

A Summer School at Home.

If you are able to attend a summer school, do so by all means, but do not feel that there is nothing to be learned at home, or wherever you may be located in vacation time. The field of research is so vast that one is obliged to concentrate upon some particular subject, and direct the energies toward it.

Some hints for summer work are here given, in the hope that some one may be benefitted by them. Success in teaching science depends not upon the material, but upon the close contact with nature to secure it. In botany, a study which affords wondrous resources, we may make the acquaintance with some flower families; for example:

Some members of them will be met with in the daily walks. Three or four teachers can form a botanical club, and send through the mail specimens of plants peculiar to the locality where they may be. The whole plant, roots, stems, leaves, blossoms, should be sent. Double or fold carefully and place in pasteboard box. Tie a little green moss around the roots, not wet, as wet things are not passed through the mail. If fresh when sent, they will be found in good condition for examination generally.

Some prominent families are these, identification being based on plan of flower generally. See how many of your specimens fall into them.

PLAN.

1. Ranunculaceae or Buttercup family } 5's. Stamens on the receptacle.
2. Rosaceae or Rose family } 5's. Stamens on the calyx.
3. Onagraceae or Evening Primrose family } 4's. Flowers on a stalk like ovary.
4. Ericaceae or Heath family } 5's. Anthers opening by chinks.
5. Labiate or Mint family } Stamens four, two longer than the others. Square stems, opposite leaves. 2-lipped corolla. 4-lobed ovary.
6. Scrophulariaceae } 5's. Stamens four, two longer than the others. Round stem. 2-celled ovary.
7. Leguminosae or Pulse family } 5's. Like the pea flower. 1-celled ovary or 1 single free pistil becoming a pod in fruit. Stamens usually diadelphous.
8. Lobeliaceae } 5's. Milky. 2-lipped. Stamens united into a tube commonly by their filaments and always by the anthers.
9. Compositae } 5's. Flowers in heads with involucre or bracts around. Stamens united by their anthers.
10. Rubiaceae or Madder family } Plan of 2's. Leaves in whorls, or opposite, and stipules.
11. Cruciferae or Mustard family } Plan of 2's or multiples of. Ovary 2-celled. Stigmas 2'sessile. Six stamens, two inserted lower than the others. The four petals form a cross.
12. Orchidaceae or Orchids } 3's. Anthers on the pistil.
13. Liliaceae or Lily family } 3's. Ovary free. Stamens 6.

A study of the wonderful distribution of seeds may be made. Gather, sort and mount specimens of all seeds found.

(1) Wind distributed, (2) self-sown or discharged by explosive power, (3) water transported, (4) seeds carried by man and animals, will be a good division to make.

The relation of the seed to the manner of its distribution will be well worth study. The use and disadvantage to agriculture will be seen.

In the case of the Russian thistle, lately introduced, see how well adapted it is to inhabit the land, regardless of the efforts made to exterminate it. It grows in round, bushy masses, about three feet high and six feet in diameter, furnished with prickles. These masses when dead and dry, but with thousands of seeds all ready, drift or are carried by the wind in enormous quantities. It is said that a single plant carries as many as two hundred thousand seeds.

An interesting study is that of the interdependence of plant and animal life, shown by the fertilization of flowers.

The various kinds of bees, moths, butterflies, wasps, flies, beetles, and some birds, all collect pollen and honey in one flower, and transmit it to another, thus producing cross fertilization.

Notice what kind of insects frequent certain flowers, as some are frequented by bumble bees, the willow by the andrena bee, Jack-in-the-pulpit by a kind of gnat, the thistle by many kinds of bees and butterflies, and so on.

See how large a list can be found during the summer. A list is given in "Elements of Botany," J. Y. Bergen, Ginn & Co., which, with many others there, will be found of value in these studies for comparison.

In mineralogy, everywhere specimens abound. Collect and identify if you can. Then those which you are unable to name can be submitted to an expert.

In meteorology the field is wide. The weather, its relation to climate and locality, will all pass under your notice. If you are at the seaside, you will notice the difference between the land and sea breezes; the fogs; if on the mountains, the air, its dryness and other features.

To those interested in the science of entomology, abundant material is available also. To find out the difference between a butterfly and moth, the day-flyers, the night-flyers, the connection between the color of plants and their visitation by insects, is extremely interesting.

A study of insects injurious to vegetation will be of value. To understand what the farmers have to contend with, this study will open one's eyes. Standard works on the subject and pamphlets published by the government can be had. *Adapted from Popular Educator.*