

trons are not created either out of the tungsten or out of the surrounding gas. It follows that they flow into the tungsten from outside points of the circuit. The experiments therefore furnish a direct experimental proof of the electron theory of conduction in metals.

I wish to express my appreciation of the assistance I have received from Mr. K. K. Smith, instructor in the laboratory, in the preparation of the tubes and in carrying out some of the measurements. Mr. Smith and I are engaged in a more detailed quantitative study of the emission of electrons from tungsten, the results of which we hope shortly to publish. I also wish to thank Dr. W. R. Whitney and Dr. I. Langmuir, of the General Electric Company, both for supplying the specimens of ductile tungsten used and also for giving me the benefit of their invaluable experience.

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MENDELIAN INHERITANCE OF EPIDERMAL CHARACTERS IN THE FRUIT OF CUCUMIS SATIVUS

THE fruits of the White Spine cucumber (*Cucumis sativus*) possess numerous white epidermal spines or trichomes which roughen the skin very markedly; while those of the Richard's Invincible, an English forcing type (var. *Anglica*), possess but few, small, indistinct, early-deciduous and black spines that scarcely roughen the skin. By crossing these varieties, the White Spine having been used as the maternal parent, there was obtained a type of fruit apparently intermediate in size and in number and prominence of the spines, with the exception that all the spines were black like the paternal parent. In the F_2 generation, of the twenty plants grown fifteen bore black spines and five white spines; six possessed smooth skins with indistinct spines like the Richard's Invincible and the remainder skins with various degrees of roughness—a few even surpassing the White Spine in the number of spines. No correlation of color of spines and roughness was noted—

smooth-skinned progeny possessing white as well as black spines.

The inheritance of the color of the spines apparently follows the simple Mendelian segregation, although the number of progeny is too small for a very exact interpretation; the small number of smooth-skinned types also indicates this character as a recessive one, especially as the F_1 fruits show no evidence of this character. Practically, these data are of little value unless they indicate that by crossing back one of these smooth-skinned, white-spined fruits with an English variety, it would be possible to obtain a new white-spined variety, differing in appearance but slightly from var. *Anglica*; theoretically, it adds a little more evidence to the support of Mendel's universal law.

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POWDERY SCAB OF POTATOES IN THE UNITED STATES

In a recent number of *Phytopathology* Professor H. T. Güssow, of Canada, Dominion Botanist, reported for the first time in America the occurrence of the well-known European "powdery" or "corky" scab of potatoes.¹ The specimens upon which he based this report were received first from Quebec, where the disease appeared to be well established in some counties. It was also recorded in isolated cases in widely separated regions of Canada, namely, Cape Breton, Nova Scotia, New Brunswick, Ontario and Alberta. These facts led Professor Güssow to suggest that probably the disease occurs in the United States.

In connection with certain studies now being carried on in the writer's laboratory upon the general subject of potato scab, requests for specimens of scabby tubers have been sent to many individuals representing widely separated localities in the state of Maine and also

¹Güssow, H. T., "Powdery Scab of Potatoes, *Spongospora subterranea* (Wallr.) Johns.," *Phytopathology*, 3: 18-19, 1913.

to numerous friends and acquaintances in other parts of the United States. In asking for these specimens the fact was emphasized that potatoes affected by scab which differed in appearance from the ordinary type of the disease were especially desired.

As soon as received all lots of tubers were subjected to careful microscopic examination for the presence of *Rhizoctonia* and for the spore "balls" of *Spongospora subterranea* (Wallr.) Johns., or the fruiting bodies of the organism which is the cause of the powdery scab. None of the specimens showed the characteristic, superficial appearance of the last-named disease and the microscopic examination failed to establish its presence in any case beyond doubt, but practically all, regardless of the source, showed *Rhizoctonia* threads in the diseased areas. In addition poured plates were made from a large number of tubers from different sources and in every case tried the organism known as *Oospora scabies* Thaxter was isolated from some of the scabby spots.

A few of the tubers received showed small but rather pronounced pits upon their surfaces. Since these were usually more or less lined with *Rhizoctonia* threads it seemed possible that this fungus might be the primary or secondary cause of the pitting. Specimens of all lots of tubers of this kind and a considerable number of others, including samples from several different states, were planted in ten-inch pots in the greenhouse. Before planting the pots and soil were sterilized by heating for two hours under steam pressure at 20 pounds. The pots were then placed in sterilized saucers upon a raised, slat-work platform. The platform was constructed of new lumber and it and the bench upon which it rested had been previously washed with a strong solution of formaldehyde. The pots were watered with boiled water and all other precautions were taken to avoid cross infection or outside contamination.

The tubers from a part of these pots have just been harvested and in two instances rather surprising results were obtained in that in both well-developed and typical cases of

powdery scab were found.² A careful reexamination of other tubers from the original lots of specimens, which are now badly dried out, was then made and these showed the presence of a small number of yellowish brown bodies, now considerably shrunken, but which are evidently the dried spore balls of the causal organism. One of the original lots was sent by Dr. George E. Stone from Massachusetts, while the other was received from Nebraska through the courtesy of Mr. W. A. Orton, of the Bureau of Plant Industry at Washington.

No conclusive evidence of the presence of powdery scab in other parts of the United States has been obtained, but tubers which show a few bodies in the diseased areas which somewhat resemble those upon the tubers described above have been received from one locality each in Maine, Vermont and Wisconsin. These have recently been planted in pots in the greenhouse, but it will be some time before a final decision can be made.

The fact that the disease has been obtained from such widely separated localities as Massachusetts and Nebraska would indicate that it may be quite generally distributed in the United States and suggests the possibility that it may be a factor in the cause of potato scab in this country. In order to obtain farther light on this and on the subject of potato scab in general the writer of this note wishes to obtain specimens of scabby tubers from as many different localities as possible, and will gladly pay transportation charges on any which are sent in response to this request.

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² Mr. M. Shapovalov, to whom credit should be given for carrying out a large part of the details of the work upon which this statement is based, isolated cultures of *Oospora scabies* from the two tubers which produced the crop affected with powdery scab. He has also demonstrated that the cultures thus obtained are capable of causing, upon inoculation, the typical form of scab which is associated with the last-named organism. Hence it is evident that both forms were present on both lots of tubers.