

The bark producing cells and bark were formed across the thin and narrow strips of living wood on the interior in the same manner as on the exterior of the wood. The subsequent divisions of the bark-forming cells bridging these thin places were as active as those on the exterior side of the wood and therefore produced equally thick bark. This interior formation of bark should not be confused with those cases of bark formation from the edges of a wound. It is also different from those instances in which parts of hollow tree trunks at times die and decay away entirely through the trunk leaving longitudinal peripheral strips varying in length from a few inches to many feet. If there is a living center of tissue unaffected by the decay process, then subsequently or even simultaneously at points along the strip, the formation of bark may often commence or may continue what may already be present. In this way strands or strips may stand apart from the main trunk and thus be partly or completely surrounded by bark by encroachments from the edges.

VARIATIONS IN ERIGERON ANNUUS.

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During the summer of 1924 the writer observed an unusual number of variations or deviations from the usual form in the flowers and mode of branching in various representatives of the Compositae. Among the most striking of these deviations were observed in the common *Erigeron annuus* growing in Monroe County, Indiana. Instances of variation were observed to be unusually numerous as compared with previous seasons. A few specimens of *Bidens bipinnata* also showed deviations.

Extreme variation in the height of the plants of *Erigeron* in the same locality and the same soil and light condition was very evident. Specimens varying from 1 dcm. to 25 dcm. were occasionally found within one square meter.

The flowers of many of the specimens were normal. Some of the plants, however, showed considerable difference in the flowers. First to attract attention in this respect was the number of rays. In some plants the number of rays was much reduced, being only about half those usually present, while in other specimens the rays were more nearly the usual number. The color of the rays was normal as was also the size and form in most instances. The rays, however, of some of the flowers were considerably shorter than those in normal heads.

The changed appearance of the stem of *Erigeron annuus* was the thing which first attracted my attention in these plants even from a distance. The flower heads in certain specimens became fewer and fewer and finally disappeared altogether. A large number of such plants produced on the stem nothing but a mixture of branches and leaves in great profusion. Other plants produced only leaves on the single stem. Both branches and leaves were formed in such number

that the stem resembled a clavate brush, or cylindrical brush and in some cases approached a moniliform appearance. Where branches were formed they were short. The leaves varied in size from the normal to many which were almost filiform, and were scattered among the normal leaves from the commencement of leaf formation to the tip of the stem. In most of the plant showing the abnormal condition the large leaves were different as to margin also. The larger of these leaves, in many of the plants, were normal as to size and shape. Most of them were entire. The others on the same specimen were coarsely and sparsely serrate. The writer has also observed this same transformation in *Erigeron* of the Indiana Sand Dunes though less pronounced, and plants of this species also sent me from Illinois. A somewhat similar condition sometimes produced traumatically should not be confused with the above mentioned state which in some cases is due to a more or less diseased condition. One specimen was observed in which a healthy normal stem of *Erigeron* was attached at the base to an abnormal stem which was equally vigorous but with the otherwise changed appearance as above described. In some specimens fasciations in the form of extraordinary stem flattening was evident. Monstrosities in *Trillium* and other plants, in some instances decidedly change the appearance of the plant as described in this paper.

A NATURAL PROOF THAT THE ROOT TIP ALONE IS SENSITIVE TO THE GRAVITATIONAL STIMULUS, II.

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In the Proceedings of the Indiana Academy of Science for 1905 the writer contributed a paper showing that the root-tip alone perceives the gravitation stimulus. This was ascertained not by means of the glass-cap experiment as was successfully performed by Czapek, but as a result of the accidental and central breaking of the scutellum and its adherence in a firm and solid mass to the root-tip. In addition the coats of the grain remained attached to the separated mass of tissue about the root-tip and formed therefore an enclosure so strong that the root-tip was unable to free itself. The root-tip thus covered by this firm mass extended 3 mm. back from the tip, which in my specimens reached to the center of the embryo. The mass weighed 15 mg. The region of gravitational perception was thus completely covered and when placed horizontally showed no response to gravity. The grains of corn had been soaked and planted vertically as regards their long axis in a mixture of sifted and properly moistened beech and maple saw-dust.

Since 1905 the writer has observed and studied five other exactly similar specimens of *Zea mays*, which were accidentally discovered and which carried masses of tissue about the root-tip as above described. The occurrence of such a covering, as mentioned here, is therefore com-