mercury, which is heated to boiling to expel both air and moisture. While still hot the second or temporary bulb is warmed to expel a portion of the air therein; the open end is placed in the mercury, which ascends into the bulb because the air contracts on cooling. When a sufficient quantity of the hot mercury has been introduced into this bulb, the tube and the other bulb are heated to expel a part of the air, and some of the mercury, which must always be kept hot to prevent its chilling and thus breaking the hot glass, enters the real bulb. By repeating the operation the bulb and stem are completely filled with mercury, which is then boiled to expel every trace of air. The tube is now drawn out close beneath the auxiliary bulb to a fine thread and cut off; the thermometer is placed in a bath heated a few degrees higher than the highest temperature which the thermometer is to show; the excess of mercury flows out, and the point is closed with a fine blow-pipe flame. As the mercury contracts on cooling it leaves a perfect vacuum above it.

The graduation is effected by putting it into ice or snow, then in the steam from boiling water, marking each of these points, dividing the space between into 100 parts if it is to have a Celsius or centigrade scale, into 80 if a Reaumur, or 180 if a fahrenheit. The graduation is carried on in each direction to the end of the stem. On the Fahrenheit scale the freezing point is marked 32, on each of the other scales it is marked zero.

Absolute zero is a term applied to a temperature 273° below zero on the centigrade scale, or—460° Fah. If we take 273 cubic inches of air, or any gas measured at 0° C., it will become 274 at+1° C., or 283 at+10° C. or 373 at 100° C., and at—10° C. it is only 263, at—49° it is only 233, and, at this rate it should become only 1 cubic inch at—272° and at—273° it should occupy no space at all, or at least not be gas any longer. As this temperature is not yet attainable, we can not positively assert that such would really be the case.

Maximum thermometers are made by placing a little float of steel upon the mercury, and the thermometer placed horizontally or nearly so. As the mercury expands it pushes along the float, which does not, however, follow the mercury when it contracts; hence we are able to ascertain the highest temperature reached during any given interval. To reset the thermometer, it is raised to a vertical position and a slight tap given to it, which causes the float to drop down on the mercury again.

A simple and more accurate form of maximum thermometer, employed by Bunsen in measuring the temperature of the Geysers, consisted of an ungraduated thermometer open at the top, such as could easily be made by a person of but little experience. When placed in the spring, of course a portion of the mercury would flow out and escape. At any subsequent time the thermometer could be placed in an oil bath beside a standard thermometer, and heated until the mercury had entirely filled the tube and was about to flow over; at this moment the standard thermometer is read, and shows the temperature to which the other thermometer had been exposed. The ordinary minimum thermometer contains alcohol instead of mercury, and the float is either of glass or of steel covered with enamel, so that it is drawn back by adhesion, but can not be pushed forward.

The most reliable form of self-registering thermometer is an upright mercurial thermometer, behind which is passed by clock-work a strip of sensitized paper. In front of it is placed a light of sufficient actinic power to blacken the paper above the mercury column. This gives not merely the maxima and minima, but all variations of temperature.

Metallic thermometers may be constructed by combining two metals which expand unequally into a spiral, which winds up when heated and unwinds when cooled. One end of the spiral being attached to an index which passes along a graduated arc. the slight motions are magnified so as to be distinctly visible. It is graduated by comparison with a good mercurial thermometer.

For measuring slight changes in temperature a thermo-electric pile, connected with a galvanometer needle, is employed. This is only applicable within very narrow limits, and requires great care to obtain satisfactory results.—*Scientific American.*

GARDENING.

March, the first spring month, will appear to our readers in widely different forms. In some parts of our country the essential signs of spring are plainly manifested; the buds are swelling upon the trees—some even are in full flower; in sunny, well-protected corners the Crocus and Snowdrops are contrasting their beautiful forms and colors, and the "busy bee" is gathering from these flowers its first crop of the season. In other parts of our country the snow-banks completely hide from our view every appearance of early spring flowers.

In this section, March is the most remarkable month of the year, and it is not uncommon to have the weather of the four season crowded into a single day. Winter, though it may return now and then in bitter nights, may be considered gone, and is rarely felt injuriously during the day. The cold winds, it is true, blacken and destroy our early flowers and try our tempers, but spring, in defiance of all hindrances, pursues its way steadily and with success. Nowhere is this more beautifully shown than in the vegetation of seeds bequeathed to the soil in the p evious autumn, and which, after lying in the earth apparently dead for many months, now assert their vitality and lift their green blades into the air. These delicate little forms, scarcely perceptible to the naked eye, are full of promise, and fill us with hope and confidence. The love of flowers of all kinds is naturally implanted in man but the early flowers of spring always bring with them the greatest degree of pleasure. The Crocus bursting through the ground is the harbinger of sunny days, and when we first meet with it in spring it is like greeting a long-absent friend. We live with summer flowers as with our neighbours, in harmony and good-will, but for the early flowers we have the most endearing affection.

Preparation for spring and summer work now begins. Should cleaning up and pruning have been neglected, defer that important work no longer than the weather compels you to. As soon as the ground is fit to work, attend to the removal and the dividing of all herbacious plants that need to be removed or increased by division. Herbacious plants have all *their* preparation for spring work completed and commence growth as soon as the frost is out of the ground; therefore remove early, in order that their first new roots may not be destroyed in removal and the plants remain worse than idle while new roots are being formed. Lilies, in particular, that have been in the border during the winter should be removed early. In planting out again select a partially shaded situation, the shrubbery border being preferable. To have Lilies in perfection the soil must be kept moist and cool; if planted in low-growing shrubbery this necessity is provided for in the most natural way. If the Lily-bed is in an exposed situation, mulch with newly-cut grass as soon as the weather becomes hot and dry.

Hot beds should now be in readiness for the sowing of seeds for early flowering plants. It should ever be borne in mind that seeds of annual plants of every description, if sown at this period, ought not to be rapidly excited by too powerful heat. Errors of this kind are very common, and the many losses of plants from this cause tend to discourage the amateur in the laudable effect to prolong the flowering season. Where any artificial heat is employed, it should be of a very gentle nature. and, with the exception of extremely tender species, the more it is dispensed with the greater will be the luxuriance, beauty, and hardiness of the plants.

As a rule, amateurs will be more benefited by a cold-frame for bringing forward plants such as Asters, Balsams, Zinnias, Petunias and Antirrhinums, etc., etc., than by a hot bed. Our custom is to sow seeds of annual, six weeks earlier than tender plants can be transferred to the open border. This should be done in a common cold-frame covered with hotbed sash. The result will be good, strong plants about six inches high at the same time that seeds sown in the open border are just breaking ground. These plants, having been grown cool, are vigorous and healthy, and can be transplanted into the flower-border without danger of loss.

House plants will now require much care and attention. The sunshine on clear days will excite a rapid growth; consequently the plants will require a corresponding amount of air and moisture. Insect life is now quite as active as plant life, and the two cannot live long together. Destroy the insects, or they will destroy your plants. Geranium-cuttings may now be struck, and the young plants grown on for the conservatory the coming winter. Young plants from seed sown in boxes should be pricked out into small pots and brought forward as rapidly as possible, but do not suffer them to grow weak and spindling. Always remember that one good, strong, healthy plant will produce more flowers than a score of puny, weak ones. Hyacinths in pots should be in perfection of bloom this month. When the flower-spike is well developed and the first flowerets begin to open, place the plants in a cool, light room. This will materially prolong their season of bloom. After flowering allow the bulbs to dry off gradually, and they will be worth preserv. ing for planting in the border the coming autumn. Hyacinths that have once been forced are in future useless for pot-culture. —*Floral Cabinets.*