

case-knife bean, acorn, horse-chestnut. Squash seeds are excellent for germination studies, because the cotyledons become green and leafy and germination is rapid. Its germination, as also that of the scarlet runner bean, is explained in "Lessons with Plants." Onion is excellent, except that it germinates too slowly. In order to study the root development of germinating plantlets, it is well to provide a deeper box with a glass side against which the seeds are planted. **12.** Observe the germination of any common seed about the house premises. When elms, oaks, pines, or maples are abundant, the germination of their seeds may be studied in lawns and along fences. **13.** When studying germination, the pupil should note the differences in shape and size between cotyledons and plumule-leaves, and between plumule-leaves and the normal leaves (Fig. 30). Make drawings.



FIG. 30. — MUSKMELON SEEDLINGS, with the unlike seed-leaves and true leaves.

14. Make the tests described in the introductory experiments with bean, corn, the castor bean, and other seed for starch and proteids. Test flour, oatmeal, rice, sunflower, four o'clock, various nuts, and any other seeds obtainable. Record your results by arranging the seeds in three classes, 1. Much starch (color blackish or purple), 2. Little

starch (pale blue or greenish), 3. No starch (brown or yellow). **15.** *Rate of growth of seedlings as affected by differences in temperature.* Pack soft wet paper to the depth of an inch in the bottom of four glass bottles or tumblers. Put ten soaked peas or beans into each. Cover each securely and set them in places having different temperatures that vary little. (A furnace room, a room with a stove, a room without stove but reached by sunshine, an unheated room not reached by the sun.) Take the temperatures occasionally with a thermometer to find difference in temperature. The tumblers in warm places should be covered very tightly to prevent the germination from being retarded by drying out. Record the number of seeds which sprout in each tumbler within 1 day; 2 days; 3 days; 4 days, etc. **16.** *Is air necessary for the germination and growth of seedlings?* Place damp blotting paper in the bottom of a bottle and fill it three fourths full of soaked seeds, and close it tightly with a rubber stopper or oiled cork. Prepare a "check experiment" by having another bottle with all conditions the same except that it is covered loosely that air may have access to it, and set the bottles side by side (why keep the bottles together?). Record results as in the preceding experiment. **17.** *What is the*