trolled. I might answer, "My dear fellow, the pest is already controlled by lethal factors and fluctuations of food supply, the cold, heat, winds and storms control it as do natural barriers, such as rivers, etc., and besides certain birds and beetles control it. Likewise, a fly parasite and a parasite wasp. Unfortunately, the latter is also controlled by a hyperparasite." In reply, supposing his anger was controlled by various inhibitions, including an inferiority complex, he might say, "Excuse me that I did not use the right word, but I am an unlearned and ignorant man. The insect has now controlled the crop and it is all dead."

I want to protest again and as strongly as I know how against the above uses of the word for meanings for which there are so many more precise designations and to urge that these other words be used, such as natural checks, climatic restrictions, topographical barriers, biological limitations or even environmental resistance for all these things that have no direct practical bearing on the problems of the farmer. He is thinking of the things that he can do to avoid the losses due to insects, fungi and other troubles. Control in this usual sense applies correctly in such cases as frost control which is accomplished by orchard heating and to moisture control by means of irrigation and cultivation. It would be just as bad to confuse these practices with meteorological limitations, restrictions or barriers. Our cooperative associations are beginning to accomplish very effectively the control of marketing to avoid this class of losses. In this work one also meets with commercial limitations, checks and barriers that must be considered, but must not be confused with what we can do to obtain better prices.

Those who insist on using the word control to express also other ideas should at least suggest another word that could be exclusively used to mean precisely what the great majority do mean when they say control.

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BLACK WALNUT CANKER

IN the fall of 1929, the extension specialist in forestry at West Virginia University, Mr. T. W. Skuce, informed me of the occurrence in the north central part of this state of a serious canker on the black walnut, *Juglans nigra* L. It was not until February, 1930, that I was able to obtain specimens in the field.

This disease has been observed upon trees varying in diameter from three to twenty inches. The cankers are located at any point on the older wood but are most conspicuous upon the trunk and larger branches where they form "cat-faces" or targets composed of very prominent concentric rings of callus tissue. The margins of the cankers are very rough, being composed of the last formed and largest roll of callus tissue, together with the attached bark. This gives the characteristic cankers a concentric flaring appearance with a diameter which is usually greater than the diameter of the trunk or limb at the point of canker formation. What appear to be young infections often show a burl-like growth before they open up to form the concentric rings so typical of the older cankers.

It has been noted also that whenever a tree is attacked several cankers are present and are well distributed on the trunk and larger limbs. Other trees near by may show no symptoms of disease. This is suggestive of an inherent difference in susceptibility among trees of similar ages in the same stand.

On many of the cankers, most commonly on the callus rings of two or three years ago, the perithecia of a Nectria are abundantly formed.

The appearance of this Nectria associated with such characteristic cankers suggests that this disease is closely related to the European canker which is well known in Europe on beech and other deciduous trees, and in America on the cultivated apple, but not reported as occurring upon black walnut. In fact, there are no published records so far as I can ascertain of this disease of the black walnut.

Because of the commercial importance of the black walnut in West Virginia and the fact that this disease renders the timber practically worthless, arrangements have been made by the Agricultural Experiment Station of West Virginia to conduct an investigation of this disease, including its geographical distribution, its origin, nature, host range, importance and the conditions surrounding infection and spread by the pathogen. This note is published to call attention to the black walnut canker; any information regarding its occurrence anywhere will be gratefully received.

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DUTCH ELM DISEASE IN OHIO

SEVERAL cases of the Dutch elm disease have been found in Ohio. The field symptoms exhibited were similar to those of the Dutch elm disease. The leaves wilted on certain branches or over the entire tree. Later, they turned yellow and dropped. The affected limbs died. When cross sections were made the typical brown discoloration of the vascular tissue was found, appearing generally as a broken ring but sometimes forming a complete circle. When the bark

was peeled back the stains appeared as short brown streaks in the spring wood.

The fungus which grew from the plantings of small pieces of the discolored wood on acidified potato dextrose agar produced a grayish white rather sparse and appressed mycelium showing zonation. Some of the colonies were yeast-like in appearance. Conidia approximately 1.5 x 3.5 μ were produced in heads on branched conidiophores. Budding of many conidia was observed. Coremia with spores approximately 3.3 x 1.7 μ formed on the wood plantings and on the agar.

A part of the lot of the original specimens sent to the Ohio Agricultural Experiment Station were forwarded to Dr. Christine Buisman, of Holland, at present at the Arnold Arboretum. She also isolated *Graphium ulmi* Schwarz from the diseased twigs.

The cases observed in Ohio have shown marked evidence of parasitism. The disease has been very destructive in Europe, and we should know as quickly as possible how wide-spread the disease is here. Specimens sent to the writer will be appreciated and will receive prompt attention.

CURTIS MAY

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THE PHOTOTROPY OF ULTRA-VIOLET-TRANSMITTING GLASSES

Two years ago when the Boyce Thompson Institute entertained the local sections of the American Chemical Society, I noticed that a sheet of ultra-violet-transmitting glass, said to be Corex, which had been used in a hot bed frame and exposed to a quartz mercury lamp, showed a distinct pinkish brown tinge. A more striking observation was that a piece of the same glass, exposed also to a mercury lamp and in addition to sunlight, showed no coloration whatever and had remained perfectly colorless.

This observation suggested that Corex was phototropic, and that the longer wave-length light supplied by the sun tended to reverse the colorizing action of the mercury lamp.

This supposition has been confirmed by more recent observations. Wood and Leathwood[1] determined quantitatively that ultra-violet-transmitting glasses which had been colored by exposure to a mercury lamp were completely restored to their original transparency by exposure to sunlight. Shrum, Patten and Smith[2] and Nitchie and Schmutz[3] have shown that the color produced by mercury lamp solarization can be completely destroyed by heating the colored glass. Clearly, then, the colorizing action of short wave-length light is reversed by longer wave-length light, and by heat. That is, the phenomenon is one of phototropy.

The purpose of this note is to draw attention to the striking similarity between the behavior of ultra-violet-transmitting glasses and the more extensively studied though little known phenomenon of phototropy. It is thought that the history of lithopone and other phototropic substances[4] may be useful to those who have occasion to handle these new glasses and who may wish to control the solarization effects either in manufacture or in use.

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THE RATE OF WORK DONE BY A RICKSHA-COOLIE

PROFESSOR BASLER'S article in the May 3, 1929, issue of SCIENCE on "Rate of Work Done by a Ricksha-Coolie," in which he finds one tenth horse-power as his work expended for short periods of time, is interesting. For comparison with his result, I present the following computation of the rate of work done by a man in walking (climbing) in the White Mountains, in going from the Ravine House in Randolph, New Hampshire, to the summit of Mt. Washington, by way of the Randolph path and the Gulf Side trail, a distance of nine and one half horizontal miles. The altitude of the Ravine House is 1,280 feet and of the summit of Mt. Washington 6,290 feet, thus giving a gain of 5,010 feet in making the ascent. To this should be added 270 feet as an allowance for two notable dips in the trail. This gives a total gain in elevation of 5,280 feet.

The trip can be made under favorable weather conditions in four hours. This would correspond to an average gain in elevation of 22 feet per minute. In the case of a man whose weight is 150 pounds, the power developed in merely raising his weight would be 3,300 foot pounds per minute, or exactly one tenth of a horse-power.

As in the case of the coolie, the man has also to expend energy in traveling the horizontal distance, and, of course, in overcoming numerous slight obstacles on the uneven path of the mountains. A sustained average of one tenth horse-power for a period of four hours would appear to be a creditable performance as measured by the figures reported by Professor Basler.

ALVAN L. DAVIS

[1] Wood and Leathwood, *Nature*, 124: 441, 1929.

[2] Shrum, Patten and Smith, *Transactions Roy. Soc. Canada* (3), 22: 433, 1928.

[3] Nitchie and Schmutz, SCIENCE, 71: 590, 1930.

[4] For a bibliography see *Chemical Reviews*, 6: 217, 1929.