pulse voltage V_0 for which the probability of starting the discharge becomes zero. For any pulse voltage greater than V_0, it is found that if sufficient *individual* pulses are applied a discharge eventually occurs, so that the breakdown voltage of the gap is the same for individual and for repeated pulses. Once, however, a discharge has occurred, the probability of breakdown within 1/400 sec. is increased, so that the 400-cycle pulses produce bursts of discharge, and a direct comparison of the ratio (No. of discharges)/(No. of pulses) for repeated and for individual pulses cannot be made.

Initial experiments, in which ultra-violet light from an auxiliary spark was applied immediately before the beginning of the high-frequency pulse, showed that ultra-violet light has marked effects on the appearance of the discharge, and on the sparking probability, for single pulses. A comparison between the sparking probabilities, with and without irradiation, can be made directly. In agreement with earlier work[1], in which a radium source was employed, it is found that the voltage at which the sparking probability just becomes zero—the true breakdown voltage—is unaffected by irradiation: at higher voltages irradiation increases the sparking probability.

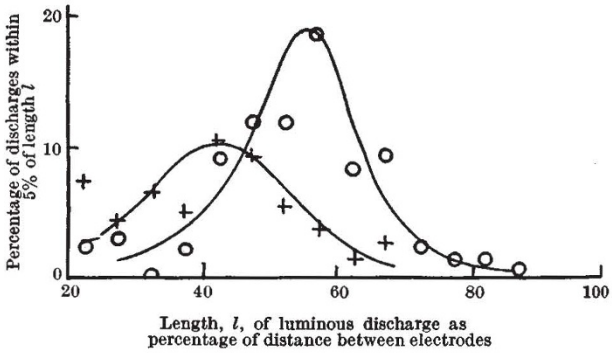

Fig. 2. DISTRIBUTION OF LENGTH OF DISCHARGES
○, one electrode illuminated with ultra-violet light; +, no irradiation

When the electrode surface is irradiated, the length of the luminous tails is increased, and shows less variation from pulse to pulse (Fig. 2). When, however, the ultra-violet light is concentrated in the gas (air) between the electrodes, numbers of mid-gap streamers are observed at each pulse, even when the typical spot and tail discharge does not occur—clearly a consequence of photo-ionization in the gas.

The observations are being extended to include an examination of the effect of changes in the duration of the pulse, the nature of the gas and the gas pressure on the discharge phenomena. It is hoped