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*On the Fruits of the Genus Anemone.* By Dr EDWARD  
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(Read 9th February 1888.)

The genus *Anemone*, notwithstanding the real affinity of the genera which botanists have classified under this name, consists of plants displaying such a decided difference in their nutritive and reproductive organs, that many attempts have been made to divide them into smaller genera or subgenera. These divisions, however, have not proved satisfactory as yet, not having been founded on sufficiently thorough investigations. Entirely different genera have often been classified together, and on the other hand those more nearly allied have been separated; less important characteristics have been remarked, and the most important overlooked.

While studying the genus *Anemone* monographically, the writer had the opportunity of convincing himself that the difference consists chiefly in the fruit, the structure and form of which are the most remarkable of all the biological characteristics. The confirmation of this thesis will be developed later on.

The fruit of the *Anemone* is a nut (achene) containing one seed, with a large endosperm without starch, and one embryo, rather small, with two perfectly developed cotyledons, or one very small roundish rudimentary embryo. As an indehiscent and dry fruit, the achene, in the first place, serves to protect the seeds (till the time of their germination) by means of its pericarp, which consists of layers of parenchyma and sclerenchyma; secondly, it aids their dissemination by means of animals, wind, or even water.

That is also the reason why the achenes of the genus *Anemone* vary in their outward appearance; all possess, however, a persistent though variable style. Even the structure of the pericarp is adapted to certain purposes; so is also the variety in the length and manner of growth of the hair of the achene, which cannot fail to strike us.

On account of the difference in the form of the achene and its embryo, the writer feels justified in distinguishing the following types in the genus *Anemone*:—

- (A) Embryo without any cotyledons rounded; in the first year the main root issues from the fruit, without appearing above ground.

1. *Hepatica*, Dill,\* *Cat. Plant. Giss.*, p. 108, Tab. v., 1719.

The second year after the seed has been sown, green cotyledons appear above ground. Fruit short or longish, oviform, short hairy; style short. At the base of the fruit an apophysis is formed from the luxuriantly developed cells of the epidermis. No special organ for the dispersion of the seeds.

2. *Sylvia*, Gaud.,† *Flora Helv.*, iii. p. 490, 1828.  
*Anemonanthea*, DC., *Syst.*, i. p. 196, 1818, pr. prt.

In the second year there appears above ground one leaf, rarely two; cotyledons under ground. Fruit oviform or almost round, covered with short hairs, rare, and of equal length; style short. No special organ for the dispersion of the seeds.

(B) Embryo bicotyledonous; cotyledons generally appear above ground some weeks after dissemination.

3. *Omalocarpus*, DC.,‡ *Syst.*, i. p. 212, 1818.

Achenes flat (flattened at the side), wing-like, hairless; style very short. The petioles of the cotyledons are joined in the germs up to the lamina. Owing to its form, the achene is particularly adapted for being transported to a considerable distance by the wind.

4. *Anemonidium*, Spach,§ *Hist. vég. phan.*, vii. p. 248, 1839.

Achenes flattened at the side, spongy at the margins, which resemble thick wings, hairless or shortly hairy. The spongy margins (or wings), whose air-filled cells are impervious to water, are instrumental as a means of dissemination, not only by wind, but also by water.

\* *H. triloba*, Chaix; *H. transylvanica*, Fuss.; *H. Falconeri*, Thoms.

† *Anemone nemorosa*, L.; *A. ranunculoides*, L.; *A. trifolia*, L.; *A. altaica*, Fisch.; *A. cœrulea*, DC.; *A. umbrosa*, C. Mey.; *A. udensis*, Traut et Mey.; *A. reflexa*, Steph.; *A. nikoënsis*, Max.; *A. deltoidea*, Hook.; *A. appennina*, L.; *A. stolonifera*, Max.; *A. baikalensis*, Turcz.; *A. flaccida*, Fr. Schmidt; *A. Delavayi*, Franch.

‡ *Anemone narcissiflora*, L.; *A. elongata*, Don; *A. polyanthos*, Don; *A. tetrasepala*, Royle; *A. demissa*, Hook. et Thoms.

§ *Anemone pennsylvanica*, L.; *A. dichotoma*, L.

5. *Rivularidium*, nov. sect.\* *Anemonospermos*, DC., *Syst.*, i. p. 208, 1818, pr. prt.

Achenes mostly oviform, never flattened, hairless. Style more or less short, generally curved like a shepherd's crook at the end. Either there exist no organs for the dispersion of the seed (?), or the curved style serves to attach the fruits to the hair of mammalia. These fruits being the heaviest in this genus, the influence of the wind as a means of dissemination is excluded.

6. *Pulsatilloides*, DC.,† *Syst.*, i. p. 195, 1818.

Achenes elongated or oviform (1 : 4 or 1 : 5); style of equal length or shorter. The pericarp is densely clothed with stiffish, slanting hair, longer at the base of the style, and shorter at the base of the fruit. By means of this hair the fruit is dispersed by mammalia, and in the same degree by the wind.

7. *Pulsatilla*, Tourn.,‡ *Hist.*, p. 248, Tab. cxlviii. 1700.

Fruit small, generally inverted, oviform, style ten times as long; achene densely clothed with short hair; style, on the contrary, scattered long hairy. Dissemination through wind by means of the hairy styles; the hair of the pericarp, on the other hand, adhering to the hair of mammalia.

8. *Eriocephalus*, Hook. et Thoms.,§ *Flor. Ind.*, i. p. 20, 1835.

*Anemonanthea et Anemonospermos*, DC., *Syst.*, i. pp. 196 et 208, 1818, pr. prt.; *Phœandra*, Spach., *Hist. vég. phan.*, vii. p. 249, 1839; *Oriba*, Adans., *Fam.*, ii. p. 439, 1763.

Fruit small, roundish-oval or club-shaped, in section

\* *Anemone rivularis*, Hamilt.; *A. antucensis*, Kz. Pöpp.; *A. Richardsoni*, Hook.; *A. Sellowi*, Pritz.; *A. rigida*, Gay; *A. hepaticæfolia*, Hook.; *A. crassifolia*, Hook.; *A. rupestris*, Wall; *A. mexicana*, H. B. K.; *A. æquinoctialis*, Pöpp.

† *Anemone capensis*, Lam.; *A. alchemillæfolia*, E. M.; *A. glaucifolia*, Franch.; *A. obtusiloba*, Don.; *A. trullifolia*, Hook. et Thoms.

‡ *Pulsatilla alpina*, Spreng.; *P. albana*, Stev.; *P. cernua*, Spreng.; *P. chinensis*, Bunge; *P. dahurica*, Fisch.; *P. Halleri*, All.; *P. patens*, Mill.; *P. pratensis*, Mill.; *P. vernalis*, Mill.; *P. vulgaris*, Mill.; *P. ajanensis*, Rgl. et Tilling.

§ *A. biflora*, DC.; *A. caroliniana*, Walt.; *A. coronaria*, L.; *A. hortensis*, L.; *A. palmata*, L.; *A. baldensis*, L.; *A. decapetala*, L.; *A. japonica*, Zucc. et Sieb.; *A. multifida*, DC.; *A. parviflora*, Mehx.; *A. rupicola*, Camb.; *A. sylvestris* L.; *A. virginiana*, L.; *A. vitifolia*, Hamilt.

round or lentiform; style short, or of the same length as the achene; pericarp densely clothed with soft long hair, longest at the base of the achene. This kind of hair is especially adapted for transporting the fruit to a considerable distance by means of the wind.

9. *Barneoudia*, \* Gay, *Hist. Chil. Bot.*, i. p. 29, Tab. i., 1845.

Achene bean-shaped, style of nearly equal length; the parenchyma of the achene has net-like incrassation. Achene covered with erect hair of the same length as itself, but longer than the hair of the style. Means of dissemination, the hair.

10. *Exinvolucrata*, nov. sect.

*Anemone integrifolia*, Spreng., occupies a separate place, owing to the entire absence of the involucre. The writer regrets not having been able to see a ripe fruit, but concludes it must be hairy, judging from the style, when in the state of fructification.

The fruit of the genus *Anemone* originates in the style, which contains in the ovary only one involucre ovulum. The warts, which are to be found in the ovary above this ovulum, and which Baillon† regards as abortive ovula and characteristic of this genus, have no diagnostic value, because they are only to be found in some species, and are of doubtful nature.

The ovulum of the genus *Adonis*, having two involucre, ‡ cannot be classed with the genus *Anemone*.

\* *Barneoudia chilensis*, Gay; *B. major*, Ph.; *B. Domeykoana*, Leib.

† *Histoire des Plantes, Renonculacées*, p. 44.

‡ *Adonis æstivalis*, L.







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