came pasty and thick. The gases were conducted through a system of stone flasks containing water, and in this way at first three fourths, afterwards eleven twelfths, of the nitric acid in the saltpeter was obtained. As the common salt in the saltpeter is not decomposed by carbonate of lime, at least at the temperature employed, the acid obtained was perfectly free from chlorine. The thick sirupy mass was drawn out of the pan while still hot, and the pan charged again. The mass, which contained caustic lime and carbonate of soda, when cold, was boiled with water to obtain caustic soda, the carbonate of lime being precipitated.

Since all the soda in the nitrate of soda is obtained in the form of caustic soda, and as a rule this covers the total cost of the saltpeter and chalk employed, this process would be a profitable one were not the costly vessels rapidly destroyed, as an eight months' experience proved, the operation often being interrupted to renew the pans.—*Carl Lieber.*

To Make Gold and Silver Inks.

Good bright gold, silver, and bronze inks are seldom met in the market; they are almost always of a dull color, do not flow easily from the pen, and the writing remains sticky. Hence architects and artists mostly prefer to use shell gold and shell silver (*Muschel-Silber*), instead of the corresponding ink. The latter, however, is so much easier and safer to use that I will describe its preparation.

For gold ink it is best to employ genuine gold leaf, but owing to the expense this is seldom used; sometimes mosaic gold (sulphide of tin) or iodide of lead is employed, but almost always Dutch leaf.

Owing to the relatively low price of silver, genuine silver foil is used for silver ink, false silver foil is seldom used, and is not so good. For other metallic inks, commercial bronze powders are employed. The genuine and false foils are also sold in a finely pulverized state; they are made from the waste of the gold beaters by rubbing it in metallic sieves to an impalpable powder.

In consequence of the beating between gold beater's skin, it has particles of grease and other impurities attached to it which must be removed before it can be used for ink. For this purpose the whole sheets, or the commercial bronze powder, are triturated with a little honey to a thin magma on a glass or porphyry plate with a pestle, as carefully as possible, as the beauty of the ink depends essentially on this. The finely rubbed paste is rinsed into a thin glass beaker, boiled for a long time with water containing a little alkali, frequently stirred, decanted, well washed with hot water, and dried at a gentle heat. By boiling this powder with water containing sulphuric, nitric, or hydrochloric acid, different shades can be imparted to it.

Next, a solution of 1 part of white gum arabic in 4 parts of distilled water is mixed with 1 part of potash water glass, and triturated with the requisite quantity of purified metallic powder. Gold ink will bear more liquid than silver ink, since gold covers much better; on rough paper more metal is necessary than on sized paper; on light paper more than on dark, to make the color of the ink appear equally intense.

In general 1 part of foil is enough for 3 or 4 parts of the above liquid. In preparing large quantities of ink, a low porcelain measure is used for transferring it to the small glass vessels where it is to be kept, and it must be continually and thoroughly stirred so that it will always keep well mixed. It requires frequent stirring also when in use. It is best to mix the dry powder with the liquid immediately before using. The ink can be used with a common steel pen, and flows very well when writing slowly, but it is better to use a pencil.

I consider the use of potash water glass of great importance. It greatly increases the metallic luster on paper, prevent its looking dead, protects the writing from being discolored by the action of the atmosphere, and also prevents its penetrating too far into the pores of the paper, without rendering it very viscid. Although the writing of itself possesses a high metallic luster, it may be increased by gently polishing with a polishing steel. Inks made with mosaic gold, mosaic silver, iodide of lead, etc., are not nearly so beautiful.—*C. H. Viedt.*

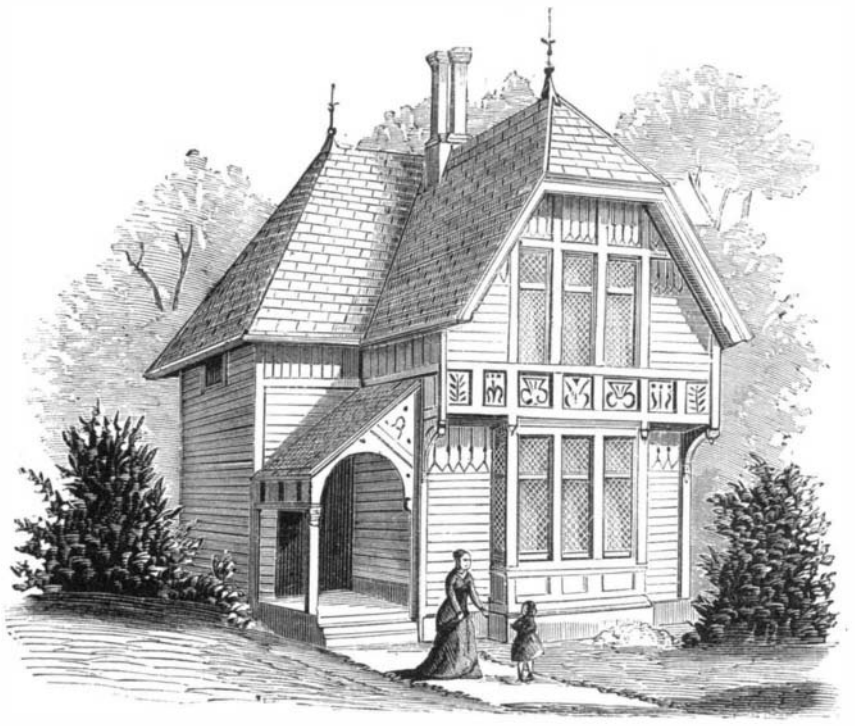
HARDY AZALEAS.

These are flowers so fresh and fragrant that they ought to

be more generally grown in shrubbery borders than they are. The colors are rose, buff orange, and orange buff; and when intermixed with tender young foliage, it is difficult to imagine anything more beautiful. In every variety of this plant, when grown well in any deep rich soil, intermixed with rhododendrons, the different tints of yellow, red, and orange have a pleasing effect among the white, rose, and purple tints of the latter plant. Another attraction possessed by these azaleas is that the foliage becomes bright yellow and crimson in the autumn. Our illustration represents the so-called Ghent azalea, a fine specimen of the hardy class.

COTTAGE ARCHITECTURE.

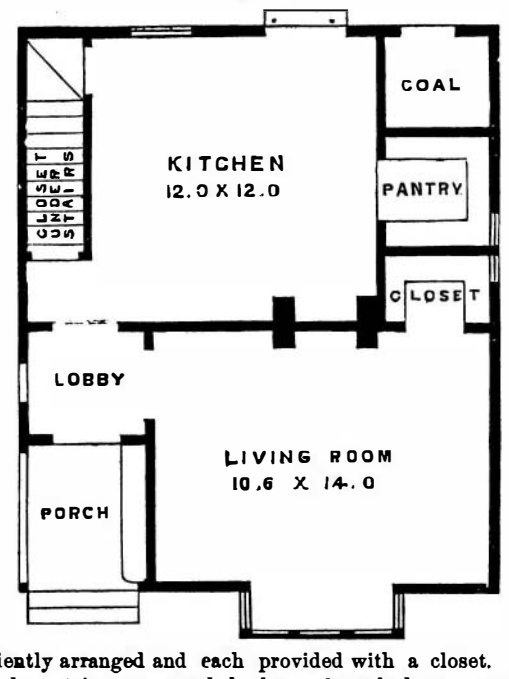
The accompanying view and plans (Fig. 2), designed for a gardener's cottage, show a building, small, but very picturesque in appearance. It would be very suitable for a gate



AN ORNAMENTAL COTTAGE.

lodge or a sea-side or summer cottage, and would look extremely well among the trees of a camp ground. The porch (with its seat) is large and roomy; the living room is of good size, well lighted by a square bay window. The kitchen is well supplied with closets. This first floor could be very much improved by adding a one-story kitchen at the rear, making the living room into a parlor, and the kitchen into a dining and sitting room; the additional cost would be very small. The second floor contains three bed rooms, very con-

Fig. 2.



veniently arranged and each provided with a closet. The two downstairs rooms and the large front bed room are supplied with open fireplaces, the value of which for ventilation is so often overlooked in cheap houses; besides this, there should be ventilating tubes or shafts in the chimney sides, with registers opening from each room, thus insuring a good system of ventilation. The roof should be ventilated by openings under the projecting eaves. The estimated cost of this building is from $1,200 to $1,800, according to locality and style of finish.

The view and plans are taken from "Wooden and Brick Buildings," the latest and best work published by Messrs. A. J. Bicknell & Co., of 27 Warren street, New York.

Smith College.

By the endowment of a charitable lady, now deceased, a new and splendid college for the higher education of young women has lately been constructed at Northampton, Mass. The students, instead of congregating in one large boarding house, are divided into small families, residing in separate cottages, scattered about the college grounds.

The general character of the institution has been determined by its founder, whose will provides that the trustees shall furnish young women the "means and facilities for education equal to those which are afforded in our colleges to young men." The fund for the institution was not given to establish an ordinary school, but to found, in the truest sense of that term, a college, which should give young women an education as high and thorough and complete as that which young men receive in Harvard, Yale, Amherst, and other colleges.

The college was dedicated in July last, under the presidency of Professor L. Clark Seelye, formerly of Amherst College, Mass.

On the Paraffins of Pennsylvania Petroleum.

Morgan, under Schorlemmer's direction, has made an examination of the normal hexane and heptane from Pennsylvanian petroleum, to test the question of the presence of isomers. The normal paraffins were chlorinated, and then converted into olefines by treatment with alcoholic potash. These olefines were treated with cold hydrochloric acid, each of them being thereby separated into two fractions, one of which dissolved in the acid, while the other did not. The latter fractions yielded secondary alcohols when suitably treated, that from the hexane being methyl-butyl carbinol and that from the heptane being methyl-pentyl carbinol. It hence appears that the derivative olefines are normal, and have the constitution $CH_2=CH-C_nH_{2+2n1}$. The former olefines, or those soluble in hydrochloric acid in the cold, yielded alcohols which appeared to be secondary, but which need further investigation.

In some remarks upon this paper, Schorlemmer says that the above results do not necessarily prove the presence of a third isomeric heptane in petroleum. Heptane when treated with chlorine yields one primary, and may yield three secondary, chlorides. If the heptenes from two of these combine with hydrochloric acid in the cold, the alcohols from them would yield on oxidation ethyl-butyl ketone and dipropyl ketone. These on further oxidation would yield propionic and butyric acids. Since Morgan obtained the latter, and as the acetic acid he obtained came probably from the presence in his heptane of a lower boiling isomer, it is probable that, owing to the method he employed, the propionic acid was overlooked. To decide the question, an absolutely pure paraffin is necessary; and the author proposes to make additional experiments with hexane from mannite.

Snuff for Insects.

The so-called tobacco meal, the *Kölnische Zeitung* says, has been successfully used in agriculture for the destruction of noxious insects, but it has not yet been applied largely on account of its high price, which is caused by heavy import duty. The only obstacle lies in the fact that the meal might be used for the manufacture of snuff.

COMBINED PORTABLE AQUARIUM AND WARDIAN CASE.

The accompanying illustration, selected from the English *Garden*, represents a simple and tasteful little parlor aquarium, in which many small exotic aquatics and some of our native water weeds will grow as well as in a contrivance of greater dimensions. It consists simply of a glass vessel, similar in shape to an ordinary bell glass, but furnished with a stand, and covered either with another bell glass or an ordinary glass shade. A handful of sandy soil or gravel and a few shells at the bottom serve to hold the roots of vallisneria, aponogeton, chara, and other water plants. Soft water is best for filling the glass if it can be obtained, and one or two goldfish add brightness and life to such an arrangement, and give motion to the water. Aquatic plants, or such of them as will grow in a vase of small dimensions, very rarely produce flowers; and in order to counteract this want of brilliancy, a vase of cut flowers may be introduced, as

shown in our engraving, and they will last fresh and beautiful for a much longer time than when they are fully exposed to the heated atmosphere of the sitting room.