Rhododendron Culture.

There is probably no group of flowering shrubs more easily cared for by the farmer than the rhododendrons. For general culture they are probably the most desirable of the showy and popular plants. The greatest care in their culture is in the original selection of the plants. There are a number of distinct species in cultivation, only two of which are hardy at the North. Probably the most desirable of these species is the *Rhododendron Catwabiense* or Catawba rose-bay, which is a native of the mountains of Virginia and southward. This species is the one most generally cultivated, and is the parent of many of the most beautiful, hardy varieties. The other hardy species is *Rhododendron maximum*, or great rose-bay, a native of the mountains of Pennsylvania and southward, and occurring occasionally as far north as Maine. In its native State it is a much larger species than the preceding, sometimes attaining a height of twenty feet or more.

The rhododendrons are broad, glossy-leaved evergreens, whose unique winter foliage is alone enough to recommend them. The flowers are large and exqusitely beautiful, and, in the cultivated varieties, show great variety of color. They make a most beautiful effect when planted in clumps, although they are desirable as single specimens. They grow readily in any good garden soil, although that of a little peaty character is often desirable. Almost the only care the hardy rhododendrons need in this country is a screen during the severe weather of summer. This is best secured by planting them to the north of a clump of trees. They are very readily transplanted in May, or even in June. In fact, they stand moving well at most any season of the year, unless when they are growing vigorously.

Some of the foreign species are desirable for greenhouse or window-garden culture, but are not hardy for the lawn. This is the case with *Rhododendron Ponticum* and some others. The culture of these plants is attended to with considerable difficulty in England. The rhododendrons belong to the family of heaths, along with the wortleberries, cranberries and laurels, and like them often thrive best in a soil containing some peat, although that is not generally necessary for their successful management. The azaleas are close botanical relatives of the rose-bays and require much the same treatment. The most desirable of these plants for general culture is probably *Azalea Indica* and its many beautiful varieties. It is not hardy in out-door culture, but succeeds well in the window. It is one of the best plants to endure the warm, dry air of rooms. It has long been a favorite in cultivation, as it grows with little care and gives exceedingly beautiful flowers in great profusion. It is a small shrub, flowering prolifically when a foot high. It does not pay the general cultivator to try to raise fancy sorts of rhododendrons and azaleas.

Transplanting.

"There is a principle in transplanting cabbage and other succulent plants which is unknown, or overlooked by many parties. They seem of the opinion that the sooner a plant is reset after being taken from the seed bed the more sure it is to live. A moment's thought will show the fallacy of this idea; if it does not, a little practice will.

"The plant gets its supply of moisture and sustenance from the soil by means of numerous small mouths at the extremities of fine rootlets. When the plant is removed from its seedbed, more or less of these are of necessity broken, and the evaporation is continually going on from its leaves more or less rapidly according to the degree of heat and sunlight it is made to stand. If transplanted at once it follows that the plant must of necessity wilt badly, and if the weather is hot and soil dry it may never survive. If, however, on being removed it has its roots 'puddled' in muddy water and is then laid in a cool, moist place, in from 12 to 48 hours numerous small white rootlets will be formed, the leaves will stiffen up and every energy of the plant is set at recovery. In other words the plant is convalescent, and if given half a chance for its life will commence growing with renewed vigor. For these reasons, plants which have been well packed and transported considerable distances by express will often wilt less on settling, and start to growing sooner than those which are reset at once when taken from the seed bed."—[Exchange.

Progressive Farming.

PRIZE ESSAY.

THE ADVANTAGES AND RESULTS DERIVED FROM THE APPLICATION OF ARTIFICIAL MANURES TO GRAIN, GRASSES AND ROOTS.

By W. L. Brown, Hyde Park, Ont.

(Concluded.)

Let us suppose, now, that these elements of plant-growth were applied in a form by which they would come more rapidly in contact with the roots, as in an artificial fertilizer form, and we have, in Mr. Lawes' experiment, data to ascertain this point also, and here is what is shown on the same field: The application was 400 lbs. of sulphate of ammonia, 392 lbs. superphosphate of lime, and 200 lbs. sulphate of potash. The crop in each case was 18 bushels for the first 12 years, against 12 bushels for the first 20 years, by barn-yard manure; and 19 bushels increase for the last twenty-four years, against 16 bushels for the dung for the same length of time. Again, the two experiments showed that there were only 22 per cent. of nitrogen recovered from the dung in the shape of crops, and 32 per cent. from the chemicals; and only 7 per cent. of phos. acid, 8½ of potash, from the dung, and 9½ and 17¾ respectively from the chemicals, thus showing the great waste going on in the application of dung, and also the advantage to be gained from the proper use of artificial manures in wheat growing over the same materials supplied in dung. And why? Because the one is more available than the other, and comes sooner into contact with the absorbing roots. This is a strong point, as it is evident that not manure nor fertilizer as names concern the farmer, but the getting of food to the plant in the most available shape.

Farm-yard manure has been supposed to be absolutely necessary to reinvest the soil with its fertile power, and I am fully persuaded that this form of manure will be the only one in which fertility will be supplied by our farmers for a long time to come. Yet it has been found by experiment that it is costly, and does not produce the results of a perfect manure, as the following experiments will show. They were made by several eminent French agriculturists, and tend to strengthen the argument deduced from Lawe's experiments with barn-yard manure and artificial manures. An experiment made by a Mr. Bravey, on a stony soil broken up for the first time, yielded, with a complete artificial manure, about 30 bushels of wheat to the acre, and with a heavy coat of barn-yard manure, only about 11 bushels was got, and without any manure at all, about 3 bushels. Another experiment by a Mr. Masson yielded with a complete artificial manure, 40 bushels of wheat to the acre, and with a very heavy coat of barn-yard dung, only 19 bushels to the acre. The results with potatoes were still more remarkable, for by another experiment made with a complete manure, the yield was over 500 bushels to the acre, and with a heavy dressing of barn-yard dung, just one-half, or 250 bushels. Similar experiments were made with other crops, and the same results obtained between the complete manures and the barn-yard manure. Now this "complete manure," as it is termed, needs some explanation, for if there be such a thing, certainly the whole success of the preparation of artificial manures and their application and effect on growing crops, will be secured. A complete manure is nothing more than supplying the nourishment—nitrogen, phosphoric acid and potash—in the proper proportions required by each class of crops we raise on our farms. Now, this M. Ville, whom I mentioned before, by carefully observing the effect of these elements on various plants used separately, and also in combination, ascertained the proportions in which they should be used in each case; and thereby he has been able to formulate complete manures, in which, with tolerable accuracy, he has arranged a complete manure for each kind of plant.

The system pursued for ascertaining what material is wanted in the soil is thus represented on a trial field of wheat:

With complete manure.....	39 bushels.
Do, without potash	28 "
Do, without phosphoric acid.....	24 "
Do, without nitrogen	13 "
No manure.....	11 "

A glance at this will show that the nitrogen contained in the soil was deficient and only able to produce 13 bushels of wheat to the acre; whilst by supplying a sufficient amount of this element to the other constituents, 39 bushels per acre were obtained. From making similar experiments on various rops, M. Ville found what complementary artificial manure to mix with barnyard dung so as to suit exactly the nature of each plant; and he invariably found that whilst the influence of one of the elements, nitrogen, phosphoric acid, and potash, was very marked, that of another was comparatively slight. He thus got what is called the "dominant" of each class of plants or the one which exercises the greatest influence on their growth and development, consequently it has been established that nitrogen is the most important element in the culture of wheat, colza, beet-root, &c., and on the other hand that its effects were hardly noticable when it was introduced into manure for peas, lucerne, clover, or even potatoes; and that the greatest results were obtained by the use of potash for this latter group. Again, potash and nitrogen have but little influence on the growth of certain plants, such as Swedes, turnips of different kinds, &c.; but the effect of phosphate of lime on these is remarkable, and from its use in England large crops are produced, and hence phosphoric acid is the dominant of this class of plants, and from 300 to 400 lbs. per acre should be sown. With this data established a maximum yield of any crop may be secured at a minimum outlay, by properly increasing the application of some special artificial manure. For agriculture can only be made profitable as an industry by keeping down the cost of production.

Following the division of the three plant elements I first assume, let us look in what shape artificial manures are available as completing the value of barnyard manure.

There are, first, in nitrogen, sulphate of ammonia, nitrate of soda, and nitrate of potash—chemical salts which have a commercial value, and which will have to be bought according to supply and demand. Sulphate of ammonia is the most available and most profitable; nitrate of potash is out of the question, owing to the price in this country. In phosphoric acid, mentioned before as soluble in water, reverted, insoluble fine bone, and fine ground rock, or apatite, according as the phosphoric acid predominates. In potash commerce offers the sulphate, nitrate and muriate; the latter is the cheapest.

If we then want a manure composed of any of these elements, either singly or together, we can easily estimate the cost, for nitrogen, phosphoric acid and potash are now sold by the pound in manures, or are supposed to be, and the value of such depends upon their purity and upon their relative quantities. Now, a pound of sulphate of ammonia is worth..... .....22 cents
One lb. of soluble phosphoric acid.....12½ "
And 1 lb. of muriate of potash..... 4½ "

39 cents.

Or, say $26 a ton, according to this rate, but, of course, a complete manure would have a higher proportion of nitrogen, and, consequently, a ton would be of much higher value. But what should be considered is: Suppose an artificial fertilizer be bought at such a price, can it be transformed into a product that will pay for the original material in the rough, pay for the labor, pay interest on the land, and a profit in addition? The man who secures the profit, added to the natural resources of his land, is the modern farmer, and he who so utilizes his capital, labor and intelligence to produce the greatest results in the application of plant food, is the most successful farmer—capital to purchase the raw material, and intelligence to work up this material to a profit. A pound of phosphoric acid sells for 12½ cents, as I have said before; a pound of phosphoric acid in wheat, at $1.14 a bushel, is worth say 33 cents. Can the farmer buy phosphoric acid in the raw state and sell it in the manufactured wheat on the margin of 21 cents? And can he do the same with nitrogen and potash? The answer to this depends upon the apprehension of plant fertilization or the application of artificial manures: their preparation, application and effect on growing crops, and in maintaining the fertility of the soil to which they are applied, and this consideration is at the foundation of modern farming on soils that require to be annually fertilized.

In conclusion, let me briefly state that this question of the application of artificial manures does not, nor is it likely to, receive in this country that attention which its importance demands. When