

nature of the gas given off by germinating seeds? Fill a tin box or large-necked bottle with dry beans or peas, then add water; note how much they swell. Secure two fruit-jars. Fill one of them a third full of beans and keep them moist. Allow the other to remain empty. In a day or two insert a lighted splinter or taper into each. In the empty jar the taper burns: it contains oxygen. In the seed jar the taper goes out: the air has been replaced by carbon dioxid. The air in the bottle may be tested for carbon dioxid by removing some of it with a rubber bulb attached to a glass tube (or a fountain-pen filler) and bubbling it through lime water. **18. Temperature.** Usually there is a perceptible rise in temperature in a mass of germinating seeds. This rise may be tested with a thermometer. **19. Interior of seeds.** Soak seeds for twenty-four hours and remove the coat. Distinguish the embryo from the endosperm. Test with iodine. **20. Of what utility is the food in seeds?** Soak some grains of corn overnight and remove the endosperm, being careful not to injure the fleshy cotyledon. Plant the incomplete and also some complete grains in moist sawdust and measure their growth at intervals. (Boiling the sawdust will destroy molds and bacteria which might interfere with experiment.) Peas or beans may be sprouted on damp blotting paper; the cotyledons of one may be removed, and this with a normal seed equally advanced in germination may be placed on a perforated cork floating in water in a jar so that the roots extend into the water. Their growth may be observed for several weeks. **21. Effect of darkness on seeds and seedlings.** A box may be placed mouth downward over a smaller box in which seedlings are growing. The empty box should rest on half-inch blocks to allow air to reach the seedlings. Note any effects on the seedlings of this cutting off of the light. Another box of seedlings not so covered may be used for a check. Lay a plank on green grass and after a week note the change that takes place beneath it. **22. Seedling of pine.** Plant pine seeds. Notice how they emerge. Do the cotyledons stay in the ground? How many cotyledons have they? When do the cotyledons get free from the seed-coat? What is the last part of the cotyledon to become free? Where is the growing point or plumule? How many leaves appear at once? Does the new pine cone grow on old wood or on wood formed the same spring with the cone? Can you always find partly grown cones on pine trees in winter? Are pine cones when mature on two-year-old wood? How long do cones stay on a tree after the seeds have fallen out? What is the advantage of the seeds falling before the cones? **23. Home experiments.** If desired, nearly all of the foregoing experiments may be