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Table of Contents.

EVERGREENS.

CONIFEROUS TREES AND SHRUBS.

By Charles Gibb, Abbotsford.

(Written for the forthcoming report of the Montreal Horticultural Society.)

Evergreens are among the most arctic of trees. Strange this, if we consider the deciduous tree a novelty upon our planet, owing to the cooling of the earth's surface since the deposit of the eocene earths, many hundreds of thousands of years ago.

An evergreen, to be ornamental at all, must be perfectly hardy. If a catalpa kills back a few inches, its large leafage hides all defects, but if an evergreen is "scorched" by our dry winter winds or by the heat of our winter sun, it ceases to be ornamental.

Young evergreens under cultivation are often exposed to conditions of life far more trying than those in the woods, where they are mulched by leaves and covered with snow. An evergreen after its first season of growth *must* be mulched, that is, it *must* have leaves or straw, or some non-conductors scattered around it to prevent the frost from penetrating deeper than the roots.

Some of the western conifers first introduced into the Eastern States were from seed from the mild moist climate of the Pacific coast, and proved quite tender in the middle States. Seed of these same varieties from elevated regions in Colorado proved quite hardy. To insure still greater hardiness, seed should be procured from the dry interior districts of British Columbia, where some of our eastern trees are found among them.

From Europe we have many species of value. From Eastern Asia we may expect much. The trees of Japan, though so successful farther south, seem to lack hardiness until we get seed from their higher altitudes. We have hopes too of finding new species on the shores of those high temperate and arctic islands which, by elevation, are scattered even through the Torrid Zone.

Some of the Pacific conifers I have not seen: most of the others I have, but only as small trees or shrubs in the nurseries or parks, or private grounds of the Eastern States.

To Dr. George M. Dawson I am indebted for kindly placing in my hands his as yet unpublished notes and map, showing the distribution of the different trees of British Columbia, noting the severe climates in which some of these beautiful species are found. To Dr. Robert Bell, M. D., for his valuable map, not yet published, showing the distribution of our forest trees northward even to the mouth of the Mackenzie River. To Prof. C. S. Sargent, for his pamphlet on the "Forests of Nevada," and one on "Ornamental trees for Massachusett's plantations," by Mr. J. Robinson of the Arnold Arboretum.

To Mr. Wm. Brown, our largest experimenter, who, many years ago, had the Marchmount nurseries at Côte des Neiges, I am indebted for the results of his long and expensive experience. The "Book of Evergreens" by Mr. Josiah Hooper of West Chester, Pa., I shall often quote from. It is a very valuable work and the only complete one upon the conifers published on this continent.

ABIES.—Spruce.

The spruce is one of the most arctic of trees. In high northern latitudes where the ground is perpetually frozen to a depth of several hundred feet, and only thaws out a few feet upon the surface during summer, there, even, the spruce is found.

Our own white and red spruce grow, even, near the mouth of the Mackenzie River, on the Arctic Ocean, as may be seen by that most interesting map by Dr. Robert Bell, about to be published by the Geological Survey of Canada.

A. *Alba var: aurea.*—In grouping evergreens, one must study their tones of color, as well as their form. The little plants of this, at Flushing, have a lively golden tint which is quite striking. Whether of dwarf habit, or not, I cannot say. Being a variety of our common white spruce there should be no doubt as to its hardiness.

Var: Cœrulea.—The young trees I have seen are of light bluish tint, and decidedly ornamental.

A. *Alcocquiana. Alcock's Spruce.*—Found, says M. Hooper, by Vietch, growing at elevations of 6000 and 7000 feet; on Fusi Yami, the mountain we see upon the Japanese tea-chests. It is in latitude 36, yet trees from these high elevations might be worth trying.

A. *Canadensis. Hemlock, and* A. *Douglasii: See Tsuga.*—A. *Englemanni*, see *Picea Englemanni.* A. *Excelsa. Norway spruce.*—I know of no foreign tree that I should so like to see largely planted throughout our country. Lowdon speaks of it as "the loftiest of European trees, attaining a height of 125 to 150 feet, and even, in some cases 180 feet, with a very straight trunk of from 2 to 6 feet in diameter." It is the common spruce of northern and central Europe, and of north-western Asia, and in Lapland it reaches latitude 69½. Its beauty, its perfect hardiness, its rapid growth, the ease with which it can be transplanted, all show its value for extensive planting. About 7 years ago, I planted 70, received from Ontario. They all grew, and are now from 10 to 12 feet in height, with very massive lower branches. Three years ago, I planted about 110, received from Illinois, and only two of

these died. Of Austrian and Scotch pine received at the same time, I lost over one-third. These plants may be had in Scotland at very low rates, sometimes for about $4 00 per thousand, and I have known those who have imported from there with comparatively small loss. First trials often prove failures. Three years ago, a friend imported 1000 trees which cost him $4 with $5 for freight, and heeled them in, late in fall. The ground froze at once, and deeply, and but 10 per cent survived. Next fall he imported 1000 more. Half of these he heeled in, in his cellar, of which only 4 or 5 lived. The remaining 500 he heeled in as the year before, but covered over with a foot deep of leaves. On the top of these leaves fell heavy snows, and by spring, the trees were all completely rotten. Let those not accustomed to "heeling in" trees buy their evergreens in spring.

The Norway spruce varies a good deal from seed. To a few grafted varieties I shoud like to draw attention. Ellwangerii, a seedling of Messrs. E. and B., a very compact grower, dwarfish in growth, and very distinct. *Gregoryana*, dark in color, and as dense as it is possible for an evergreen to grow. In shape, like a huge plum-pudding, slightly flattened. *Inverta*, has its branches all bending directly to the ground. Its leader should be tied to a stake to insure its being erect. *Monstrosa*, a coarse, strong grower, with awkward long naked limbs, either grotesquely pretty or otherwise, and at any rate curious. It needs ample space.

A. *Morinda. Himalayan Spruce.*—Although found in Bhotan at elevations of from 7000 to 12000 feet, the plants in cultivation are very uncertain north of Philadelphia. Three years ago, I knew no better than to try it. This shows the necessity of lists like this. It was badly injured on the Centennial grounds, in Philadelphia.

A. *Orientalis. Eastern Spruce.*—A native of the shores of the Black Sea, and adjacent mountains, a region as far north as we are, but of far milder climate. It has unusually long, shining green foliage, and is decidedly ornamental. I have seen it in the experimental grounds of the Rural New Yorker, near Jersey City, at Flushing, and at other places. And I could hardly say that it was hurt. It is well worth trying, but we must not assume it to be as hardy as the Norway, for I see that it is not so.

A. *Polita.*—Is sometimes, but perhaps wrongly known as the *Tiger Tail Spruce*. It is a native of Japan, and has long, stiff, sharp-pointed foliage. I saw it in a number of places last summer, and it had stood as well as Orientalis.

ARAURICARIA.

A. *Imbricata. Chili Pine.*—To one species of this tender genus I wish to draw attention. There are vast forests of it covering the slopes of parts of the Andes, from near the basis of these mountains to far up towards their snow lines, between 36 and 46 south latitude. I have seen it struggling for life in sheltered positions in Central Park, and, in the Middle States, the plants in cultivation are far from hardy; but, as Mr. Scott observes, the seeds of these plants were brought from Conception Bay, in latitude 37 and near the sea, where Scott says the Fuschia grows wild. Any one who reads Loudon's description of the different altitudes, and high southern latitudes, in which this tree is found, will have some hopes that when we get seeds from the right quarter, we shall be able to grow it here, so that some day, we may be as proud of our Araurícarías as the Parisians are of their Puggle monkeys in the Jardin des Plantes.

BIOTA.—EASTERN ARBOR VITÆ.

All these are found by Messrs. Ellwanger and Barry to be tender and requiring winter protection, at Rochester. They are however, neat, ornamental, and worthy of extra protection.

CEDRUS.—Cedar.

C. *Atlantica. Mount Atlas Cedar.*—Is said by Mr. Hoopes, to be specifically distinct from the cedar of Lebanon. It is found, says Dr. James Brown, on the Atlas Range at elevations of from 7000 to 9000 feet. The trees seem hardier than those of Lebanon, but of doubtful hardiness here.

C. *Deodara. Indian or Deodar Cedar.*—Is a native of the mountains of north-eastern India, at elevations of from 7000 to 11,500 feet, and, according to Loudon, 12,000 feet; and Loudon seems to be correct, for I have spoken to those who have seen five forests of it at fully 12,000 feet.

The line of perpetual snows on the southern side of this part of the Himalayas is said to be 15,000 feet, and the progeny of plants but 4,000 feet below should stand the winters here. Yet the plants in cultivation are far from hardy. Mr. Brown had 100 plants of it. Of course they died, as the tree is not hardy at some distance to the south of us.

Mr. Hoopes quotes Dr. Griffith, who speaks of its "gigantic dimensions...where for nearly half the year it is enveloped in snow." The rarity of the air and the heavy rain-fall of the higher Himalayas are conditions very different from what we have here, yet we may expect some day to get plants that will stand our winter temperature.

C. *Libani. Cedar of Lebanon.*—It is often said, that there are more cedars within 50 miles of St. Paul's in London, than upon all the Lebanon. This seems now to be far from true. Yet what noble trees may be seen in England, already in a state of decay, planted towards the close of the 15th century.

The little group at the head of the Wady Kadisha so long known to pilgrims comprises about 400 trees, and is the only tree of any kind about there. This group, says Dr. Thompson, is over 6000 feet above the Mediterranean, but the altitudes of the different groups found by travellers further north is not noted, nor can I state its altitude on the Taurus, or other ranges. If our first European trees came from this Wady Kadisha, the extreme tenderness of their offspring seems difficult to account for. It proved quite tender, of course, with Mr. Brown. It is not hardy much north of Philadelphia. Its habitat in the past cannot now be determined, on account of the almost total destruction of all tree-life in these regions. If the traveller forgets to get a switch, when he mounts his horse at Jaffa, he may not be able to cut one till he arrives at the bush on the banks of the Jordan. With the exception of the few plantations of orange and mulberry, and the scattered groves of olive and fig, there is no tree-life whatever. Let a man travel through those eastern treeless countries, journeying day by day over their barren hills, and along those dry water-courses, marked on our maps as rivers, let him note the richness of the soils of these arid wastes, and the ruins which show the populations they once sustained, and, if he has any love for his native land, he will do his little best to prevent it from becoming treeless likewise. For after a country becomes treeless, when, from its geographical position, it is at all so pre-disposed, it soon becomes dry and barren, and, ceasing to support its population, becomes waste.

CRYPTOMERIA.

C. *Japonica. Japan cedar.*—This is a tender plant, also tried by Mr. Brown. Mr. Hoopes says it is a perfect success at Baltimore and Washington, in favourable situations. It is less sure about Philadelphia. I have seen it injured by winter in Central Park.

CUPRESSUS.—Cypress.

The evergreen cypress is a native of the milder climates of this and the old world. The upright cypress, (C. *sempervirens*), that dark, gloomy, columnar tree, so common in the cemeteries of southern Europe and the east, will scarcely stand in Philadelphia; neither will the Funereal cypress, (C. *Funebris*), which, last year, also proved a failure with Mr.

Brown. Both of these are classed, even by Mr. Hooper, as tender. Lawson's cypress, a rare beauty from California, is somewhat tender at Rochester. The Nootka Sound cypress, (C. *Nutkaensis* or *Chamaecyparis Nutkaensis*), is said to be decidedly ornamental, and grows to larger size near the coast in British Columbia. One might not expect it to prove hardy here. However, Mr. Sargent has found it at an elevation of 4000 feet, and small ones at even 5,500 feet on Silver Mountain near Yale, B. C. Here, then, lies our hope of being able to grow this beautiful tree, when we are enterprising enough to obtain the seed from this high elevation. The C. *Thyoides* or "white cedar" is much like our native, so called, white cedar, but is much finer and more delicate. It is common in Virginia and Carolina, but is found here and there northwards, even as far as Lanark, Ontario, latitude 45. This tree was identified by Vilmorin, of Angers, France, to whom Mr. Brown had been sending seed collected in the county of Lanark.

JUNIPERUS.—Juniper.

We must not over-look the ornamental value of this race of plants.

J. *Communis. Common Juniper.*—Is a native of Europe and Asia, and of this continent. I see that in Prof. Schübeler's map, it is noted as growing wild in Norway, as high as latitude 71. It usually grows from 3 to 10 feet in height, sometimes much higher, and assumes all sorts of shapes. Mr. Brown had bushes 4 or 5 feet high, imported from Scotland, and grew hundreds of little plants from them. They seemed to be pretty hardy, perhaps quite so, but were well covered with snow, and far more so than the Irish.

Var. Hibernica. Irish Juniper.—Is highly ornamental, feathery in leaf, and in form resembles a green column. It is highly ornamental, but needs protection in our climate.

Var. Suecica. Swedish Juniper.—Proved perfectly hardy with Mr. Brown, and more satisfactory than the English or common kind. He had plants 30 years old, most of these were very recumbent on account of the habit of growth impressed upon them, while young, by the heavy snows. One of these plants was six feet in diameter. It seeded freely, and thousands of young plants were raised from it. Its hardiness without snow-coverings, which we now so often miss, is a thing we must not assume too positively.

J. *Sabina. Common English Savin Juniper.*—Is another of the trailing junipers, which proved perfectly hardy with Mr. Brown. The foliage is not feathery like the Swedish, but is more yew-like, and more dense and glossy.

J. *Virginiana. Red cedar.*—Though we are north of the usual range of the red cedar, as a timber-tree, yet, as a shrub, Mr. Drummond says it extends high northward. In the Ottawa valleys there was one island where it had grown to large size. Mr. Sargent says it extends southwards to Florida, and from the Atlantic to the Pacific, and is the most widely distributed of American trees.

Its foliage is decidedly ornamental, feathery, and unlike any other tree here. I have seen it in Minnesota of a rich glaucous tint, singularly beautiful. Leaving New York by rail and entering the Hudson, the traveller is often struck by the many dark cypress-looking trees growing on the hill sides. This is a local fastigiate form of this tree, usually it is more spreading.

PICEA.—Balsam or Fir.

Those who have only seen our native balsams have no idea of the beauty of some of the foreign piceas.

P. *Amabilis. Lovely Silver Fir.*—This is perhaps the most lovely of all the piceas. It has long, soft, softly tinted foliage of surpassing beauty. In northern California, it grows to a height of 250 feet, and is found at elevations of 4000 feet, and has also been found by Mr. Sargent on Silver Mountain, near Yale, B. C. The specimens I have seen about Boston and on the Centennial Grounds at Philadelphia, stood last winter well. Like all balsams it is suited to most soils. Its great beauty should induce some one to try it.

P. *Apollinis. Apollo Silver Fir.*—Struck me as a great beauty and one that was not injured upon the Centennial Grounds. It is a native of Greece, Mr. Hoopes says, found at elevations of 1500 to 4000 feet, and growing to a height of 60 or 70 feet.

P. *Engelmanni.*—Formerly known as *Abies Engelmanni*, is a native of the Rocky Mountains from the sub-alpine to the alpine districts, says Dr. Engelman, as quoted by Mr. Hooper. In Colorado it occupies a belt between 8000 to 12000 feet of elevation. It is one of those whose appearance takes away all doubts as to its hardiness. It has been said to be one of the only three conifers that will endure the winters of St. Petersburg. But, while I can readily expect it to do well there, yet there are very many other conifers that would resist their cold winters equally well. In appearance it is a spruce, not a balsam, and some of the grafted varieties are of remarkable beauty. A little plant I have is somewhat the color of frosted silver, not green. This tint is *especially* worthy of trial.

P. *Firma.*—From Japan. Two specimens in the Centennial Grounds, killed back 3 or 4 feet last winter. No other evergreen suffered so severely.

P. *Fraseri. Fraser's Balsam Fir.*—A native of the east in middle States. No improvement upon our other species.

P. *Grandis. Great Silver Fir.*—One of the coast flora of British Columbia, says Dr. George Dawson, adapted to moist localities. No assurance of its hardiness.

P. *Hudsonica. Hudson's Bay Silver Fir.*—Is a dark velvety green shrub, as dense as a clipped hedge. It may grow 2 or 3, or even 4 feet high, and is decidedly ornamental.

P. *Lasiocarpa.* (*Abies Subalpina of Engelmann.*)—Seems to be confused with P. *Amabilis.* All I can say is that they are equally ornamental, growing side by side. This however, has been found by Dr. George Dawson in rainy, yet severe districts of British Columbia, in its interior plateau, at elevations of 4000 feet. It also occurs on the Rocky Mountains in the Peace River district, and grows in cold damp situations between Lesser Slave Lake and Athabasca River, when at times it must be subject to a temperature of 50 below zero. It is however a tree suited to moist soils, and to cool moist summers, not the hot, dry summers we have here. At least it is so in British Columbia.

P. *Menziesii.* (P *Pungars* or P. *Sitchensis; Menzies' Spruce.*)—"The blue spruce of the Rocky Mountains," says Dr. Engelmann, "is entirely sub-alpine, occurring between the limits of 7000 and 9000 feet in low or marshy soils, especially along the borders of streams. The plants grown from the first seed brought from California proved quite tender at Boston. Those from Colorado have proved quite hardy and decidedly ornamental, and quite hardy, I believe, with R. Douglass at Waukegan, Ill., on the border of the Wisconsin. Dr. George Dawson finds it in many parts of British Columbia, but so far, not in the very severe climates. It delights in partial shade and moisture.

P. *Nobilis.*—Mr. Hoopes quotes this as growing in California to the hieght of 200 feet, at elevations of from 6000 to 8000 feet. Its foliage too, is said to be very beautiful. At the Centennial, the Hon. H. G. Joly, when noting the annual rings of the different woods exhibited, found this the fastest grower from the Pacific coast.

P. *Nordmanniana. Nordman's Silver Fir.*—This has been found, says Mr. Hoopes, on the Adshar Mountains at an elevation of 6000 feet, and growing to a height of 80 to 100 feet, in some places, in high alpine regions intermingled with

Abies Orientalis. It is abundant on the hills of the Crimea. This latter place, however, though upon our own latitude is the land of the peach, apricot, and almond. Even the orange is grown there with partial protection. I have seen a good many specimens of this really lovely tree in many places, and have watched the effects of last winter upon them, and I doubt if it would stand our severe climate. We may expect that hardier specimens will be introduced.

P. *Peetinata. European Silver Fir.*-Is the common balsam of central and northern Europe. It proved hardy with Mr. Brown, and it should be so, for it is a native of high cold latitudes. Yet it is not always reliable in the middle States, and apt to be short-lived.

P. *Picta. Siberian Silver Fir.*-Would seem to be a fir that we might try with safety, as it is found at high elevations, in that cold country, on the Altai mountains, says Loudon, it forms large forests at an elevation of 4000 feet, and is even found as high as 5272 feet. Some specimens that I have seen even rival Amabilis, perhaps the loveliest of the Pacific piceas, while others that I have seen are not equal in beauty to our own balsam. Bearing this in mind I would urge the trial of this tree.

PINUS.—Pine.

P. *Austriaca. Austrian Pine.*—Is one of those trees that has worked its way into public favor, so that it is now extensively planted. It is unusually dark in color, and coarse and stiff in leaf. It is not as fast a grower as the white or the Scotch pines. Mr. Hoopes says it will thrive in wetter soils. It is perfectly hardy in Montreal, hardy with me, hardy in Minnesota.

P. *Balfouriana.*—Mr. Sargent, in his pamphlet on the "Forests of Central Nevada," noted this tree on Prospect mountain, at an elevation of 7500 and 8000 feet. On account of its tufted foliage it is known to the lumbermen as the Fox-tailed Pine, and in its native mountains is strikingly ornamental. Trees from this dry region are worthy of our notice. It is also a native of California.

P. *Banksiana. Banksian or Grey Pine.*—This pine extends far to the northern limits of our white and red pines, and thence westward to the mouth of the McKenzie, almost to the Arctic sea. About Boston, I find it makes several growths during the year. Elliott says that when he procured specimens from the barren sands of the Islands of Lake Michigan, 25 years ago, he thought them of little use Now they are 40 feet in height and extremely beautiful. Loudon fell greatly in love with it. Scott says, "odd and picturesque, but not handsome." It seems to vary very much in size and in habit of growth, and usually forms a bush with numerous ascending shoots.

P. *Cembra.Swiss Stone Pine.*—This is found in the Alps, at elevations of 4000 and even 6000 feet, forming trees 50 feet in height. It is a tree of slow, erect growth. Its foliage consists of innumerable dense little tufts of leaves, which are different from other pines, and quite ornamental. Mr. Brown planted this tree, and it, of course, proved hardy. On the Alps it is found at higher elevations than the Sylvestris.

Var. Siberica.—This is found in the severe climate of eastern Siberia, even at elevations of 3000 feet, and from what I have read of the cold climates where this pine grows, I fancy that it is often exposed to even lower temperatures than our own Banksian pine. It is even of still slower growth than that found in Switzerland.

Var. Mandschurica.—The beautiful light color of this tree struck me very much at the Parson's Nursery, Flushing, Long Island. It would make a beautiful contrast with either of the two named above.

P. *Contorta. Western Scrub Pine.*—Also known as the Bull, or Black Pine. Dr. George Dawson speaks of this tree as covering large areas in the higher elevations of British Columbia, on the hills that rise above 3500 feet, and where the rainfall is to great for the healthy growth of P. *Ponderosa*, and states on the authority of Dall, that it is found as far north as Fort Selkirk in Alaska, in latitude 63. I have not seen it, but it is said that, as an ornamental tree, its straggling and crooked branches are objectionable.

P. *Excelsa. Lofty Bhotan Pine.*—This is the noble pine of the Himalayas, found at elevations of from 6000 to 8000 feet and even occasionally, says Hooper, up to 11.500 feet. It is much like our own white pine, when young, but is longer in leaf, and is, when older, said to be more spreading and drooping. It has stood the winters in the States to the south of us, and yet has often failed there, some think, owing to the richness of the soil in which it has been planted. The rarity of the air of its native elevations may be the cause of its tendency to throw its sap so much into the leading shoot,—a sort of vegetable apoplexy, if we may so speak. I would especially draw attention to the argument upon this tree in Scott's "Suburban Homes."

P. *Monticola. White Pine.*—This tree is much like our own white pine, and is abundant, says Dr. George Dawson, in the southern portion of the coast ranges in British Columbia, where it attains a height of 60 to 80 feet, in some places, in rather severe climates. It clings to the regions of heavy rainfalls. We want the trees from the severe and dry climates. It also extends southwards into California, where it is found, says Mr. Hoopes, at an elevation of 7000 feet.

P. *Mugho .Mugho Pine.*—Is a pine bush or shrub, a native of the mountains of central Europe, growing sometimes to a height of 20 feet, but more often a mere bush. It has been used largely as a foreground to larger evergreens, in Prospect Park, Brooklyn, and with very good effect. It is likely to prove hardy, but has not yet been tried here.

P. *Pinaster. Cluster Pine.*—Is a native of both shores of the Mediterranean, the west of Asia, and the Himalayas. In France, says Loudon, it cannot be cultivated, with a view to profit, north of Paris, and even in that latitude is often destroyed by severe winters. In France its special use has been to cover tracts of drifting sand. This beautiful species, says Mr. Hoopes, is exceedingly unsatisfactory, and cannot be depended upon in the northern and the middle States. Mr. Brown had some young trees which proved hardy, but in this matter we must act with caution.

Pinea. Stone Pine.—A lofty tree with spreading umbrella-like head, as may be seen in photographs of different parts of Italy. It is a native of the south of Europe, and of the north of Africa. It is quite tender for some distance to the south of us. I only mention it, that it may not be confounded with the Swiss stone pine.

P. *Ponderosa. Heavy-wooded Pine.*—Is found in the dry interior regions of the Pacific coast. It has dark-colored, long, coarse foliage, which is strikingly ornamental. "It abounds," says Mr. Sargent, "in all the Rocky Mountain region, and extends through New Mexico and Arizona to the Sierra Nevada, where, on the dry eastern slope it constitutes, in some of its forms, fully three quarters of the forest. Dr. George Dawson finds it in the central dry regions of British Columbia between the coast ranges and the Selkirk and Gold ranges up to latitude 51° 30'. Also on the east side of the Rocky Mountains, on the 49th parallel. At the height of 3000 feet it is replaced by the Douglass fir and P. *Contorta.* It occurs also in western Montana in severe climates. This is a tree of wide habitat, suited to dry soils, and found in very severe climates, one that should be tried, not for its timber, but for ornamental purposes.

P. *Resinosa. Red Pine.*—It is strange that our native red

pine should have been so over-looked. It is scarcely to be found for sale in American catalogues, and is seldom planted here. In foliage it is much like Austrian, but has the one defect of being more open and sparse of branches.

P. *Strobus.*—Our native white pine may yet be peddled in some parts of our country as a rare exotic, so scarce has it already become. In England it is known as the Weymouth pine, so named from the five trees at Longleat House, Wiltshire, the seat of the Marquis of Bath (1), grown from seed, says Loudon, introduced in 1705. The following varieties are worthy of notice.

Var. Compacta.—Is a dwarf round-headed little tree or shrub, like a continually pruned white pine. Scott says it makes a growth of 2 to 5 in., per annum, and grows to a height of 10 or 12 feet at maturity. It is one of the best of the dwarf pines.

Var Nivea.—I have only seen this when young, but was very much struck by its silvery white foliage.

P. *Sylvestris. Scotch Pine.*—Though known as the Scotch pine, the Sylvestris is found from the Mediterranean to latitude 70 in Norway, and from Spain to Kamtschatka. In the severe climates in southern Siberia it reaches latitude 63. It is a hardy species, those sent from the Scotch nurseries showing no signs of tenderness. It is nearly as fast a grower as the white pine, and has been planted in enormous quantities in the north western States.

Var .Rigensis. Riga or *Russian Pine.*—This is the variety which has been grown to the south-east of Riga, and which, for a long time supplied the masts for the British and French navies. These masts were 70 or 80 feet in length, and 18 to 25 inches in diameter. Those grown in Sweden were of smaller size, and were known as spars. A large portion of this Riga pine, says Loudon, was grown upon the banks of the Dneiper, and carried 25 miles to the Dwina, where it was rafted down to Riga, the chief point of the mast trade. As early as 1785, the French government sent a mast-maker to Riga for seed. This was sown in different places, and did not seem to differ from the Sylvestris pine. At least so it would seem. The question I cannot answer, but the fact is known, for at the government Ecole Forestière at Barres, Department of Loiret, formerly a private estate of M. de Vilmorin, there are 30 groups of Sylvestris pine, planted with a special view to showing the comparative value of the mast-pines of Riga, and other varieties. (See "The School of Forestry in Europe," by Dr. J. C. Brown, Edinburgh, 1877.) Seed procured by F. R. Elliott, and described in his "Popular Trees and Shrubs," proved in many ways unlike the ordinary Sylvestris.

Of the following pines I should like to say a few words. The P. *Albicaulis*, the white, or white-bark pine, of Oregon and of the coast ranges, up to latitude 53, has been found by Mr. Sargent on Silver Mountain, near Yale, B. C., at an elevation of 5000 feet. The P. *Australis*, the long-leaved pine of the Gulf States, is not hardy even in the middle States. P. *Ayacahuite*, the lovely long-leaved pine from Mexico is certainly hardier than was expected. It did not suffer at Flushing last winter. Jeffrey's pine (P. *Jeffreyii*,) is very much like Ponderosa, and grows to large size in the mountains of northern California, but I do not know at what elevation, nor our chances of being able to grow it. I have seen a fine specimen of this tree, on the grounds of Ellwanger and Barry, and it seemed to show no tenderness there. Lambert's pine, (P. *Lambertiana*,) which grows to a height of 200 feet in California, is much like our own white pine, and seems to be hardy, as far as tested, to the south of us. The P. *Massoniana*, is one of the most widely distributed conifers in Japan, and is found as a bush at high elevations. The variety known as the *Sun-ray Pine* has distinct golden radiations which are remarkably attractive. The little plants I have seen would lead one to suppose it a dwarf species. A few plants that I saw at Flushing on the Experimental Grounds of the Rural New Yorker, and in the Centennial Grounds at Philadelphia, were not injured by last winter. The P. *Monticola* of the Pacific coast, is much like our own white pine. In British Columbia, Dr. George Dawson finds it on the coast ranges, and also inland, in the region of abundant rainfall. The trees of the dry regions are more likely to be of use to us.

(1) *Lord Weymouth* is Lord Bath's second title, and is borne by his eldest son. A. R. J. F.

RETINESPORA.

This is a family of rare beauty from Japan. They are very varied in foliage, some resembling the juniper, others the arbor vitæ, and others, the cypress. Struck by their beauty I watched them carefully, noting how they stood the past severe winter in different places near Boston, at Flushing, in Central Park, in Philadelphia, and I find they differ in hardiness, and some seem promising even here. *Filifera* (thread branched,) seems allied to our arbor vitæ, but more delicate, and the ends of its branches have elongated drooping filaments, very graceful and pretty. It seems one of the hardiest. It was not hurt on the Centennial Grounds at Philadelphia, where, from some cause, the evergreens suffered more than in Central Park or about Boston. *Obtusa Nana* is more cypress-like in foliage, very distinct, soft and velvety, not as hardy as some others, but worthy of green-house care. *Pisifera* (pea-fruited,) is much like our arbor vitæ, but more delicate. It stood well wherever I have seen it, and that in many places, but is less novel, and less worthy of trial. *Plumosa* is quite feathery and dense in habit of growth. It stood everywhere as well as Filifera. *Plumosa aurea*, I wish to draw especial attention to. Its outer branches are all tipped with a bright lively yellow which it maintains through the greatly part of the year. It forms a striking contrast to other evergreens in winter when all else is leafless. In Central Park, *pluwosa* and *filifvra* lost their fresh-green tint, as our white cedar so often does here, yet this golden variety did not fade in the least. In the grounds of the Rural New Yorker it tipped slightly, this is the only place in which it seemed to shiver. It is becoming a favorite about Boston. *Argentea* is tipped with white, but not equal to the above. *Squarrosa* is feathery and of a beautiful tint, but not as hardy as others.

SCIADOPITYS.

S. *Verticillata. Umbrella Pine.*—Is a native of Japan, found in parts of the Island of Nipon, among the mountains, in latitude 36. It is quite unlike any other tree I ever saw. In its native land it is said to grow to a height of 100 feet. It was introduced here but a few years ago, and is proving a very slow grower. The plants I have seen at Mr. Sargent's, near Boston, at Wellesley, Mass., at Flushing, Long-Island, showed that it had stood this late severe winter without injury. It is well worthy of such protection as it may need in our climate.

Sequoia.—This is the mammoth tree of California. Fancy trees nearly 300 feet in height, and 35 feet in diameter of trunk. The tree cut down by Bayard Taylor showed by its annual rings an age of 3100 years! It contained 250,000 feet of timber. Imagine being able to ride, on horseback, the distance of 75 feet in the hollow of a fallen tree and then emerging from a knot-hole in one side!

This tree is not quite hardy in the Middle States. The finest specimens in the east are those in the grounds of Ellwanger and Barry at Rochester, which must be, I should say, at least 25 feet in height. These trees suffered, but comparatively little from the severity of last winter, and would appear to be rather hardier than the majority of those brought

to the eastern States. Mr. Hoopes states that it grows on the Sierra Nevada range in latitude 36 or 37, at an elevation of 5000 to 7000 feet, so that hardier specimens may yet be found.

TAXUS.—Yew.

The yew is a tree of rich sombre tint, slow growth, and long life, which thrives best in partial shade, and in moist climates. The English yew, (T. *Baccata*) has for some reason been planted largely in English church-yards, where there are trees 800 and even 1000 years old.(1) Scott says it does well at Newport, and in New York, but not inland in the same latitude. It was hurt on the Centennial Grounds, last winter. Mr. Brown found it much hardier than the Irish, which would not live above the snow. Mr. Hoopes says the upright Irish yew will not stand north of Philadelphia. The golden yew, (*Variegata aurea,*) I saw at Flushing, and was very much struck by its bright golden colour. It was not at all hurt there by the severe cold of last winter, and Mr. Hoopes says of it that it is even hardier than the species. This tree should be tried by those who will give it special winter protection.

Our native yew, often called the ground hemlock, when cut back into compact bushy form is quite ornamental. There is a golden variety of it too, but it by no means equals that described above.

THUGA.—ARBOR VITÆ.

Our native white cedar, (T. *Occidentalis.*) is our most convenient, if not our best hedge plant. For a wind break it cannot equal the spruce, nor can it equal the hemlock for delicate beauty; but for a quick, cheap, good hedge it is the best plant we have. Young trees chopped out of our black muck swamps in spring, planted close, and evenly cut back, if the soil be not too dry, quickly grow into a handsome hedge. One word of caution, trees from dense thickets, if planted in exposed places, often winter-kill.

I am glad to see cedar-hedging coming into vogue. In some parts of Missisquoi it is not uncommon. The finest in the province, as far as I know, for surpassing anything in Montreal, is that on the grounds of Mr. W. P. Carter, at Cowansville.

T. *Gigantea. Gigantic Arbor Vitæ.*—This is the giant cedar (so called) of the Pacific coast. On the coast of British Columbia, Mr. George Dawson has found it measure 15 feet in diameter of trunk, and 150 feet in height. Mr. Dawson, who has made detailed notes of its distribution in British Columbia, finds it inland in severe climates, whence we should obtain seed for trial.

T. *Occ. aurea* and Peabody's Arbor Vitæ; and the "*Golden*" of R. Douglass, of Waukegan, Ill., are golden tipped varieties of our common cedar, which are bright in color and highly ornamental. The probable tenderness of the golden yew and the golden retinespora should cause us to prize these all the more. There are also silver tipped varieties, but not equal to the golden, and dwarf dense little gems useful in ornamental gardening.

T. *Siberica. Siberian Arbor Vitæ.*—Is fully as good a hedge plant as our native, more dense in foliage, and it would seem more hardy, that is, it does not so lose its freshness of color as does our own when exposed to dry cold without our usual covering of snow. Mr. Brown thought very highly of this variety.

TSUGA.—Hemlock.

Our native hemlock is one of the most graceful and beautiful of all coniferous trees. Imagine a hemlock 50 inches across the stump grown in the open from infancy, branched to the very ground. There are specimens about Boston such as we have not, and cannot have for many years to come.

It is also our most beautiful hedge plant, though not as easily transplanted, nor does it become ornamental as soon as our white cedar. There is a beautiful hedge on the grounds of the late A. J. Downing, at Newburg, N. Y., one of those living, un-tombstone-like monuments which he so loved to leave behind him.

There are two dwarf varieties of it I must mention. The round-leaved hemlock (T. *Canadensis Macrophylla*) is a compact, foreign-looking, bushy shrub of slow growth and dark foliage, very curious and unlike a hemlock. Sargent's weeping hemlock (T. *Can. Sargentii pendula*) found on Fishkill Mountain by H. W. Sargent. Its graceful pendulous beauty can hardly be surpassed. I saw specimens at Flushing and on the Grounds of the Rural New Yorker not hurt by last winter.

Of other varieties, the Indian hemlock (T. *Brunoniana*) though found in Bhotan at an elevation of 10,000 feet, has proved quited uncertain and tender in the Middle States. The Douglass spruce (T. or *Pseudo-Tsuga Douglasii*) is a tree of which there are vast forests on the Pacific slope, where it grows to a height of 150 to 200 feet. Specimens have even been measured, it is said, which reach 300 feet. The singular zigzags of its northern limits in British Columbia, have been carefully mapped out by Mr. Geo. Dawson, who has found it in the interior, in latitude 55, at elevations of 3000 feet and even higher but then of small size; also upon the eastern slope of the Rocky Mountains, in climates of medium moisture and of very low winter temperature. Its foliage, I must say, is of medium beauty only. The western or Californian hemlock, (T. *Mertensiana*) Mr. Geo. Dawson says, closely resembles our native species, but grows on the coast of British Columbia to a height of 200 feet, with a trunk 6 feet in diameter. It is found, usually, in the regions of abundant rainfall, and in some severe climates. The (T. *Pattoniana* or *Williamsonii*,) has been found by Mr. Sargent on Silver Mountain, British Columbia, at an elevation of 4000 to 6000 feet.

(1) Probably for the purpose of affording staves for the long bows with which the retainers of the Monasteries were armed.

A. R. J. F.

First steps in Farming. Young man's Department.

As a summing up of the proper way of regarding organic matter, I cannot do better than quote from the address of Dr. Aitken, chemist to the Royal and Highland Society, given in the *N. B. Agriculturist* of December 14th last, since I wrote my article on the subject.

"The great difference between farm-yard dung and artificial manures is its great bulk and the large quantity of organic matter it contains. The effects of short dung upon light soils and of long dung upon heavy soils are to improve greatly the *physical character* of each. Organic matter, though it is *not directly absorbed* by the roots of such plants as form our crops, has important functions to perform in the soil. It forms a soft kindly bed for the roots to ramify in, and it is sufficiently retentive of moisture to prevent the crop from suffering much from the drought. Our forefathers had great faith in organic matter, and though chemistry has shewn that they were wrong in supposing that it formed *directly* the food of plants; yet, as it contains about nitrogen enough to form 1 o/o of ammonia, as the carbonic acid formed by its decomposition has the power of setting free the constituents of the various minerals in our soil, and as it is, as I said before, mechanically useful, we must not be led by the supporters of the "mineral theory" to undervalue it."

I am the last man to undervalue *dung*, but I am a most determined opponent to those who, trusting in Sir H. Davy and other ancient authors, try to persuade us that it will pay a farmer to drag about a quantity of tough fibrous vegetable

matter from our swamps and peat-beds, in the vain hope of, by contact, converting it into a valuable manure. If used at all, it should be used as an absorbent of urine, or as a means of diluting the spent lime of the gas-works.

Artificial Manures.

This name *artificial* is hardly a correct, though it is a convenient one. Nitrate of soda, for instance, is a natural product,—sulphate of ammonia is not. A better term would be *auxiliary* or *special* manures.

When I first recollect anything about farming, the only two manures, that could be called artificial, were *bones* and *rape-cake*. The Scottish farmer used the one for his turnips, and the Norfolk men, on their light sandy soil, found the latter very beneficial to the wheat-crop. Here, practice was in advance of science, and very remarkably so, for bones contain a large proportion of phosphoric acid, and rape-cake contains a large proportion of nitrogen, and, as we shall hereafter see, Messrs. Lawes and Gilbert have proved to demonstration that these two crops demand severally these two elements of manure.

Somewhere about 1842 Cheshire, Eng., was thrown into a state of excitement by the discovery, that on the worn out cheese-pastures a dressing of a ton of half-inch bones had a wonderful effect; as it need have, the cost of the dressing then being about $25. There was nothing really surprising in this, if theory be correct, for the years' milk of each cow drew from the land 80 lbs. of phosphate of lime or bone; and the calf if killed, or the bullock, if the calf was allowed to arrive at maturity, carried off a considerable amount; no wonder, then, that the land became almost incapable of supplying any milk at all. The wonder was, and is, that bones had, comparatively speaking, no effect on old grass-land except in Cheshire and a few parishes in the counties immediately surrounding that county! Why, no scientific men have ever been able to say, any more than they can say why sulphate of lime or plaster, which on all leguminous crops (pease, beans, clover, &c.,) in America, works such miracles, has positively no effect in England—it is never employed there, thousands of experiments having shown its uselessness. The discovery of the benefit of bones when applied to grass-lands was due to an accident: a cart load was upset, and not cleared away for a few days, owing to wet weather or something, and the shrewd tenant of the farm soon saw the marvellous difference in the grass, and persuaded his landlord to give him a few tons for experiment's sake. Just so with linseed-cake. Formerly, when the oil had been expressed the refuse of the mills was thrown away; in the neighbourhood of one of these establishments a cottager's cow was observed to be in wonderful fettle; upon inquiry, it was found that she went regularly to feed upon the rejected husks of the linseed; and now cake is worth $50 a ton! (1)

The next step was the reducing the bones to the condition of coarse "dust", as it was called, but it was hardly a correct appellation. This was never much used in the south, till a few Scotchmen, *des drôles*, I am sorry to say, for the most part, but good farmers, came from the north and got situations as gentlemen's bailiffs. These men introduced the drill-culture for roots, and the use of bones, to the benighted Southron. The drill-culture for roots, I say, for sowing grain with the drill is quite another thing, and purely an Essex invention; though Jethro Tull, 300 years ago, sowed his grain in rows, the seed was deposited by hand.

Phillip Pusey, the President of the Royal Agricultural Society of England, tried to move a step further in the utilisation of bones as a special manure. That lamented friend of the farmer had a mind resembling, though with a wide interval, the mind of the great Bacon. He saw that, whereas wheat (fall wheat I mean) required no great amount of ready food for the first few months of its existence, turnips, unless they found a plentiful supply of ready cooked provisions the moment they started into life, had an enemy to contend with, the *haltica nemorum*, or fly, that would quickly sweep them off. From this deduction, Mr. Pusey argued, that if the bones were subjected to a preparation which would assimilate them to the condition in which they were found after they had been three months buried in the soil, the question would be solved. He accordingly made a heap of bones and earth, kept it damp, and after turning it over twice, found the bones reduced to a pasty meal. This, when exposed to the air, soon became dry enough to pass equally through the manure drill, and the quantity of bone dust necessary to produce a fair crop of roots was at once reduced from 16 bushels to 6 bushels per acre. I am sorry to say that most of our bones are exported. How long it will be before the province of Quebec, with its immense exportation of butter and cheese arrives at the exhausted condition of Cheshire forty years ago, I cannot tell; but it is clearly on the high-road thitherward.

Now, bones are composed, principally, of phosphate and carbonate lime. There is a certain amount of gelatine and some fat, the former being the source of nitrogen, of which there is about 3 0/0 to 4 0/0 in raw bones, equivalent to 3,642 to 4,856 of ammonia, but samples vary a good deal. The carbonate of lime is practically valueless, the phosphoric acid is what we want, and I will now try to show you, without any use of hard terms, what changes take place in bones treated as we have just described.

You must please to understand that there are three distinct forms of phosphate of lime. *Calcium*, you who have learned (and not forgotten) latin will remember, signifies lime, and the chemist's adjective derived from it is *calcic*; the three forms may be represented:

Composition of Tri-Calcic Phosphate	Composition of Bi-Calcic Phosphate	Composition of Mono-Calcic Phosphate
Phosphoric Acid	Phosphoric Acid	Phosphoric Acid
Lime	Lime	Lime
Lime	Lime	Water
Lime	Water	Water

You see at once how their names and their composition are connected. Three lime phosphate—one equivalent of phosphoric acid and three of lime; two lime phosphate—one of phosphoric acid and two of lime, with one equivalent of water taking the place of the missing equivalent of lime, and the one-lime phosphate—one of lime and one of phosphoric acid, with two equivalents of water.

In each case there is one equivalent of phosphoric acid, combined with three equivalents of base; but, in one case, the only base is lime, in the other two lime and water are the bases. And now observe the changes that take place, in the soil or in the heap, by which the bones are rendered fit food for the plant: The phosphate of lime in bones is the three-lime kind, and will not dissolve in water—ah! but the water which falls on our fields takes up *carbonic acid* in its passage through our atmosphere, and, doubtless, there is some produced in the soil itself, hence the whole thing is changed; one equivalent of lime is removed by the acid, and the three-lime phosphates becomes two-lime phosphate and carbonate of lime. Now the two-lime phosphate will dissolve, though slowly, in water, and therefore plants can feed on it. When we broke the bones fine, the action of the carbonic acid and water was greater on account of the larger surface

(1) Was, when I wrote the above, last December; now it is only worth, thanks to cotton-cake, $40

exposed to their influence, and we made a heap of bones and earth, moistened, to soften the bones and cause a more rapid disintegration of them when covered up by the soil The following diagram shows the action of the carbonic acid upon the three-lime phosphate in bone:

Composition of Tri-calcic phosphate	Re-Agents Employed	Products of Decomposition
Phosphoric Acid Lime Lime Lime	Water Carbonic Acid	Bi-calcic phosphate Carbonate of lime

The three-lime, or tricalcic phosphate, contains about 46 0/0 of phosphoric acid, and consequently 54 0/0 of lime.

Voelcker's analysis of bone-dust is as follows:

Moisture	12.06
Organic matter	29.12
Phosphate of lime and magnesia bone-earth.	49.54
Carbonate of lime	6.99
Alkaline salts, common salt, &c	1.91
Sand	0.38
	100.00
Containing nitrogen	3.69
Equal to ammonia	4.49

It will be, perhaps, useful to compare the values of farm yard dung and bones. Dr. Madden, whose analysis of bones, though thoroughly trustworthy, must have been taken from a sample very poor in nitrogen, gives the following result: one ton of bone equals, as regards:

Organic matter	1	ton	farm-yard	dung
Soluble matter	1	"	"	"
Easily dissolved	2.9	"	"	"
Nitrogen	3.9	"	"	"
Saline matter	5.0	"	"	"
Earthy phosphates	18.3	"	"	"

Therefore, if all the various degrees in which bone-dust is superior to farm-yard dung be added together, one ton of it is equal to thirty tons of dung. I need hardly repeat that the organic matter is only valuable in proportion to the amount of nitrogen it contains, except as a mechanical agent for lightening the land.

Next month I hope to enter on the subject of the great discovery of Liebig . the manufacture of Superphosphate of Lime.

Arthur R. Jenner Fust.

SHEEP SHEARING.

It may be taken as an axiom in economics, that the more completely finished for the use of the consumer any article is when it leaves the manufacturer, the higher proportionate price will it fetch. For instance; cotton yarn is much dearer in proportion than the rough cotton as the bale leaves the press in its native country; and it is clear, from this consideration, that the labour expended on the cleansing, teasing, and other manipulations it undergoes, with a proper addition to the price of the article, goes on accumulating, until at last the purchaser of a printed calico dress pays for the whole.

Thus, I have often wondered why the farmers of this province are so fond of shearing their sheep in the unwashed state. To begin with, it will be said that the wool is washed afterwards: true enough, but shearing a sheep with a dirty skin makes rough work, and moreover, wool washed off the sheep's back is deprived of its *yolk*, and when dry feels harsh, and is in an unfit state for certain processes of manufacture.

In the year 1862 I superintended the washing of 60 sheep for the late M. Amable Demers, of Chambly. The affair was very simply managed: the sheep were penned in a temporary fold, by the side of the "petite rivière de Chambly;" a large tub was kept full of water into which each sheep was plunged

Fig. 1.

and thoroughly washed, the dissolved *yolk* acting as a soap; and after ten days, passed in a clean pasture, the sheep were shorn, so much to the satisfaction of the proprietor and the manufacturer (Mr.Thomas Willett),that the former presented me with a two year old fat wether in acknowledgement of my assistance. I say, that the sheep were kept in a *clean* pasture, because it is well that there should be no roads or earth-banks for them to soil themselves against. The practice of tub-washing, as distinguished from pool-washing, has long been in use in Yorkshire, England; and was the invention of Raspail, a French chemist, who observed that "when the wool is washed this soap (yolk) is dissolved, and takes the salts with it. Hence it follows that the water that has been used in this process becomes, at each repetition, better adapted for the purpose." Stephens, in his "Book of the Farm," objects to the practice, but he seems never to have tried it, and as a set off to his opposition, I think the fact that in England tub-washed wool always brings from a half-penny to a penny a pound more than pool-washed wool will be sufficient.

Sheep should not be washed until the water has attained a temperature from 56° F. to 60° F. After washing, they should wait ten days or so, before shearing, as the wool must not only be thoroughly dry, but the yolk, the natural oil of the wool, must return into it again, and the new wool should have risen from the skin, before the old is taken off. Disregard to this particular renders shearing difficult, and certainly injures the appearance of the fleece. Generally speaking, one may wash the first week in June and shear in the second: if the water of small streams be used, it will be found warm enough by that time.

"The yolk being a true soap, soluble in water," says Luccock, "it is easy to account for the comparative ease with which the sheep that have the natural proportion of it are washed in a running stream." The composition of yolk was found to be, in the rough: soap of potash, carbonate of potash, acetate of potash, muriate of potash, lime, and an

animal fatty matter which imparts to wool its peculiar odour. The medium quality of yolk in short-woolled sheep, according to Youatt, is about ½ the fleece. More yolk is found on the breast and neck of the sheep than on any other part of the body, and it is there that the finest and softest wool grows. Softness of the pile is, therefore, evidently connected with the presence and quality of yolk. There is no doubt that this

Fig. 3.

substance is designed to nourish the wool and to give it richness and pliability. In what way is the growth of the wool promoted? By paying more attention than our farmers are accustomed to give to the quantity and quality of this substance possessed by the animals which they select for breeding purposes, the quantity and quality of the yolk, on which farmers seldom bestow a thought, and the nature of which they neither understand nor care about, will, at some future period, be regarded as the very essential and cardinal points of the sheep—considered as a wool bearing animal, I must add to M. Youatt's expression of opinion; for wool is so low in price and mutton so dear, that the question now-a-days is: which sheep will produce the most and finest quality of meat?

Shearing.—A smooth barn-floor is the best place for this operation. Our flocks are so small that no extensive preparation is needed. The best shears have additional springs between the handles to separate the blades more forcibly, but they hurt the hand, and are not worth the trouble. The great thing in shearing is to keep the points clear of the skin by gently pressing the blades upon the skin—keep the hand low, and rest the broad part of the blades upon the skin—you will not cut your sheep much if this is attended to. With scissors, such as I have seen used in the French country, but ragged work can be made.

Our engravings illustrate the three stages of shearing; First, after setting the sheep on its rump, and on the supposition that the clipper is a right-handed man, he rests on his right knee, and leans the back of the sheep against his left leg *a*, bent. Taking the shears in his right hand, and holding up the sheep's mouth with his left, he first clip the short wool on the front of the neck, and then passes down the throat and breast between the fore-legs to the belly. Then placing the fore-legs *b* under his left arm *c*, he shears the belly across from side to side down to the groins. In passing down the belly and groin, where the skin is naturally loose, while the shears *d* are at work, the palm of the left hand *e* pulls the skin tight. The scrotum *f* is then bared, then the inside of the thighs *g g*, and lastly, the sides of the tail *h*. These are all the parts that are reached in this position. For the clipping of these parts small shears suffice; and as the wool there is short, and of a detached character, it is best clipped by the *points* of the shears, as carefully held close, like *d*.

Fig. 2 represents the *second* stage of clipping. Its position for the sheep is gained by first relieving its fore-legs *b* from their position in fig. 1, and, gently turning the sheep upon its far side, while the shearer, resting on both knees, supports its far shoulder upon his lap. You may always rely upon this fact—the more a sheep feels at ease, the more readily it will lie quiet to be clipped. Supporting its head with his left hand, the clipper first removes the wool from behind the head, then around the entire back of the neck to the shoulder-top. He then slips its head and neck *a* under his left arm *g*, and thus having the left hand at liberty, he keeps the skin tight with it, while he clips the wool with the right, from where the clipping in the first position, fig. 1, was left off to the back-bone, all the way down the near side. In the figure, the fleece appears to be removed about half-way down the carcass; the left hand *b* lying flat, keeping the skin tight; while the right hand *e* holds the shears at the right part, and in theproper position. The clipper thus proceeds to the thigh and the rump and the tail *d*, which he entirely bares at this time.

Clearing the sheet of the loose parts of the fleece, the clipper, holding by the head, lays over the sheep on its clipped or near side, while still continuing on his knees; and he then rests his right knee, fig 3, over its neck on the ground, and his right foot *b* on its toes, the ankle keeping the sheep's head down to the ground. This is the *third* position in clipping. The wool having been bared to the shoulder in the second position, the clipper has now nothing to do but to commence where it was then left off, and to clear the fleece from the far side from the back-bone, where it was left off in fig. 2, in the second position, towards the belly, where the clipping was left off in the first position, fig. 1.—the left hand *e* being still at liberty to keep the skin tight, while the right hand *f* uses the shears across the whole side to the tail. The fleece *g* is now quite freed from the sheep. In assisting the sheep to rise, care must be taken that its feet are free from entanglement with the fleece, otherwise, in its eagerness to escape from the unusual treatment it has just received, it will tear the fleece to pieces.*

On comparing the attitudes of the clipper and of the sheep in the different stages of clipping just described, with those of a mode very common in the country, it is necessary to look again at the *first* stage of the process, fig. 1, the common practice of conducting which is to place the sheep upright on its tail, and the clipper to stand on his feet, supporting its back against his legs—which is both an insecure and painful position for the sheep, and an irksome one for the man, who has to bow much down to clip the lower part of the animal.

* The artist has erroneously represented the sheep lying on its *far* side, and the clipping to proceed from the belly to the back-bone, which is the proper posture for the second position, as also the keeping the head of the sheep down with the left leg *a*, whereas the sheep should have lain upon its *near* side, the wool been shorn from the back-bone to the belly, and the head *d* kept down with the right leg, as described above.

In the *second* stage, fig. 2, the man still remains on his feet, and the sheep upon its rump, while he secures its head between his legs, in order to tighten the skin of the near side, which is bent outward by his knees. The skin is certainly tightened, but at the expense of the personal ease of the

Fig 2.

animal; for the hand can tighten the skin as well, as shown in all the figures, at *b* and *c*, whilst the bowing down so low, and as long, until he clips the entire side, cannot fail to pain the back of the clipper. The *third* position is nearly the same in both plans, with the difference in the common one, which keeps the left leg bent, resting on its foot—a much more irksome position than kneeling on both knees.

A. R. J. F.

Maize as a Farm Crop for North.

Without any real acclimatization, (for maize is a true tropical plant, as intolerant of frost or chill as the banana), our "Indian corn" is profitably grown over a wider extent of the earth's surface than any other cereal. It adapts itself, by an infinite power of variation, to the length of the summer, whether it be 12 months or 90 days. All it requires is that its season, long or short, shall be warm and sunny; and whether it be the "giant maize" of Peru, or the "creeper corn" of Canada, it is ready at its appointed time with a generous crop, varying in a far wider proportion to the tillage given it, than to variety grown, or the length of its season. It is, in fact, easier to grow large average crops of corn northward and southward, although the largest authentic crop (147 bushels to an acre) is reported from South Carolina. Many experimenters in New England have approached this maximum closely upon single acres, but on large areas, north and south alike, an average of 60 bushels to the acre is a large crop. The general average is about half that quantity, and even in a selected list of good farmers, the average in a series of years would hardly exceed 40 bushels.

Corn demands high solar heat and sunshine, as well as freedom from frost. Without these it grows slowly, and makes no crop. For this reason it does poorly on foggy sea-coast lands, even though the frostless season there may be a comparatively long one; while on the other hand, with the right variety, a hundred days between frosts, and plenty of sun, there is no surer or more profitable crop grown by farmers anywhere than Indian corn.

This corn not only yields a better average of grain to the acre than other cereals, but in its stalks it furnishes a large quantity of feeding material, much more valuable, as well as greater in amount than the small grain. Wherever it can be grown, therefore, maize is a favorite crop; and America in giving it to the world, bestowed a greater boon on mankind than all the products of her mines of precious metals.

In northern New England and Canada an almost indentical variety of this grain is cultivated, short in stalk,—from 5 to 7 feet,—with a small cob, and small, fruity, yellow grains, its rows, rarely more than 12 in number upon the cob, and preferably not more than 8, where the seasons are shortest. There is a considerable difference in the "strains" of this variety, produced by careful selection and tillage. Some of the poorer and more degenerate sorts give a very scanty yield of ears, many stalks being entirely earless, while short and abortive ears make up the bulk of a crop which, with its pitiful 15 or 20 bushels to the acre, brings down the census averages so woefully, and so discredits the skill of American farmers. This result of carelessness and neglect is not local. It is found in all sections of the continent alike, and testifies to as poor farming on the rich prairies of the west as is to be found in the pine barrens of the south, or the frosty valleys of the north. And right alongside of these wretched crops may be found others, with carefully selected strains of seed, adequate fertilization, and good tillage, giving an average of 60 or even 70 bushels of grain, with a crop of stalks alone worth more than all that grows upon the careless farmer's field.

The northern farmer who grows Indian corn wants a quick maturing variety, a variety that ears well, and one that has a small cob, which will dry out in the short season between harvest time and winter. Does he want one long ear, or does he want two or more short ears upon a stalk? This is an important question in the selection of seed, and in efforts to establish a "thorough-bred strain." Perhaps some will say "we want two ears to the stalk, and we want them long." That is a laudable ambition, but, according to my experience, not an easy one to realize. The long ears are usually found single, the multiple ears shorter according to their multiplicity. If we could rely upon a single long ear to each stalk, bearing as much grain as the two ears which may be found upon one best well-bred strain, the preference would be strongly in favor of the long ears, because it would have the expense of one of the more costly parts of the corn harvest,—the husking. Whether this result can be obtained is very doubtful. It seems to be a much more feasible way of getting a large product to the ear to increase the number of rows, than to greatly lengthen the ear of an 8 rowed corn.

But the greatest drawback to large crops is the vast number of earless, or nearly earless, stalks in our corn fields. Three hundred 8 inch ears of good 8 rowed yellow flint corn of the variety commonly grown in New England or Canada will make a bushel of shelled corn. Of selected long ears, ranging from 10 inches to a foot (the latter rare), 225 ears will make a bushel. As usually planted we have about 5,000

hills to the acre, with three to four stalks in the hill, say 18,000 stalks. An average, therefore, of one good 8 inch ear to the stalk gives us 60 bushels of dry shelled corn to the acre. As the average crop of the country is less than thirty bushels, it is plain that our corn fields do not average one good 8 inch to two stalks. And yet there are strains of this corn that under good culture will average three good ears to two stalks, which gives a yield of ninety bushels with hill culture, and over 100 bushels when the crop is planted in drills, one kernel every six inches, or, as I prefer for convenience in cultivation, two kernels every foot. One great benefit that agricultural colleges and government experiment stations might confer upon the people is in the perfecting of seed corn by selection, and its distribution among the farmers. Corn requires so little seed, and is so prolific, that the distribution of improved seed in pint or half pint packages by mail, gratuitously, from such institutions, would probably increase the yield of corn from a grain average at least 25 per cent. It would be a profitable investment, and the principle is susceptible of indefinite extension. It it useless to expect that improvements in the seed of our staple crops will be to any great extent made by the farmers themselves. Under ordinary care and culture the tendency is to degradation rather than improvement. But a little money judiciously spent under government authority would give us a provincial fountain of improvement, and might become a standing exemplar of the profit of skilled methods, which could not fail to have its effect in raising the standard of agricultural effort, in addition to the direct benefits it would confer.

Our corn growers err and suffer loss in the use of inferior seed, but still more by adhesion to antiquated methods of cultivation. When the land first began to be cleaned of forests it was necessary to plant the corn by hand, and till it with the hoe. In that way a crop sufficient to give food for the family was painfully got. Now that the stumps are gone on our older farms, there remains much rocky and stony land upon which corn, if grown there at all, must be grown by hand tillage. But such land should be tilled as little as possible. It should be devoted to fruit or grass, or, in many cases, allowed to revert to forest, as its most profitable application. We have large areas of plain land which (especially when sandy, as much of it is), is the ground in which our corn delights, and upon which it is a delight to the farmer to grow it. On such lands all the work of producing the crop can be done by horse power, the farmer riding upon and guiding his implements with little fatigue, slight expense and superior crops. The sulky plow, the mechanical dung-cart, the horse corn-planter and fertilizer distributor, the smoothing harrow and the riding cultivator will do all the work, do it far better than it is usually done by hand, and at a tithe of the expense. Only when it comes to harvesting do we return to the old methods and slow processes which limit the crop and encroach upon the profits. I believe that corn will yet be cut and husked by machinery.

By the recent discovery of ensilage, maize is made - only to give us grain and dry forage, but it takes the place of root crops in giving us the soft and succulent food so essential to success in dairying, if not in stock feeding. Ensilage has passed the experimental stage, for it fills a painfu' gap that has always existed in American farming. Neither our climate nor the habits of our people are adapted to extensive root growing. The heat and sunshine that gives us the corn is unfriendly to the growth of roots, and indisposes the farmer to the slow, long continued and painful methods of tillage required by that class of crops. I believe that these points, and especially the latter, will defeat the efforts to domesticate the beet sugar industry on this continent. It requires more hand work and back-breaking toil than our farmers will give for so moderate a return.

Not the least of the valuable peculiarities of our great American cereal is that, properly managed, it is a renovating rather than an exhausting crop. Unlike other cereals, it roots deep and wide, and with its broad leaves and hungry roots forages for itself in way that makes it the surest as well as the most productive crop we have, and, at the same time, leaves the land in a superior condition and full of materials for the growth of the succeeding crop. Corn, grass, and clover, will make the American farmer who understand his business rich, with less hard work than any other species of agriculture. These crops make meat and manure, they make butter and cheese, and the farmer who makes these things is always prosperous.

Newport, Vt., January 12, 1882. T. H. H.

LARD CHEESE.

The manufacture of lard cheese is increasing, and in the words of one of the proprietors of the patent covering its manufacture are, "it is bound to win," and there is no doubt there will be an effort made to introduce the system in the Dominion of Canada the coming season. It is my duty as a public instructor to investigate the matter and place the truth before the manufacturers so they may not be led to adopt the system until they know more of it than those who are pecuniarily interested in the sale of machines and royalties choose to tell.

While in the States, recently, I took considerable trouble to learn all I could relating to the manufacture of the said cheese; and it was with a desire to arrive at a fair conclusion, as to the merits of the said cheese and its demands upon the public patronage and confidence. I do not think I am prejudiced in the matter, or influenced by any other motive than a sincere desire to advance the interest of the dairymen at large, so far as honesty to the consumer will permit

In this article I shall not be personal; but will try and hold up the question to the scrutiny of the public in a fair and just manner. In the first place, the persons who are interested in the patent covering the manufacture of said cheese, and some others, claim that it is just as good, wholesome, and nutritious as the full cream cheese, and this being the case, it is perfectly honest to manufacture and sell such cheese without branding it so the consumer may know it is not the genuine.

They say, if it were branded or marked in such a way, that some people would not purchase it from mere prejudice, and it would not have a fair chance to compete for public approval. They say, also, that it is much more profitable to the manufacturer and dairyman to produce the said cheese than to make the genuine, and it being made at so much less cost, it will be a great benefit to the consumer as *it can be sold at a less price.*

This last claim is a rather doubtful one, as the cheese is so good that the shipper can not detect it and pays the price of the genuine, and I cannot understand how it is going to the consumer at a lower price than pure cheese Perhaps many of the readers of the Journal know the process of making this class of cheese but I will give a short explanation here, for the benefit of those who do not know; at the same time reminding them that it is from personal observation and not from hearsay In the first place, the milk is set for the cream to rise and is skimmed as closely as possible, the object being to take out all the butter and have the skim milk remain sweet.

This sweet skim milk is now enriched with lard in the following manner. two vessels, holding from 12 to 15 gallons each, and similar in construction, fitted up to heat their contents by steam and standing in a convenient place to the engine, now come in use.

Into one of them a quantity of lard is placed equal to 1½ lbs. lard for each 100 lbs. of milk to be worked up, and in the other, about double the quantity of sweet skim milk that there is of lard and now, both lard and milk are heated up to about 120 to 130 degrees Fahrenheit

Now little faucets are turned, and the lard and milk run out and join in a spout leading into the bottom of a small machine which has an upright cylinder revolving at a speed from 2500 to 4000 revolutions per minute. This cylinder is bristling with little points, and the centrifugal force exerted by the revolving cylinder is so great that the lard and milk are thrown up and round this cylinder until it is discharged through a tube at the top, perfectly mixed and in a foam. The inventor of this machine claims that the fat is caught upon those points, and the skim milk is thrown round it, thus forming a new globule of fat similar to the globule in new milk. As for this theory, it is not sound, as the milk being heavier than the fat it would be thrown on the outside, while the fat would remain in the centre. But

that it is a very thorough mixture must be granted, for it takes several hours for the mixture to separate if left standing.

The skim milk being poured into the cheese vat and heated up to the proper degree, the mixture of lard and milk is poured in and stirred through the whole, and if butter-milk is used, it is now added, the rennet applied, and the operation now goes on similarly to the making of full-cream cheese.

Four or more pounds of pure butter replaced by 1¼ lbs. of lard, brought from some western slaughter house, rendered from hogs brought from all parts of the west and south, most of them being sound and healthy, but many are diseased and it is well known that those that are not fit for packing are rendered into lard, and we are asked to believe that one and one-half pounds of this lard of doubtful reputation if compounded with 6¼ lbs. of skim milk curd, will make as wholesome and nutritious food as 4 pounds of butter compounded with the same amount of skim milk curd.

Such a statement does not require any arguments to refute it, and it is a reflection on the common sense of the public for any one to make it.

A great many families in the eastern States raise their own pork and lard, because they do not wish to use the western, although they could buy the western cheaper than they could raise it. Must this lass of people be compelled to eat what they do not want, by having it concealed in their cheese, which they have a right to suppose is entirely the product of the cow?

A great many people of weak digestion and dyspeptic cannot eat lard in any form, while they can eat butter freely, and this proves that lard cheese would *not* have the same effect on the stomach that pure cheese would have, and is not the same. But granting it is so nearly like full cream cheese that the consumer cannot detect the difference, the claim that it is honest to sell it without branding it as counterfeit, is not just or reasonable.

There are two classes of people who have an especial right to object to this, and they are, first, those who from religious scruples do not eat the product of the hog, at all, and think it unclean and unfit for food, and the other class, those who abstain from it certain days and seasons of the year, and both of these classes eat largely of cheese, and what fair minded and tolerant man will say it is not an outrage upon human rights and religious liberty, to hide the article they do not desire in one of the commodities of food in such a manner that they will eat it unknowingly. They say, all they want is a fair trial of their cheese to convince the public that it is just as good as any.

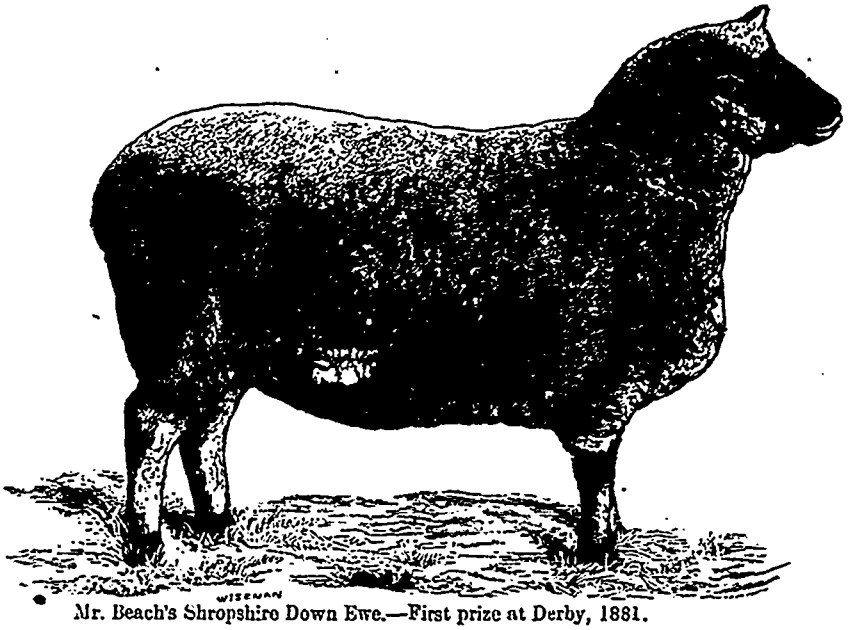
If they really want a *fair trial*, it would be no more than fair to offer it to the consumer for just what it is, and at a price proportionate to the cost of the article with full cream cheese which, wholesale, is less than one-half; or when pure new milk cheese is worth 13 cents, lard cheese can be made, as above described, for six cents and still pay the royalty to the patentees and a good profit to the manufacturer.

Now giving the retailer three cents for cutting per pound, when best cheese sold retail for 16 cents, lard cheese should retail for 9 cents, and no doubt there would be a large amount of it used by some people, but no one would be imposed upon when they did buy. The claim that it is equal to full cream cheese and is difficult to detect, is the strongest reason why it should be so distinctly marked that all may know it is not genuine, and the claim that it is more profitable to the producer is the same claim that the counterfeiter of money might set up if he succeeded in producing a counterfeit bill so perfect that it could not be detected. I take my stand right here, and I believe I am supported by public opinion when I say, that if all the parties who are engaged in the manufacture of said cheese, together with the patentees and those who control the sale of rights, machines, etc., should have a private room where they issued counterfeit National notes and bills and flooded the country with them, they would be guilty of no greater moral crime than they are now, and still they have an enviable reputation for honesty of purpose and integrity of character, and I know that the parties who are at the head of the whole business are extremely sensitive as to the good opinions of the public!

In conclusion I make this statement without any personal feeling of friendship or hate, that he who engages in this nefarious enterprise of making counterfeit cheese and selling it for the genuine, should occupy a cell in the same prison ward with him who counterfeits the Nation's notes, or forges his neighbor's name, and if there is any choice, the counterfeiter of food is the greater scoundrel of the two.

I earnestly hope that there may be legislation on this matter, making it a crime of the same nature to counterfeit an article of food as to make spurious money, or to forge a name.

J. M. JOCELYN.



Mr. Beach's Shropshire Down Ewe.—First prize at Derby, 1881.

Report of Pole Star Creamery for Season 1881.

Creamery opened June 6th, and closed November 6th. Open five months.

Whole number of pounds of milk manufactured into butter and cheese:			736,774
Pounds of butter made			14,429
Pounds of cheese made			65,532
Pounds of cheese made from 100 lbs. of milk,			8 82/100
Pounds of butter made from 100 lbs. of milk,			1 96/100
Total pounds of solid from 100 lbs. of milk,			10 88/100

Cheese sold as follows:

June and July,	1st sale,	1,114 lbs.	@	8 cents.
	2d "	25,917 "	@	7 "
August,	3rd "	18,933 "	@	11½ "
September and	4th "	11,426 "	@	12 "
October.	5th "	8,142 "	@	11 "

Butter sold to July 5th	20 cents.
From July 5th to August 1st,	22½ "
Balance of season,	24 "

Previous to August 1st, milk was all set for skimming; after that date only one-half was set, and the morning's milk was worked in new.

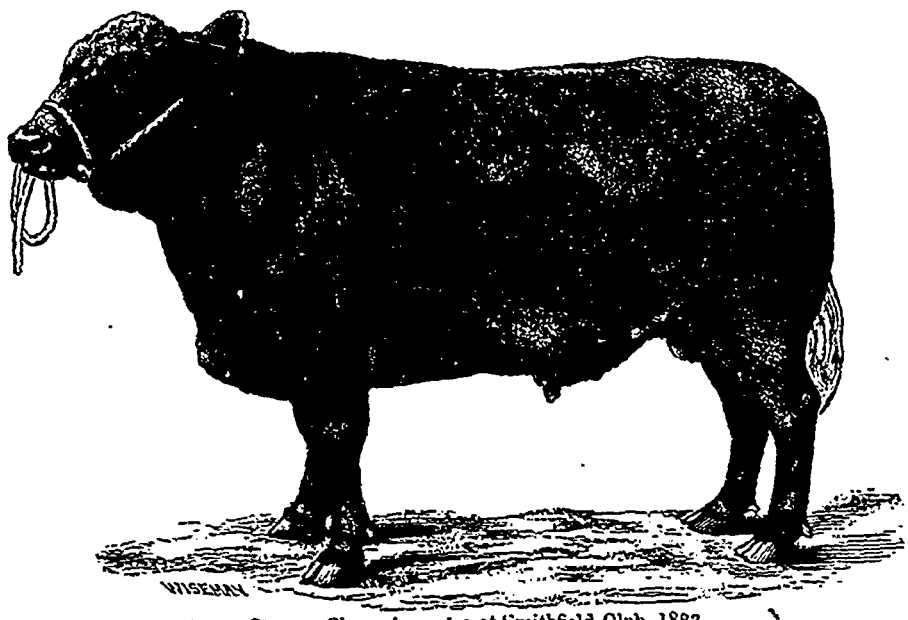
J. M. Jocelyn,

Clarenceville, dec. 7th 1881.

To R. W. Shepherd, jr., *Report Committee Montreal Horticultural Society and Fruit Growers Association of Quebec.*

Dear Sir,—I have long intended to give you those promised "notes" of last season's experience with the new Grapes fruited by me. The most prominent in my mind as possessing special merit for earliness, productiveness, and fine fruit, is the Worden, a plant seedling of Concord brought out by Mr. Worden, of Minetto, New-York. I have fruited it for two years and find it better in many respects then its parent, and much earlier, promising to be as productive and hardy, larger and better in flavour. Planted alongside of Moore's Early I can see but little difference in its time of ripening. Telegraph, though not a very new variety, claims I think, more attention than has been given it, is as large in berry as the preceding, ripens early, and has a very compact and handsome cluster. Black-Eagle, one of the late Dr. Underhill's productions, gives much promise for favorable localities in this Province, ripens about with Concord, a little later perhaps, and is a grape of superior flavour. Burnett, No. 19 of our friend Dempsey's hybrids, ripens earlier than the latter and when fully ripe, or a little past, it has a fine flavour, and the berry is very large. I consider it a Canadian triumph. Whitehall was sent me, in request for early new grapes, by Mr. Campbell, of Ohio, he is pronounced the best western Authority on this fruit: _ medium sized berry, ripening very early, and it may on further acquaintance be found very desirable, as the flavour is good. Belvedere from same quarter is a little later, very productive, in some respects resembling Creveling, no better. As the Talman was said to be "confused" with the Champion, I, from curiosity, obtained it from its original state, Ohio, and if not true to name, Mr. Campbell is responsible. Alongside of Champion, and the so called Beaconsfield, I found it several days later and better in quality, keeping in eatable condition long after these varieties were worthless. The Champion, bought of J. S. Stone, of Charlotte, N. Y. the proprietor and introducer of it, and the Beaconsfield, bought of Menzies and Gallagher, of Point Claire, prove identical in every respect.

Mr. Arnold's black grapes, crosses of Clinton with Black St. Peter, and Black Hamburgh, Brant. Canada, and Othello, were allowed to overbear. Those I had on exhibition were small and not matured, their flavour is not developed till after frost. Brant, the earliest, may be worthy of culture with us, as it is excellent for table or wine. To conclude the black grapes Mr Burr's new-Kans-as grape, "Early Victor," deserves notice. Prof. Husmann, of Missouri, advised me to try it, and the vines showed great vigor. It has been placed in the market this fall and has the endorsement of prominent grape authorities as the earliest grape known, and the best of its class, the Labrusca. As to Red Grapes the Brighton is early, hardy, vigorous, and good. Lindley, No. 9 of Rogers' Hybrids, is a favorite with me, a rampant grower, splendid bunch and berry, has to be restricted in bearing. Agawam another favorite, for its aromatic flavour, has but one fault, imperfect bunches. Salem is very desirable and, particularly, as a long keeper.



Polled Angus Steer.—Champion prize at Smithfield Club, 1882.

Northern Muscadine is the earliest red grape I have, and does not drop from the bunch as in some localities. In white grapes, Lady, the earliest, bore for the first time, though planted three years, and was satisfactory except a slight tendency to crack, Eva, one of Mr. Miller's successes, promises well, is vigorous, and superior in quality to Martha, its parent, and I believe will succeed generally in the Province; ripens with Delaware. Elvira is a strong grower, healthy foliage; Martha, though springing from Concord, when young makes a slow growth, of the two latter I will defer an opinion until after another year's trial. Autuchon, Arnold's No. 5, Clinton crossed with Golden Chasselas, small berry, but a long tapering bunch, fine quality, the foliage of this and all Mr. Arnold's hybrids the Thrip shows a preference for. Allen's Hybrid, so fine with me last year, was reduced in size beyond recognition by the ravages of this destructive insect. Mr. Caywood's Duchess, and Mr. Rickett's, Lady Washington, both made a strong growth and the foliage was very healthy. These and the Prentis, may appear in my exhibit next year.

Professor Husmann's last work on grape growing should

be in the hands of every grape raiser, but I must caution them about his opinion, from a Southern point of view, in reference, on page 53, to many varieties which he condemns that we cannot at present afford to drop from our fruit list. Agawam, Allen's Hybrid, Diana, Croton, Diana Hamburg Northern Muscadine, Rebecca, and Hartford, he pronounces "worthless"; and they perhaps have been superseded in the South by many better varieties we cannot grow North.

Though I find by experience it is best to be somewhat conservative as to system of training the vine, and try new systems cautiously, I am giving trial to the Kniffin System now being introduced on the Hudson, and in N. Jersey. The trellis is, two wires, the lowest 3½ feet from the ground, the upper 6 feet. The vine has but one stalk tied perpendicularly to both wires, arms are allowed to grow opposite each wire, right and left, and all other shoots on main stalk brushed off as they appear. In fall, these arms are cut back to 5 or 6 buds for fruiting next year, and the following year, the new arms that will start from the buds at the base of the present fruiting arms, at their junction with the stalk are allowed to grow to end of trellis, only clipping off ends of shoots that may grow too rampant, after fruiting, and at fall pruning the present season's wood that bore is to be cut clean away to stalk; at the same time cut back present year's arms to 5 to 6 buds as before. The system is claimed to require very little attention and was highly recommended to me by Mr. Williams, secretary of the N. Jersey Horticultural Society at the last session of the American Pomological Society in Boston. The only doubt I have is, that in time the stalk will become too rigid to lay down for winter protection; if so, I will not remove vine from trellis but tie matting around it.

J. PATTISON.

Messrs. D. M. Ferry & Co., flower and seed catalogue for 1882 is at hand. It is really a work of art which should be seen, read and carefully scanned by all our readers. By referring to the advertisement elsewhere it will be seen how to apply for this catalogue which is sent free.

We have repeatedly tried seeds from this firm, with constant and complete satisfaction.

Allender on Dairying.—Continued.

BUTTER-MAKING.

I cannot do better than advise every one who wants printed information on this subject to obtain Mr. Jenkins' "Hints on Butter-making," price 6d.

One word, however, about churns. I am constantly asked, "Which is the best churn?" A good dairyman or woman will make good butter in any churn, but if I have to give my decided opinion, I prefer the churns that are put together like boxes, such a Bradford's, or Thomas and Taylor's, or the *End-over* barrel churn, as made by Waide; not forgetting my special favourite, the swing churn, undoubtedly the best for a small dairy; any of these in preference to the old *barrel* churn. It is only quite recently that I arrived at this conclusion. I find that the churns I mentioned, by reason of their angles, will do the work with a minimum of dashers inside, whereas in a barrel churn a considerable amount of dasher is necessary, otherwise the milk would rotate with the churn; therefore, in future, I shall avoid all barrel churns, no matter by whom made. Concussion is what we want, and not friction; and this we get, even without dashers, in a box form rather than a barrel.

Should cream be churned when sweet or when slightly "turned"—ripened? I say the latter, but the *exact* state of acidity, and how the requisite acidity is to be brought about, is yet a matter of question. This subject has received much attention in Denmark. Mr. Jenkins lately gave me some very interesting information on this point, shewing that the new "world" that is being opened out by the investigations of M. Pasteur, Mr. Lister, and other scientific men here and in France and Germany, relating to the "germ theory," *will* play a part in dairy work, both in the manufacture of cheese and butter. It has been found that where, for the purpose of "*turning*" the cream, churned daily, some sour buttermilk from the prevous day's churning is used, after a certain length of time, say three weeks or a month, a fresh start is necessary—that is to say, some fresh milk must be allowed to become sour, and this being used instead of butter-milk, new seed is, as it were, provided.

This is, however, too wide a question to enlarge upon here. One thing is quite certain, that both in butter and cheese making there are influences, at present unknown, which materially affect the quality and flavour of the product. A paper, entitled "The Effect of the 'Infinitely Little' in Cheese making," has been published lately in France, bearing on this subject. I have not yet seen it myself, but have been informed of it by Mr. Jenkins.

"MARKETING," AND "ASSOCIATED DAIRIES."

In my former paper I said: "To my mind, butter factories are quite as much, if not more, needed than cheese factories." The great advantage foreign butter has over our home produce is, that, in addition to the greater care bestowed in its manufacture, it is offered to the trade in a more *convenient* or more marketable form. Now I think this is perhaps the most important point to which I shall call attention to-day.

Take fresh butter. Twenty years ago, when I was living in Buckinghamshire, the retail butterman in London had to get up early, drive to Newgate Street, and there, looking over many hundred flats of butter at the various salesmen's stands, select that which pleased him most; the butter, received during the night from the farmers in the Vale of Aylesbury and elsewhere, being made up in 2-lb. rolls, packed in flats or baskets, these latter lined with paper (often old newspapers) to keep out the dust, and the butter wrapped in a coarse cloth. Having made his selection, and had his purchases carried to his cart, he drove back to his shop. Empty flats and cloths had to be cared for, and duly returned. This system, doubtless, had been in vogue for years and years before the time I speak of—before railways, in the old days of the carriers—*and it is in vogue now*, as you will see by the basket of butter which I have brought here to-day. That flat of butter was purchased just as you see it, in the market, and the box of French butter that I have here, was bought at the same time. The French butter cost 17, per dozen, the English 16. Now, I want to draw attention to this—is not the way in which that flat of butter is packed a disgrace to us? Look at it in comparison with the French butter, the one is the produce of a single farm. I suppose two such lots are sent per week, and any one buying it would require to see it, and if they bought six lots, each would have to be inspected, because no two lots would be alike; whereas if any one required one hundred boxes of the French butter, they need but look at a single box, or not even that. The name of "Bretel Freres" on that box is a sufficient guarantee. Their house is as well known, and stands as high, as any merchant in any business in the City of London. The business they do is enormous. Now *they* have had a profit out of that butter, the market salesman has had his commission, the box is included, and the package has come from a foreign country.

Butter marketed as you see in this flat, at one time formed the whole supply for London; it does not now amount to a twentieth—nay, not a hundredth—part of what is required. Few provincial towns used fresh butter, as we understand it; salt butter only being known. Foreign butter, as shewn by our imports, formed then but a very small item in our con-

sumption. Look at the figures now. In ten years our imports have risen from £6,000,000 to £12,000,000 sterling. What do these figures shew? Take last year's return of 2,326,305 cwt., or £12,141,034—equal to £3,325 per day. To produce this quantity of butter, nearly 1,200,000 cows would be needed. Certainly the countries in which these cows are kept have no special advantage, either in climate or soil, over ours—no great advantage over us in the value of the animals, or of labour, and the cost of transport *against* them; and yet there is the fact, that a product of daily consumption, the fresher the better, and that could be produced in this country certainly as well, if not better than in any other country in the world, comes here in these enormous quantities, to feed our people, not only putting money into the pockets of the foreign farmer, but paying a handsome commission to two or three large mercantile houses, who have a finger in every cwt. imported. What is the answer to this question? It is this, and this only: foreign butter—whether it be fresh, from Normandy or Brittany, or salt, from Denmark or other countries—comes in a more *marketable form*. The process by which this is arrived at is simple, and could be easily carried out by us. Will we do it? That is the question.

Agents of the large houses in Normandy, such as Messrs. Bretel and others, attend the local markets, buy the butter from the farmers who, in their own interest, attend to rules laid down by the buyers. It is then carted to the stores or factories, and there put through a machine; so that, instead of having 1,000 different lots, varying from 20 lbs. to 50 lbs. each, they turn out many tons per day of precisely the same sample. This, instead of being packed in baskets, rough cloths, and perhaps newspapers, as you see before you, is put into boxes, each holding 24 lbs. in 2-lb. rolls, neatly made and nattily papered; and if you look at 1,000 boxes, you cannot tell "t'other from which." As you see that box, so hundreds of thousands come over annually.

The result of this is, that if this butter is not any better than that sent to market by English farmers, it commands a higher price and more ready sale, because it is in a more *marketable condition*. That is to say, instead of the retailer in London having to go to market at five or six o'clock in the morning, select his butter, and be back in time to attend to his business, he can write to an importing house and order ten, twenty, or fifty boxes of butter to be delivered to him just when he requires it, and in any quantity: and he is perfectly certain that so long as he is supplied with the same brand, he will receive every box in every consignment of the same colour and quality, varying, of course, slightly with the season. The same remark applies to salt butter. In buying "Dorset," one firkin differs from its next-door neighbour; one is made at one farm, and another is made at another. Whereas, from Denmark and the north of Europe, and wherever there are large associated dairies, the retailer can send to the merchant, and order a certain number of firkins of this brand or that, and knows that he will get what he requires, thus saving himself immense trouble and loss of time in marketing, and enabling him to give his customer, the private consumer, day by day, butter, salt or fresh, of the same appearance and quality.

It may now be considered how this may be done in England.

I suggest that, instead of each farmer, as in Buckinghamshire and other counties, making once or twice a week his two to ten dozen of butter, they should work together and make amongst them from twenty to fifty dozen *per day*, which would be of the same quality and appearance throughout, and enable the retailer to purchase direct their produce with as little trouble as he now buys foreign butter.

Mr. Jenkins points all this out in the concluding sentences of his little pamphlet, "Hints on Butter-making." He says:

"A member of the Society recently sent me two pats of butter of his own make. The quality was excellent, and I sent one pat to a factor in Tooley Street. He replied, 'If your friend can send me half a ton or upwards of such butter per week all the year round, I shall be happy to correspond with him.' Herein lies the difficulty of getting at the London market, and it can only be overcome by associations of farmers, or by the creation of new middlemen, whether companies or individuals."

A move has already been made in this direction. Mr. Carrick, stimulated by what he saw at Carlisle, has started a butter dairy, on a large scale, near that city. He buys milk to a very large extent, and has already, I believe, a most prosperous business. His customers' demands already exceed his supply, and I know that he lately had to refuse an offer of 1s. 9d. per lb. for 500 lbs. a week.

In Devonshire, a dealer is buying butter in the local market, reworking it, and sending out large quantities of an equal sample. Machines for this purpose are now to be obtained, and it is a business well worth the attention of energetic men. But what I should prefer is that farmers should associate and carry the business out themselves, thus saving the intervention of one out of the two middlemen.

I have been told hundreds of times that farmers will not associate. I say they will, if they are so fortunate as to meet with a man they know, and in whom they have confidence, to organize the association. I refer with the greatest pleasure to a most successful association, that has been working for the last four years—"The Gillingham Dairy Farmers' Association"—organized by my friend, Mr. J. Williams Bell. Mr. Bell, most kindly, lately sent me the figures of this society for 1880. Eleven farmers contributed 151,281 gallons of milk. This was partly sold as milk and cream, the rest made into cheese and butter; and, although chiefly summer milk (that is to say, 22,342 gallons were sent in in June, and only 3,832 in January), the sum received for the milk and its products, not counting the whey, was £5,120 3 11—equal to 8·18d. per gallon; and the total working expenses, including rent and rates, interest on capital, manager's salary, commission, fuel, repairs and renewals—in fact, all charges—came to just ¾d. per gallon.

Mr. Bell writes to me: "I have no doubt that such an association as ours is a right and proper thing, but the farmers will not take a rope when it is thrown to them, and, so far as I know, it is the only one of the kind in this country.

"I shall at all times be most pleased to see you and any friends of yours, and to tell you *gladly* everything I know. I have no secrets about dairy matters, and I always tell my people firmly to tell inquirers frankly and fully all that they wish to know, and then to do their utmost to beat them afterwards.

"I send you a copy of our last year's account, with a form of members' account, and a monthly statement of milk delivered, and I willingly submit myself to any further examination and cross-examination at your hands.

"I may add, that we never have a discordant word, and if any member ventured to be disagreeable, we should turn him out by an overwhelming majority; but no one ever is disagreeable. None have left us, and we make joining a favour."

This is a model, of which I would that there were many copies.—(*To be continued.*)

Hampshire Downs.

A pen of this years's (1881) lambs, exhibited at the Smithfield Club show, weighed 6 cwt. 10 lbs., or 227, live weight, per head. No other pen of lambs in the yard could touch this result, excepting lambs of the same breed. Age, 40

weeks; carcase weight, about 40 lbs. per quarter, though the breeder thought they would go 75 o/o of the live weight, *i.e.* 42 lbs. per quarter! The early maturity of Hampshire Downs is due to inherent qualities; to the constant use of lambs as sires; and to the great care and skill bestowed upon them by the shepherds of their native places, a rough but a genuine and intelligent, nay a thoughtful race of men. The 1st prize *Southdown wethers* only weighed 3 lbs. per head more than *Hampshire Down lambs*; not much for twelve months growth!