type produce a metastable form of thallium.

In addition to this type of collision there should be at least two other resonance potentials and each of these will give rise to several lines in emission. Table I shows the probable stages in the excitation of normal thallium.

Metastable thallium, which Grotrian shows may be produced by heating to 800°C., should have resonance potentials about one volt lower, corresponding to $\nu = 2p_1 - 2s$ and $\nu = 2p_1 - 3d_{1,2}$.

One may now predict with certainty the critical potentials for other elements in this group as shown in Table II. Further work with these vapors is in progress.

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CROSS-INOCULATION STUDIES WITH CUCURBIT MOSAIC

CONTINUED cross-inoculation studies with cucurbit mosaic have shown that the disease may be transmitted to nearly all species of the cucurbits and to a number of plants in families other than the cucurbitaceæ. The cross-inoculation experiments with the cucurbits, described in an earlier paper,[1] have been continued until we now have 8 genera, 23 species, 8 varieties and 96 horticultural varieties which are known to be susceptible to the disease. This list includes a number of species and varieties from Europe, Asia and Africa. With the exception of the genus *Citrullus*, all of the cucurbits thus far inoculated have proven susceptible to mosaic. Inoculations in this genus have included twenty varieties of watermelon and citron, but infection has been secured only in the case of the green-seeded citron,[1] which appears to be susceptible to the disease.

Cross-inoculations with plants of other families, as earlier reported, gave some evidence that cucurbit mosaic was transmissible to martynia *(Martynia louisiana)*,[1] pepper *(Capsicum annuum)*,[2] milkweed *(Asclepias syriaca)*,[2] and pokeweed *(Phytolacca decandra)*.[3] Further studies have shown that cucurbit mosaic is readily transmissible to these hosts and back to the cucumber. The disease has also been transmitted from milkweed to both martynia and pepper and back to the milkweed. The writers have found that the most uniformly successful method of inoculation consists in the transfer of aphids from a mosaic plant to the plant inoculated, but successful results have also been obtained by artificial inoculation with the crushed tissue or expressed juice of mosaic plants.

We have also found that cucumber mosaic is readily transmissible to tobacco through the pepper and *vice versa*, the pepper apparently acting as an intermediate host. Numerous direct inoculations from cucumber to tobacco have been unsuccessful up to the present. Elmer,[4] however, reports that he has secured infection on cucurbits inoculated with tobacco mosaic and *vice versa*.

A continuation of the earlier experiments with the potato[3] has shown that cucumber mosaic is apparently transmissible to this host. We have secured a high percentage of infection in several series of inoculations to the cucumber from potato plants which had earlier been inoculated with cucumber mosaic. Tubers from potato plants which were inoculated from the cucumber in 1921 developed symptoms of mosaic when grown in the greenhouse during the past winter. Experiments also indicate that potato mosaic may possibly be transmitted to the pokeweed. In the latter experiments the potatoes used were from mosaic stock secured in northern Wisconsin. These experiments are still in a preliminary stage, however, and are being continued at the present time. During the past summer it has been found that cucumber mosaic may also be transmitted to the pigweed (*Amaranthus retroflexus*) and to a cultivated ground cherry (*Physalis sp.*).

A complete report of this work is being submitted for early publication.

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2 *Phytopathology*, 11, 47, 1921.
3 *Phytopathology*, 12, 42-43, 1922.
4 SCIENCE, 56, 370-373, 1922.