# FASCIATION.

LUMINA C. RIDDLE.

The phenomena of fasciation are sufficiently striking to attract the attention of the most casual observer, and the malformation occurs so frequently that nearly every person has seen one or more cases of it. It manifests itself usually by a remarkable broadening and flattening of the stem, crowded phyllotaxy and often spiral twisting and splitting of this broadened axis, although the portion of the plant affected and the exact character of the growth varies with the nature of the plant. Those having the rosette habit throughout their entire life, as the common dandelion, show fasciation in the peduncle of the inflorescence. In the thistle (*Fig. 2,*) which has the rosette habit during the first year

Fig. 1. *a. Ailanthus glandulosus. b. Ranunculus abortivus.*

and is stemmed during the second year, it has only been observed in the second year's growth and affected the entire stalk. In the herbaceous hollow-stemmed plant of *Ranunculus abortivus*, (*Fig. 1, b,*) the entire stem was found fasciated and inside was found a reversed cylinder having the delicate epidermal layer within and a well developed ring of fibro-vascular tissue surrounding it. In *Erigeron philadelphicus* the leaves were so closely

compacted that the stem was entirely concealed while the top of the stalk was twisted down. In woody plants fasciated stems are nearly always split or twisted, often both, as shown in *Ailanthus glandulosus* (*Fig. 1, a.*)

Fig. 2.
Fasciated Thistle, *Carduus lanceolatus.*

Fasciation is found frequently occurring in many cultivated plants; the flowers, hyacinths, gladioli, narcissus, violets, geraniums, nasturtiums (*Tropoeolum*); the garden vegetables, cabbage or *Brassica oleracea*, and beets, *Beta vulgaris*; and trees, Pinus, Thuya, Taxus, Salix, Alnus, Ulmus, Prunus and Populus. Several plants are cultivated only in their fasciated form, the most familiar one being the coxcomb, *Celosia cristata*, L., and to this peculiar distortion is due the wide crest so greatly desired by the florist.

That it is possible to transmit the tendency to fasciate we have as proof not only the coxcomb but the results of experiments carried out by De-Vries, with eight different plants in all of which fasciation proved to be hereditary. The percentage of fasciated seedlings in the fourth generation was 40: while in the fifth, 24 per cent. showed marked fasciation. Wherever there was a tendency to revert to the normal it seemed to result from scanty nutrition, while where abundance was supplied the number of fasciated plants was in great predominance.

Goebel in his "Organography of Plants," states that it is difficult to answer the question as to the cause of fasciation. He classes it under malformations which appear spontaneously and are not caused by external conditions although these may call the deformity forth. Other authors suggest various causes which are many times wholly contradictory. Union of several stems, flattening of one growing point, over nutrition, lack of nutrition, decline of vital energy,

injury combined with superabundance of food, and shortening of the leafy axis, have all been suggested and in many cases are supported by apparently convincing proof. Fasciation to a slight degree was produced experimentally by the writer. Sturdy seedlings of the lima bean were selected and the plumule removed before the cotyledons were wholly expanded. Adventitious buds appeared in the axils of the cotyledons, much crowded together and compressed between stem and cotyledons, and several of these gave rise to fasciated growths. In this case the amount of stored nutrition was that required for the normal seedling. Development was arrested by the removal of the plumule so that the independence of the plant was delayed. Buds were crowded and there were several closely placed together. But what the internal disturbances are that give rise to this peculiar development even the best of authorities hesitate to state positively.

Fasciation has been known to occur in the following plants that are reported in the Ohio Check List. The nomenclature is that used in Britton's New Flora :

Zea mays,
Asparagus officinale,
Salix alba,
" " vitellina,
Phytolacca decandra,
Ranunculus abortivus,
" acris,
" bulbosus,
" repens,
" septentrionalis,
Berberis vulgaris,
Lepidium campestre,
Bursa bursa-pastoris,
Hesperis matronalis,
Spiraea salicifolia,
Fragaria vesca,
Trifolium pratense,
" repens,
Amorpha fruticosa,
Robinia pseudacacia,
Linum usitatissimum,
Ailanthus glandulosus,
Euphorbia cyparissias,
Decodon verticillatus,
Althaea rosea,
Chamaenerion angustifolium,
Onagra biennis,
Gaura biennis,
Convolvulus sepium,
" arvensis,
Myosotis palustris,
" arvensis,
Echium vulgare,
Mentha aquatica,
Linaria canadensis,
Antirrhinum majus,
Digitalis purpurea,
Plantago rugelii,
Dipsacus sylvestris,
Campanula rapunculoides,
Cichorium intybus,
Leontodon autumnale,
Tragopogon porrifolius,
Taraxacum taraxacum,
Lactuca sativa,
Bellis perennis,
Erigeron philadelphicus,
Rudbeckia hirta,
Anthemis arvensis,
" nobilis,
Chrysanthemum leucanthemum,
Carduus lanceolatus,
" arvensis.