two to eight times greater than reported by other workers.

Since many of the trees observed were fallen, weathered and partly burned, the grain in the limbs could not be determined in every case; but out of 215 observed in particular, the limbs showed the same direction of grain as in the trunk, except four cases in which the limbs showed twisting and the trunks were straight.

A new road runs through the area studied; from the roadway many trees, of various sizes, had been pulled. This condition afforded opportunity to study the roots, and the roots of 57 trees were studied. Of these, 31 (55 per cent.) showed twisting to the right of the tap root or smaller roots. Only 7 (12 per cent.) showed left-hand twisting, and 19 (33 per cent.) were straight. In practically all cases the trees had been cut so close to the ground that the direction of grain in the trunk could not be determined.

The degree of twisting varied considerably, as has been described in other regions. As measured at the surface, the direction of grain was seen, in many cases, to run at an angle of 45° to the main axis of the log. This extreme degree of twisting was observed in trees twisting to the left as well as those twisting to the right.

The most striking thing found in this study was that in any single tree the degree of twisting at the surface may be considerably greater than at any level nearer the center of the trunk or limbs. The accompanying figures illustrate conditions in trunks of actual trees and may be taken as typical examples of what was found after many careful examinations. In large, as well as small trees, this differential twisting may be taken as the general rule. This would seem to indicate that trees tend to become more twisted at the surface as they grow older. That the outer layers are twisted more than the inner ones is consistent with the observation of Cahn that larger trees were twisted more than smaller ones.

Many deciduous trees were observed that were twisted, and in some cases they were very sharply twisted, even in the limbs. Accurate records were not kept of the relative numbers, but there was a marked impression that left-hand twisting was more common than among the pines.

The purpose of this paper, simply, is to give a few additional facts on this general subject. I do not propose an explanation of the cause of twisting in trees, but I do believe that some of the observations listed here raise serious objections to the conclusion that tree twist is caused by prevailing winds. If prevailing winds cause the limbs of trees to twist, it seems reasonable to expect that the limbs on one side of a tree would twist in one direction and those on the opposite side twist in the opposite direction. All the limbs of any one tree, however, always twisted in the same direction It is believed, also, that wind could not cause roots to twist. The fact that the outer layers of the trunk and limbs are usually more sharply twisted than successive layers nearer the center is regarded as further evidence that wind is not responsible for the twisting.

EARL H. HERRICK
LOUISIANA STATE NORMAL COLLEGE

THE STINGING EPYRIS

WHEN the senior author wrote the short article, "A Small Insect Which Stings Severely," which appeared in SCIENCE for February 26, 1932 (pp. 243–245), he was unaware of the fact that the stinging propensities of the very same insect—*Epyris californicus* (Ashmead)—had previously been reported in SCIENCE by a physician, Chas. E. von Geldern, M.D.,[1] of Sacramento, California. In his article are described fully the systemic disturbances following the sting of the tiny insect from the medical view-point. Fortunately, the family referred to as living at Clarksburg is the same in both articles. In view of the increasing interest in the insect it was deemed desirable to ascertain more fully the present status of the effect of the stings on the various members of the family in question. Accordingly, the junior author, who happens to be conducting entomological investigations in the same region and who has become acquainted with the different members of the family, has secured the additional facts presented herein. The family is now composed of father, mother and four children, aged 13, 11, 9, and 3, respectively. The three older children only are mentioned in Dr. von Geldern's observations. Whereas in 1927 the father and mother both suffered considerable discomfort following the sting of the insect which resulted in asthma, numbness, nausea, localized itching and cramps, and diarrhoea, they are no longer affected seriously. For the past two years the stings have caused neither abdominal pains nor nausea. At that time also the third child, then 4, and the first, then 8, were no longer subject to manifestations of discomfort, while the second son, then 6, was greatly disturbed. At this writing the fourth boy is only irritated by the stings. The third, who up to a short time previously was only irritated, when last stung became flushed and very weak. The second son, when first stung, exhibited symptoms of asthma and general discomfort, but apparently became more or less immune until early in March, when a sting caused a flushed and swollen face and a burning of

[1] "Systemic Effects Following the Sting of a Species of *Epyris*," SCIENCE, 65: 1682, March 25, 1927, pp. 302–303.

the eyes. The oldest son is no longer bothered, except a local irritation at the time of the stinging. On April 9 he was stung in several places on the back which caused severe irritation, but no systemic complications followed.

In the experience of this particular family, over a space of nearly ten years, the very young children appeared to be only slightly affected by the stings of *Epyris*. As they grew older there was a period, from 5 to 10 years of age, when systemic complications arose, followed by a marked decrease in these symptoms.

E. O. ESSIG
A. E. MICHELBACHER
UNIVERSITY OF CALIFORNIA

MUCIFICATION OF THE VAGINAL EPITHELIUM OF MICE AS A TEST FOR PREGNANCY-MAINTAINING POTENCY OF EXTRACT OF CORPORA LUTEA

IN August, 1931, we set forth in SCIENCE[1] the possibility of the use of histological changes in the vaginal mucosa of mice as a practical test for potency of extract of corpora lutea. This suggestion was based upon the fact that "Histological changes of the vaginal mucosa, comparable to those occurring during pregnancy, were found when normal, adult, unmated female mice were treated, just after oestrus, with an extract of corpora lutea, . . . with daily injections of extracts for periods ranging from 3 to 14 days." The histological changes referred to consisted of a mucification of the vaginal epithelium giving a "picture characteristic of pregnancy."

This view, however, was disputed by R. K. Meyer and W. M. Allen this year in SCIENCE[2] as follows: "The production of vaginal mucification by corpus luteum extracts which maintain pregnancy in ovariectomized pregnant animals, as described in a recent article in SCIENCE by Harris and Newman, is, we believe, not a test for progestin but a test for the small amount of oestrin which the extracts used by them undoubtedly contain."

The position taken by Meyer and Allen was based upon the fact that they were able to produce mucification "in one adult guinea-pig, new-born guinea-pigs, mice, and rats with Parke, Davis and Company's theelin (crystalline oestrogenic preparation from the urine of pregnant women)."

It should be noted that while Meyer's and Allen's results are of considerable interest, they scarcely seem to justify, *a priori*, the application which these experimenters made of them to our results, inasmuch as Meyer and Allen state that, "The method we have used in general is to castrate adult rats, mice, and guinea pigs," while we[3] definitely specified the use of "normal" mice

The practicability of any biological assay depends, of course, upon careful adherence to the described method in respect to all variables. Certainly, in the present instance, the presence or absence of ovaries in the test-animals might well be considered a variable of the greatest importance.

In actual tests, such seems to be the case. While we do not question, in any respect, the facts of Meyer's and Allen's results, we do find that when we use "normal," *i.e.*, not ovariectomized, mice we are unable to produce vaginal mucification typical of pregnancy by daily injections of Parke, Davis and Company's theelin. In these tests (14 animals) we used doses ranging in individual cases from 0.05 r.u. per day for 8 days (the optimum dosage for the production of mucification in ovariectomized mice, according to Meyer and Allen) to 0.5 r.u. per day. Save for the fact that we used normal mice in all cases, whereas the workers cited used ovariectomized animals, the variables, as far as we can judge, were under as similar control as could be expected in two different laboratories.

Thus, from our work it appears that the injection of an oestrin preparation into otherwise normal mice does not bring on mucification of the vaginal epithelium.

As a result of this work, we are inclined to deny the implication of Meyer and Allen in respect to our previous publication.[1] Though one may still maintain that the corpus luteum "hormone" in our extract so conditions the test-animals that it permits "the small amount of oestrin which the extracts . . . undoubtedly contain" to have the same reaction as it would on an ovariectomized animal, the important fact for the moment is that the extract is a crucial factor in the reaction, and that our test as described[1] still seems to be practical for the purpose originally set forth.

It is, perhaps, timely to recall that the end results of many biological assays are often producible by wholly different substances, the end result being of test-significance only when variables are controlled as indicated, and oftentimes even then only when the experimenter has a fairly good notion of what substance he is testing.

REGINALD G. HARRIS
THE BIOLOGICAL LABORATORY
COLD SPRING HARBOR, L. I., N. Y.

[1] Reginald G. Harris and Dorothy M. Newman, "A Practical Test for Potency of Extract of Corpora Lutea," SCIENCE, 74: 182, 1931.

[2] Roland K. Meyer and Willard M. Allen, "The Production of Mucification of the Vaginal Epithelium of Rodents by the Oestrus Hormone," SCIENCE, 75: 111, 1932.

[3] With the technical assistance of Dorothy M. Newman.