After seven days one plant of Brittle Wax in the field cage reacted similarly to the plants in the greenhouse. When the second pair of leaves appeared, mosaic markings were not apparent and it was thought that weather conditions had checked the progress of the disease in the plant. However, upon examining the plants one week later, two plants of the three upon which the insects had been placed had developed typical mosaic symptoms. All of the plants in the check cages, as well as in the twenty-foot row outside of the cages, have remained healthy up to this time, one month from the time of the appearance of the first pair of leaves.

The species of aphid used in these experiments has been identified by Miss Eugenia McDaniel of the entomology department as *Macrosiphum solanifolii*. This species has been collected on beans at other times, especially early in the season. *Phaseolus vulgaris* is one of the known hosts of this very polyphagous species.

SUMMARY

The spread of bean mosaic was observed during 1921 under conditions which strongly suggested transfer by insects. The sudden appearance of the disease in the water cultures of beans growing in the greenhouse, and infested with aphids, indicated even more definitely the mode of dissemination. Definite proof of the transfer of the virus by *Macrosiphum solanifolii* was obtained under controlled conditions, both in the greenhouse and in the field.

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THE EXTENSION OF THE X-RAY INTO THE ULTRAVIOLET SPECTRUM

IT was found that when thermions liberated from a tungsten filament were accelerated and allowed to impinge on a metal grid maintained at a variable positive potential, secondary electrons were emitted from the grid. The number of such secondary electrons emitted were measured by means of a galvanometer in series with the grid and a plate maintained at a constant positive saturation potential.

On plotting the secondary current as a func-

tion of the accelerating voltage, acting on the primary electrons, a sudden change in the slope of the curve occurring at critical potentials was interpreted in the usual way. The energy-quantum relation $V(\text{volts}) \; L \; (\text{Å}) = 12320$ was used to compute the equivalent wavelengths.

The following table gives the preliminary results thus far discovered. The quantities bracketed are still doubtful. Those preceded by an (a) are not found by the usual breaks in the curves but are positions on the continuous curves where the ratio of the number of secondary (s) electrons per primary (p) were such as indicated in the s/p column. At present it appears as if the convergence wavelength (s/p = 3) for tungsten ended at 91.2 Å and is followed by an absorption band extending probably down to 14 Å. This is then followed by the $M\alpha$ line, here extrapolated as 7.04 Å from the above measurements.

TUNGSTEN

Volts	Wave-length (Å)	S/P	Remarks
4.4	2800		Hull found 2700 shortest spark spectrum.
(17)	(725)		Suspected
35.0	352		
(60)	(205)		
135	91.2	3	Doubtful
144	a85.6	2.5	
181	a68.0	2.0	
295	a41.7	1.5	
435	a28.3	1.0	
( )	( )	0.0	
1750	7.04		Extrapolated X-ray data gives $M\alpha = 7.007$)

IRON

Volts	Wave-length	Remarks
3.3	3763	
8.5	1450	Millikan's iron spectrum shows 1430 and 1409.
10.4	1184.6	Also 1184.
24.3	507.0	Also 506 and 552.1. Intensity 7. $M\alpha$ computed from Sanford's formula gave 484 Å.
45.8	269	Iron shows spectrum 271.6 Å.
( ) 200	a( ) a61.6	Doubtful.

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