intelligent student; secondly, whether the teaching of genetics and cytology is satisfactorily co-ordinated between the botanical and zoological sides; and thirdly, whether the questions set in examinations adequately cover the newer parts of the syllabus.

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Vernalization of Winter Rye during Ripening

VERNALIZATION of winter rye by chilling, which normally is carried out during the germination of ripe grain, has been successfully applied during ripening while the ears remained attached to the parent plant. To this end each ear was placed in a boiling tube inserted in the neck of a vacuum flask containing ice. Thus the ear was not in direct contact with the ice and a fairly even temperature of 1°–1·5° C. was maintained within the tube. The ears were selected for treatment at various times after anthesis, and, after being kept for twenty-four days at a low temperature, allowed to finish ripening normally. Ears which were selected from the middle period of ripening alone produced grain which on spring planting proved to be vernalized. The control grain came from ears kept for a similar period in vacuum flasks without ice.

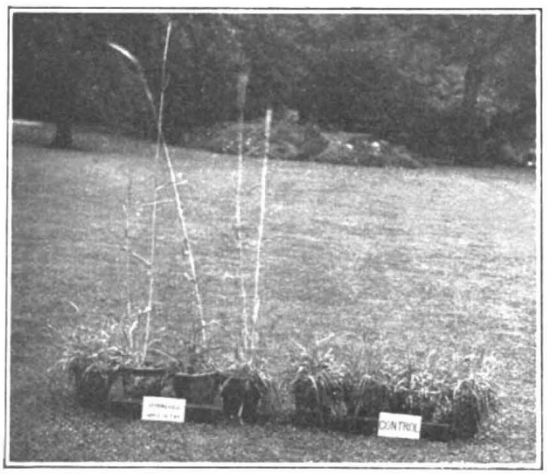

FIG. 1.

Ripening ears with stems and green leaves were also successfully vernalized after being detached from the plant. They were placed in water, and chilling carried out in a refrigerator at 1° C. for a period of six weeks. Control ears were ripened in a dark room at 17°–18° C. A photograph of plants grown from grain of chilled and unchilled ears is shown (Fig. 1).

Experiments are now in progress to find at which stage in the development of the embryo the application of cold is most effective.

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Sparking Potential of Mercury Vapour

THE sparking potential of mercury vapour between parallel electrodes previously degassed at about 750° C. has recently been measured in this laboratory throughout a large range of vapour densities, and the influence of the material of the cathode on the sparking potential has also been examined.

When the density of the vapour is expressed in terms of the corresponding pressure, p mm. of mercury, of a permanent gas at 17° C., and d is the distance in cm. between the electrodes, the sparking potential was found to be almost a linear function of the spark parameter pd from about 500 to 5,000 volts. The value of pd at the minimum sparking potential was 1, while at the highest vapour density used pd was 85 and the sparking potential was 5,000 volts.

The minimum sparking potential V_m was measured for a number of different cathode surfaces, and the values obtained are given in the accompanying table, where φ is, approximately, the work function of the cathode.

Cathode.	φ	V_m in volts.
Clean nickel	5	400
Clean 'Staybrite' steel	4·7	380
Nickel coated with a mercury film	4·4	305
Steel " " " "	4·4	305

It is seen that large changes in the value of V_m were produced by small changes in the work function of the cathode surface.

A corresponding variation of the normal cathode fall with the work function of the cathode material has previously been noted[1]. With the highest values of pd, however, the sparking potential was practically independent of the nature of the cathode surface, and this result is in accordance with the general theory of the spark discharge[2]. At these high vapour densities, also, the spark time lag was very pronounced.

The large variation of V_m with the nature of the cathode surface affords strong evidence in support of the view that the cathode plays an important part as a source of electrons under the impact of positive ions; and that in mercury vapour this mechanism is of predominating importance in the production of the spark and in the maintenance of the discharge. In this respect mercury vapour differs from a typical diatomic gas like hydrogen[3]. However, this result does not necessarily exclude the possibility of the existence of the process of ionization by positive ions in collision with the molecules of mercury vapour which in fact has been detected[4] with ions of energies of about 700 electron volts, but it would appear that this process does not predominate over the electrode effect, especially at those densities which correspond to the minimum sparking potential.

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