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THE

GARDENER'S MAGAZINE,

AND

REGISTER

OF

RURAL AND DOMESTIC IMPROVEMENT:

COMPRISING

TREATISES ON LANDSCAPE GARDENING,
ARBORICULTURE, FLORICULTURE, HORTICULTURE,
AGRICULTURE, RURAL ARCHITECTURE,
GARDEN STRUCTURES,
PLANS OF GARDENS AND COUNTRY RESIDENCES,
SUBURBAN VILLAS, &c.

ALSO

LISTS OF NEW AND RARE PLANTS, FRUITS AND VEGETABLES.

CONDUCTED BY

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PREFACE.

THE Contents of the *Gardener's Magazine* for 1842 are analytically arranged in the following Table, and the principal matters are indexed Alphabetically at the end of the Volume.

TABLE OF CONTENTS.

ORIGINAL COMMUNICATIONS.

FLORICULTURE.

HORTICULTURE.

AGRICULTURE.

REVIEWS.

MISCELLANEOUS INTELLIGENCE.

GENERAL NOTICES.

FOREIGN NOTICES.

DOMESTIC NOTICES.

RETROSPECTIVE CRITICISM.

QUERIES AND ANSWERS.

OBITUARY.

LIST OF ENGRAVINGS.

LIST OF NEW AND RARE PLANTS

FIGURED IN THE BOTANICAL PERIODICALS FOR THE YEAR 1842.

Tropæolàceæ.

TROPÆ'OLUM
edùle Chili - - - 413

Oxalideæ.

O'XALIS
lasiopétala Buenos Ayres - 413

Leguminòsæ.

ACA'CIA
platýptera Swan River - 413
MIMO'SA
uruguénsis Uruguay - - 413
ZI'CHYA
glabràta Swan River - - 413

Onagràceæ.

FU'CHSIA
cordifòlia Mexico - - 178
radicans Brazil - - 178
GODE'TIA
albéscens Columbia River - 413

Philadelphàceæ.

PHILADE'LPHUS
mexicàna Mexico - - - 414

Myrtàceæ § Leptospérmeæ.

BABINGTO'NIA
Camphorósmæ Vasse River - 414

Passifloràceæ.

LOA'SA
Pentlándica or Peru - - 414
PASSIFLO'RA
Middletoniàna South America 414

Crassulàceæ.

ÆO'NIUM
cruéntum Canaries - - 178
ECHEVE'RIA
acutifòlia Mexico - - 414
ròsea Mexico - - - 414

Cactàceæ.

ECHINOCA'CTUS
corynòdes S. America - - 178
OPU'NTIA
decúmbens Mexico - - 178

Compósitæ.

PODOTHE'CA
gnaphaliòdes Swan River - - 415

Stylídeæ.

STYLI'DIUM
Brunoniànum Swan River - 415
pilòsum Swan River - - 415
recúrvum Swan River - - 178

Campanulàceæ.

GLOSSOCO'MIA
ovàta North of India - - 415

Gesnerièæ.

ACHIME'NES
longifòra Guatemala - - 416
pedunculàta Guatemala - 416
ròsea Guatemala - - 179
GE'SNERA
díscolor Brazil - - - 179
longifòlia Guatemala - - 415
móllis Caraccas - - - 179
NIPHÆ'A
oblónga Guatemala - - - 416

Ericàceæ.

ARCTOSTA'PHYLOS
nítida Mexico - - - 179
púngens Mexico - - 416
CLE'THRA
quercifòlia Mexico - - 416
RHODODE'NDRON
Gibsòni Khoseea Hills - 179

Jasmíneæ.

JASMI'NUM
caudàtum Sylhet - - 416

Gentiàneæ.

PREPU'SA
Hookeriàna Brazil - - 179

Convolvulàceæ.

MI'NA
lobàta Mexico - - - 417

Boragíneæ.

CYNOGLO'SSUM
anchusòides Cashmere - 417

Solàneæ.

BRUGMA'NSIA
floribúnda South America - 417

Scrophularíneæ.

COLU'MNEA
Schiedeàna Mexico - - 417
FRANCI'SCEA
latifòlia Rio Janeiro - - 179

Labiàtæ.

STA'CHYS
speciòsa Mexico - - 179

Verbenàceæ.

CLERODE'NDRON
splèndens Sierra Leone - - 417

Primulàceæ.

LYSIMA'CHIA
lobelióides North of India - 418

Orchidàceæ.

AE'RIDES
quinquevúlnerum Philippines - 180
ARUNDI'NA
dénsa Sincapore - - 419
CATASE'TUM
abrúptum Brazil - - 418
Wailèsii Honduras - - 418
CATTLE'YA
granulòsa Guatemala - - 418
CIRRHOPE'TALUM
Medùsæ Sincapore - - 419
CŒ'LIA
Baueràna W. I. and Mexico - 419
CYPRIPE'DIUM
barbàtum Mount Ophir - 419
CYRTOCHI'LUM
filipes Guatemala - - 180
EPIDE'NDRUM
cinnabarìnum Pernambuco - 419
phœníceum Cuba - - 419
raníferum Mexico - - 419

LIST OF PLANTS

MENTIONED OR TREATED OF IN THE PRESENT VOLUME.

*** The word "*cult.*" occurring after any species or variety indicates that there is an article on its culture.

LIST OF FRUITS.

LIST OF CULINARY VEGETABLES.

LIST OF AGRICULTURAL PLANTS.

LIST OF GARDENS AND COUNTRY SEATS.

LIST OF BOOKS REVIEWED OR NOTICED.

LIST OF CONTRIBUTORS.

THE

GARDENER'S MAGAZINE,

JANUARY, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *On the Chemical Statics of Organised Beings.* By M. Dumas.

[The following discourse formed the concluding lecture of Professor Dumas in the E'cole de Médecine in Paris. It was translated and published in the *Philosophical Magazine* for November and December, 1841; and, conceiving it to be the most masterly production of the kind which we had ever seen, we applied to Mr. Taylor, and the other editors of the *Philosophical Magazine*, for permission to transfer it from the pages of that work to those of the *Gardener's Magazine*. This permission has been very kindly granted, and for it such of our readers as are of a philosophical turn will, we are sure, feel as much obliged as we are ourselves. We have in the present Number only given a portion of the article, and it happens to be that which is the least interesting to gardeners; but the remainder, which is entirely occupied with vegetable chemistry, will be given in our next Number, and, in the meantime, those who are too anxious to wait can procure a copy of the *Philosophical Magazine* for December last.]

Life, whose painful mysteries you are called upon to fathom, exhibits among its phenomena some which are manifestly connected with the forces that inanimate nature herself brings into action, others which emanate from a more elevated source, less within the reach of our boldest stretch of thought.

It has not been my province to accompany you in looking with an inquisitive eye into all that part of your studies under which those facts which appertain to the normal or irregular exercise of the instincts of life arrange themselves. Still less have we ever had to bring under our consideration those noble faculties, by means of which the human intellect, mastering all that surrounds it, breaking down all obstacles, bending all the powers of nature to its wants, has step by step made conquest of the earth, of the seas, of the whole globe; a vast domain,

which our recollections, our presentiments, perhaps, so often make us consider as too narrow a prison. To others more fortunate belongs the care of initiating you in these important studies, the privilege of unfolding to you these lofty themes; our task, more humble, must be limited to the field of the physical phenomena of life; and there are still some which have not found a place in our lectures.

It is specially, indeed, the functions of matter in the production and growth of organised beings, the part which it takes in the accomplishment of the phenomena of their daily existence, the alterations which it undergoes after their death, that we have had to study together, and this study alone has quite sufficed us for this year's occupation.

I. Plants, animals, man, contain matter. Whence comes it? What does it effect in their tissues and in the fluids which bathe them? What becomes of it when death breaks the bonds by which its different parts were so closely united.

These are the questions which we touched upon together, at first with hesitation, for the problem might be far above the powers of modern chemistry; we afterwards considered them with somewhat more confidence, as we felt from the silent and inward assent of our understandings that the path was sure, and that we could descry the goal gradually standing out, clear of all that obstructed our vision. If from these labours, which you have witnessed, or I should rather say, in which you have taken part; if from this scientific effort there have arisen some general views, some simple formulæ, it is my duty to become their historian; but allow me the pleasure of adding, that they belong to you, that they belong to our school, the intelligence of which has been exercised on this new ground. It is the ardour with which you have followed me in this career that has given me strength to pursue it; it is your interest which has sustained me; your curiosity which has awakened mine; your confidence which has made me see, and which proves to me at this moment that we are still in the path of truth.

These remarks will remind you of the wonder with which we found, that, of the numerous elements of modern chemistry, organic nature borrows but a very small number; that from these vegetable or animal matters, now multiplied to infinity, general physiology borrows not more than from ten to twelve species; and that all the phenomena of life, so complicated in appearance, belong, essentially, to a general formula so simple, that, so to speak, in a few words the whole is stated, the whole summed up, the whole foreseen.

Have we not proved, in fact, by a multitude of results, that animals constitute, in a chemical point of view, a real apparatus for combustion, by means of which burnt carbon incessantly

returns to the atmosphere under the form of carbonic acid; in which hydrogen burnt without ceasing, on its part continually engenders water; whence, in fine, free azote is incessantly exhaled by respiration, and azote in the state of oxide of ammonium by the urine?

Thus from the animal kingdom, considered collectively, constantly escape carbonic acid, water in the state of vapour, azote, and oxide of ammonium, simple substances, and few in number, the formation of which is strictly connected with the history of the air itself. Have we not, on the other hand, proved that plants, in their normal life, decompose carbonic acid for the purpose of fixing its carbon and of disengaging its oxygen; that they decompose water to combine with its hydrogen, and to disengage also its oxygen; that, in fine, they sometimes borrow azote directly from the air, and sometimes indirectly from the oxide of ammonium, or from nitric acid, thus working in every case in a manner the inverse of that which is peculiar to animals? If the animal kingdom constitutes an immense apparatus for combustion, the vegetable kingdom, in its turn, constitutes an immense apparatus for reduction, in which reduced carbonic acid yields its carbon, reduced water its hydrogen, and in which also reduced oxide of ammonium and nitric acid yield their ammonium or their azote.

If animals, then, continually produce carbonic acid, water, azote, oxide of ammonium; plants incessantly consume oxide of ammonium, azote, water, carbonic acid. What the one class of beings gives to the air, the others take back from it; so that to take these facts at the loftiest point of view of terrestrial physics, we must say that, as to their truly organic elements, plants and animals spring from air, are nothing but condensed air; and that, in order to form a just and true idea of the constitution of the atmosphere at the epochs which preceded the birth of the first organised beings on the surface of the globe, there must be placed to the account of the air, by calculation, that carbonic acid and azote whose elements have been appropriated by plants and animals. Thus plants and animals come from the air, and thus to it they return; they are real dependences of the atmosphere.

Plants, then, incessantly take from the air what is given to it by animals; that is to say, carbon, hydrogen, and azote, or rather, carbonic acid, water, and ammonia.

It now remains to be stated, how in their turn, animals acquire those elements which they restore to the atmosphere; and we cannot see without admiring the sublime simplicity of all these laws of nature, that animals always borrow these elements from plants themselves.

We have, indeed, ascertained, from the most satisfactory re-

sults, that animals do not create true organic matters, but that they destroy them; that plants, on the contrary, habitually create these same matters, and that they destroy but few of them, and that in order to effectuate particular and determinate conditions.

Thus it is in the vegetable kingdom that the great laboratory of organic life resides; there it is that the vegetable and animal matters are formed, and they are there produced at the cost of the air:

From vegetables, these matters pass ready-formed into the herbivorous animals, which destroy a portion of them, and accumulate the remainder in their tissues:

From herbivorous animals, they pass ready-formed into the carnivorous animals, who destroy or retain some of them according to their wants:

Lastly, during the life of these animals, or after their death, these organic matters, as they are destroyed, return to the atmosphere whence they proceeded.

Thus closes this mysterious circle of organic life at the surface of the globe. The air contains or engenders oxidised products, as carbonic acid, water, nitric acid, oxide of ammonium. Plants, constituting true reducing apparatus, possess themselves of their radicals, carbon, hydrogen, azote, ammonium. With these radicals they form all the organic or organisable matters which they yield to animals. These, forming, in their turn, true apparatus for combustion, reproduce carbonic acid, water, oxide of ammonium, and nitric acid, which return to the air to produce anew and through endless ages the same phenomena.

And if we add to this picture, already, from its simplicity and its grandeur, so striking, the indisputable function of the solar light, which alone has the power of putting in motion this immense apparatus, this apparatus never yet imitated, constituted of the vegetable kingdom, and in which is accomplished the reduction of the oxidised products of air, we shall be struck with the import of these words of Lavoisier:—

"Organisation, sensation, spontaneous movement, life, exist only at the surface of the earth, and in places exposed to the light. It would seem that the fable of the torch of Prometheus was the expression of a philosophic truth which had not escaped the ancients. Without light, nature was without life, was dead and inanimate: by the gift of light, a beneficent God spread upon the surface of the earth organisation, feeling, and thought."

These words are as true as they are beautiful. If feeling and thought, if the noblest faculties of the soul and of the intellect, have need, for their manifestation, of a material covering, to plants is assigned the framing of its web with the elements which they borrow from the air, and under the influence of the light which the sun, its inexhaustible source, pours in unceasing floods upon the surface of the globe.

And as if, in these great phenomena, all must be connected with causes which appear the most distant from them, we must moreover remark how the oxide of ammonium, the nitric acid, from which plants borrow a part of their azote, are themselves almost always derived from the action of the great electric sparks which flash forth in stormy clouds, and which (furrowing the air through a vast extent) produce there the nitrate of ammonia which analysis detects in it.

Thus, from the craters of those volcanoes whose convulsions so often agitate the crust of the globe, continually escapes carbonic acid, the principal nutriment of plants; from the atmosphere flashing with lightnings, and from the midst of the tempest itself, there descends upon the earth the other and no less indispensable nutriment of plants, that whence they derive almost all their azote, the nitrate of ammonia, contained in storm-showers. Might not this be called, as it were, an idea of that chaos of which the Bible speaks, of those times of disorder and of tumult of the elements which preceded the appearance of organised beings upon the earth?

But scarcely are the carbonic acid and the nitrate of ammonia produced, than a form more calm, although not of inferior energy, comes to put them in action; it is light. Through her influence, the carbonic acid yields its carbon, the water its hydrogen, and the nitrate of ammonia its azote. These elements unite, organised matters form, and the earth puts on its rich carpet of verdure.

It is, then, by continually absorbing a real force, the light and the heat emanating from the sun, that plants perform their functions, and that they produce this immense quantity of organised or organic matter, pasture destined for the consumption of the animal kingdom. And if we add, that animals on their part produce heat and force in consuming what the vegetable kingdom * has produced and has slowly accumulated, does it not seem that the ultimate end of all these phenomena, their most general formula, reveals itself to our sight?

The atmosphere appears to us as containing the primary substances of all organisation, volcanoes and storms as the laboratories in which were first produced the carbonic acid and the nitrate of ammonia which life required for its manifestation or its multiplication.

In aid of these comes light, and developes the vegetable kingdom, immense producer of organic matter: plants absorb the chemical force which they derive from the sun to decompose carbonic acid, water, and nitrate of ammonia; as if plants real-

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[* "*Le règne animal*" in the original; but this is obviously an error.—Edit. *Phil. Mag.*]

ised a reducing apparatus superior to all those with which we are acquainted, for none of these would decompose carbonic acid in the cold.

Next come animals, consumers of matter and producers of heat and force, true apparatus for combustion. It is in them, undoubtedly, that organised matter puts on its highest expression. But it is not without suffering from it that it becomes the instrument of sensation and of thought; under this influence organised matter undergoes combustion; and in reproducing the heat and the electricity, which produce our strength and which are the measure of its power, these organised or organic matters become annihilated in order to return to the atmosphere whence they came. Thus the atmosphere constitutes the mysterious link which binds the vegetable to the animal kingdom.

Vegetables, then, absorb heat, and accumulate matter which they have the power to organise.

Animals, through whom this organised matter only passes, burn or consume it in order to produce in its aid the heat and the different powers which their movements turn to account.

Suffer me, therefore, if, borrowing from modern sciences an image of sufficient magnitude to bear comparison with these great phenomena, we should liken the existing vegetation (truly a storehouse in which animal life is fed,) to that other storehouse of carbon constituted of the ancient deposits of pit-coal, and which, burnt by the genius of Papin and Watt, also produces carbonic acid, water, heat, motion; one might almost say life and intelligence.

In our view, therefore, the vegetable kingdom will constitute an immense *depôt* of combustible matter destined to be consumed by the animal kingdom, and in which the latter finds the source of the heat and of the locomotive powers of which it avails itself.

Thus we observe a common tie between the two kingdoms, the atmosphere; four elements in plants and in animals, carbon, hydrogen, azote, and oxygen; a very small number of forms under which vegetables accumulate them, and under which animals consume them; some very simple laws, which their connexion simplifies still more: such would be the picture of the most elevated state of organic chemistry which would result from our conferences of the present year.

You, like myself, have felt, that before separating we have need of collecting our thoughts, of fixing with precision all the facts, of bringing together and summing up the opinions which explain and develope these great principles; lastly, that it was useful, as regarded your future studies, to give you in writing, and in a clearer form, the expression of these views, which were partly brought into existence under the stimulus of your

presence, and consequently reduced into form with the hesitation which so often accompanies the first enunciation of our thoughts.

II. Since [the causes of] all the phenomena of life are exerted upon matters which have for their base carbon, hydrogen, azote, oxygen; since these matters pass over from the animal kingdom to the vegetable kingdom by intermediary forms, carbonic acid, water, and the oxide of ammonium; lastly, since air is the source whence the vegetable kingdom is fed, and the reservoir in which the animal kingdom is annihilated; we are led to take a rapid survey of these different bodies with a special view to general physiology.

Composition of Water.—Water is incessantly formed and decomposed in animals and plants; to appreciate what results from this, let us first see how it is composed. Some experiments founded on the direct combustion of hydrogen, and in which I have produced more than two pounds of artificial water,—experiments which are in truth very difficult and very delicate, but in which any errors would be unimportant with regard to the circumstances which we are engaged upon,—make it very probable that water is formed, in weight, of 1 part hydrogen, and 8 parts oxygen, and that these whole and simple numbers express the true relation according to which these two elements combine to form water.

As substances always present themselves to the eyes of the chemist by molecules, as he always endeavours to connect in his thoughts, with the name of each substance, the weight of the molecule, the simplicity of this relation is not unimportant.

In fact, each molecule of water being formed of one molecule of hydrogen and one molecule of oxygen, we arrive at these simple numbers, which cannot be forgotten.

A molecule of hydrogen weighs 1; a molecule of oxygen weighs 8; and a molecule of water weighs 9.

Composition of Carbonic Acid.—Carbonic acid keeps incessantly forming in animals, and is continually undergoing decomposition in plants; its composition, therefore, deserves a special notice in its turn.

Now carbonic acid, like water, is represented by the most simple numbers. Experiments founded on the direct combustion of the diamond, and on its conversion into carbonic acid, have proved to me that this acid is formed of the combination of 6 parts by weight of carbon and 16 parts by weight of oxygen.

We are therefore led to represent carbonic acid as being formed of one molecule of carbon weighing 6, and two molecules of oxygen weighing 16, which constitute one molecule of carbonic acid weighing 22.

Composition of Ammonia.—Lastly, ammonia, in its turn, seems formed in whole numbers of 3 parts of hydrogen and 14

of azote, which may be represented by 3 molecules of hydrogen weighing 3, and by 1 molecule of azote weighing 14.

Thus, as if the better to show all her power, nature operates, in the business of organisation, upon a very small number only of elements combined in the most simple proportions.

The atomic system of the physiologist revolves on these four numbers: 1, 6, 7, 8. 1 is the molecule of hydrogen; 6, that of carbon; 7, or twice 7, i. e. 14, that of azote; 8, that of oxygen.

These numbers should always be associated with these names, because for the chemist there can exist no abstract hydrogen, nor carbon, nor azote, nor oxygen. They are beings in their reality which he has always in view; it is of their molecules that he always speaks; and to him the word hydrogen depicts a molecule which weighs 1; the word carbon, a molecule which weighs 6; and the word oxygen, a molecule which weighs 8.

Composition of the Air.—Does atmospheric air, which performs so great a part in organic nature, also possess as simple a composition as water, carbonic acid, and ammonia? This is the question which M. Boussingault and I have recently been studying. Now, we have found that, as the greater number of chemists have thought, and contrary to the opinion of Dr. Prout to whom chemistry owes so many ingenious views, air is a mixture, a true mixture.

In weight, air contains 2,300 of oxygen for 7,700 of azote; in volume, 208 of the first for 792 of the second. The air, besides, contains from 4 to 6 10,000ths of carbonic acid in volume, whether it be taken at Paris or in the country. Ordinarily, it contains 4 10,000ths. Moreover, it contains a nearly equal quantity of the carburetted hydrogen gas which is called marsh gas, and which stagnant waters disengage perpetually.

We do not speak of aqueous vapour, which is so variable; of oxide of ammonium and of nitric acid, which can only have a momentary existence in the air because of their solubility in water.

The air, then, is constituted of a mixture of oxygen, azote, carbonic acid, and marsh gas.

The carbonic acid in it varies, and indeed greatly, since the differences in it extend almost from the simple to the double, from 4 to 6 10,000ths. May this not be a proof that plants take from the air this carbonic acid, and that animals take back a part from it? in a word, may not this be a proof of that equilibrium of the elements of the air attributed to the inverse actions which animals and plants produce upon it?

It has, indeed, been long since remarked, animals borrow from the air its oxygen, and give to it carbonic acid; plants, in their turn, decompose this carbonic acid, in order to fix its carbon and restore its oxygen to the air.

As animals breathe continually; as plants breathe under the

solar influence only; as in winter the earth is stript, whilst in summer it is covered with verdure, it has been supposed that the air must transfer all these influences into its constitution.

Carbonic acid should augment by night and diminish by day. Oxygen, in its turn, should follow an inverse progress.

Carbonic acid should also follow the course of the seasons, and oxygen obey the same law.

All this is true, without doubt, and quite perceptible as to a portion of air limited and confined under a jar; but, in the mass of the atmosphere, all these local variations blend and disappear. Accumulated centuries are requisite in order effectually to put in action this balance of the two kingdoms, with regard to the composition of air; we are then very far from those daily or yearly variations, which we had been apt to look upon as being as easy to observe as to foresee. With regard to oxygen, calculation shows that, exaggerating all the data, not less than 800,000 years would be required for the animals living on the surface of the earth to consume it entirely.

Consequently, if we suppose that an analysis of the air had been made in 1800, and that during the entire century plants had ceased to perform their functions on the surface of the whole globe, the animals at the same time all continuing to live, the analysts in 1900 would find the oxygen of the air diminished by 1-8000th of its weight, a quantity which is beyond the reach of our most delicate methods of observation, and which, assuredly, would have no influence whatever on the life of animals or plants.

As to this, then, we cannot be deceived; the oxygen of the air is consumed by animals, who convert it into water and carbonic acid; it is restored by plants, which decompose these two bodies.

But nature has arranged everything so that the store of air should be such with relation to the consumption of animals, that the want of the intervention of plants for the purification of the air should not be felt until centuries have elapsed.

The air which surrounds us weighs as much as 581,000 cubic kilometres of copper; its oxygen weighs as much as 134,000 of these same cubes. Supposing the earth peopled with a thousand millions of men, and estimating the animal population at a quantity equivalent to three thousand millions of men, we should find that these quantities united consume in a century only a weight of oxygen equal to 15 or 16 cubic kilometres of copper, whilst the air contains 134,000 of it. It would require 10,000 years for all these men to produce a perceptible effect upon the eudiometer of Volta, even supposing vegetable life annihilated during all this time.

In regard to the permanence of the composition of air, we may say with all confidence that the proportion of oxygen which it contains is secured for many centuries, even reckoning

for nothing the influence of vegetables, and that, nevertheless, these restore oxygen to it incessantly in quantity at least equal to that it loses, and perhaps more; for vegetables live just as much at the expense of the carbonic acid furnished by volcanoes, as at the expense of the carbonic acid furnished by animals themselves. It is not then for the purpose of purifying the air that these breathe, that vegetables are especially necessary to animals; it is, above all, to furnish them, incessantly, with organic matter quite ready for assimilation; organic matter, which they may burn to their advantage.

There is, therefore, a service necessary, without doubt, but so remote, that it can scarcely be recognised, which vegetables render us, in purifying the air which we consume. There is another service so immediate, that if, during a single year, it were to fail us, the earth would be depopulated; it is that which these same vegetables render us by preparing our nutriment, and that of all the animal kingdom. In this, especially, is found the chain that binds together the two kingdoms. Annihilate plants, and the animals all perish of a dreadful famine; organic nature itself entirely disappears with them in a few seasons.

We have, however, said that the carbonic acid of the air varies from 4 to 6 10,000ths. These variations are very frequent, and very easy to observe. Is not this a phenomenon reproaching the influence of animals who introduce this acid into the air, and that of vegetables which deprive it of it?

No; this phenomenon, you are aware, is a simple meteorological phenomenon. It is with carbonic acid as with aqueous vapour, which forms on the surface of the sea, to become condensed elsewhere, fall again in rain, and be reproduced under the form of vapour. This water, which is condensed and falls, dissolves, and carries with it carbonic acid; this water, which evaporates, yields up this same gas to the air.

A great meteorological interest would attach to the observation of the variations of the hygrometer, and those of the seasons, or of the state of the sky with the variations of the carbonic acid of the air; but hitherto all tends to show that these rapid variations constitute a simple meteorological event, and not, as had been thought, a physiological event, which, singly considered, would infallibly produce variations infinitely slower than those which are, in fact, observed as much in towns as in the country itself.

Thus the air is an immense reservoir, whence plants may for a long time derive all the carbonic acid necessary for their wants; where animals, during a much longer time still, will find all the oxygen that they can consume. It is also from the atmosphere that plants derive their azote, whether directly or indirectly: it is there that animals finally restore it.

The atmosphere is, therefore, a mixture which unceasingly receives and supplies oxygen, azote, or carbonic acid, by means of a thousand exchanges of which it is now easy to form a just idea, and the details of which a rapid analysis will now enable us to appreciate.

(*To be continued.*)

ART. II. *On the Evils of indiscriminately watering Plants in Pots immediately after being shifted.* By N. M. T.

To insert cuttings of plants, particularly those of a soft-wooded or succulent nature, into moist materials, before the wounds made in preparing them are healed over, is often attended with fatal consequences, from the moisture finding its way into the pores of the plant, thereby causing putrefaction and decay.

Now the woody parts of plants, being more consolidated and less porous than their roots, are altogether less calculated to imbibe an undue portion of moisture, yet we find that even these do so to a most injurious extent, and therefore we may reasonably conclude that roots mutilated and placed in the same circumstances would have a greater chance, from their peculiar organisation, to suffer from such a cause; nor can there remain a doubt that they do so. This points out as most injudicious, the practice of turning plants out of their pots, reducing their balls, as the case may be, thereby lacerating every fibre, and placing every rootlet in a worse position than a cutting, and then finishing the operation by giving a good drenching of water, which, as we have already seen, must make dire havoc among the previously reduced channels by which the plant receives its food.

Such is, in a great measure, the cause of delicate plants suffering so much from shifting, of the check they receive unless the operation be carefully performed, and consequent loss of time in recovering from its effects. Still this is an every-day practice, that has descended to us hallowed by the custom of ages, and sanctioned by the highest authorities. Who ever heard of directions for shifting or potting plants that did not end thus?—"Give the whole a good watering, to settle the mould in the pots, and the operation is completed."

After shifting or transplanting plants in dry hot weather, when an arid atmosphere causes, by excessive evaporation, an unusual drain upon the roots, the necessity of a supply of water will soon become apparent; and administering it under such circumstances is less injurious than under any other, from the activity maintained in every part of the plant rendering stagnation an

unlikely occurrence. But even then, when practicable, it is better to confine them in a close moist atmosphere, which, with water over head, and shade, will enable them to exist through the medium of the leaves until growing has commenced, and the roots are in a condition to receive, without injury, the necessary supply.

It is, however, when there is a deficiency of heat, vegetation languid, and a corresponding danger from excess of moisture, that such precaution is most required, and the contrary practice most hurtful. Among seedlings of tender sorts the mortality from such mal-treatment is truly great; and, when the impossibility of transplanting such without in some shape hurting their few and almost unformed spongioles, scarcely more consolidated than the fluid in which they are so thoughtlessly immersed, is considered, their certain destruction is not to be wondered at. The advantages these derive from the treatment described led me first to examine more closely what I deem a matter of much importance.

Before quitting the subject for the present, I may here add that the injury inflicted by such treatment is not confined to the plants alone, the soil also is ofttimes irreparably injured. It has been placed between the sides of the pot and the root-bound ball containing the plant, where, being in a comparatively loose state, it receives the whole of the water that is considered sufficient to moisten the whole mass; as, where there is so little resistance, it is as effectually repelled by the dry ball as by the sides of the pot. This reduces what has been added to the condition of a puddle, and in this state it stands a good chance of being baked as hard as a brick: at all events, it has been totally unfitted to afford that nourishment to the plant it otherwise would have done. Such consequences may be avoided by applying moisture gradually: but if some time is allowed to elapse there is not so much to fear, even from the usual soaking, as the old and new materials must in the interim have become equally dry; a state, let it be remembered, indispensable to the thorough incorporation of such materials.

Folkestone, Oct. 20. 1841.

Art. II.I *Notices of some new or rare Hardy or Half-hardy Trees and Shrubs in the Nursery of Messrs. Rollison of Tooting.* By John Scott.

By the kind permission of Messrs. Rollison, I am enabled to forward to you specimens of some rare and little known shrubs, consisting of hardy and half-hardy species, recently introduced to, and propagated in, this nursery.

RANUNCULA'CEÆ.—*Clématis califórnica?* A species apparently related to *C.* flórida.

WINTERA'CEÆ.—*Illícium religiòsum* Sieb.? Introduced in 1841, but from whence is uncertain. Leaves alternate, ovate, smooth, entire, thick. Flowers white, large, produced from the axils of the leaves, and resembling those of Eugèn*ia* austràlis, but much larger. A fine half-hardy evergreen, easily grafted on I. floridànum.

MAGNOLIA'CEÆ.—*Magnòl*ia *hýbrida* Hort. A pretty dwarf deciduous species, fit for a wall in a small garden. Obviously closely allied to M. purpùrea.

M. grandiflòra var. *Hárwicus* Hort. A Continental variety, raised between M. grandiflòra exoniénsis and M. fuscàta. Very scarce. Hardy.

BERBERI'DEÆ.—Bérberis. Several species have come up from seeds received from Dr. Royle, but of which it is yet impossible to give any proper description.

CAPPARIDA'CEÆ.—*Isómeris califórnica.* (I. arbòrea *Nutt.* Torrey and Gray's Flora, vol. i. p. 124.; Bot. Mag., n. ser. t. 3842.) Said to be a handsome plant, fitted for a wall, with slight protection.

HYPERICA'CEÆ.—H*ypéricum rosmarinifòlium* Lam. Dict. Tor. and Gray, vol. i. p. 159. A pretty narrow-leaved species, from Kentucky, proper for a wall.

AMPELI'DEÆ.—V*ìtis parvifòlia* Royle's Illust. p. 145. A very curious species of vine, from elevated situations in the Himalayas, with exceedingly small leaves for the family to which it belongs. Calculated for a miniature arboretum. Introduced two or three years ago, and likely to prove a useful addition to our climbers.

V. *heterophýlla* Sieb.? A beautiful and very desirable climber, from Japan, with variegated leaves. Introduced here in 1841.

AQUIFOLIA'CEÆ.—I*lex latifòlia* Hort. A fine species, with very large oval leaves, introduced from the Continent in 1841. I cannot say whether or not it is hardy. There is another species, called *I. l*aurifòlia, in cultivation in the nurseries: I have not seen it; but, from description, I am inclined to think it the same as the above.

LEGUMINO'SÆ.—Sophòra *grandiflòra?* Introduced in 1841, from the Continent. It will prove a good plant for the conservative wall.

Indigófera nepalénsis?. A free-growing shrub, and apparently hardy.

Kennèdya spléndens Bot. Reg. This plant is very hardy, and, I believe, will be found to be a fit subject for a conservative wall, with slight protection, or perhaps without any.

*A*MYGDA'LINÆ. — P*rùnus* Mùme *Sieb.*? Japan? I do not know any particulars of this species; the plants here are yet too small for me to be able to say any thing about it. It appears to me to belong to *C*érasus, section *P*àdi.

C*érasus Laurocérasus* Lois. var. *cólchica* and Emerélli (?). These are varieties of the common laurel, received from Belgium in 1841.

*S*PIRÆA'CEÆ.—*Spiræ'a fissa* Lindl. (Gard. Mag., 1840, p. 593.) and *Reevès*ii *Hort*, are both good shrubs, especially the first.

*R*OSACEÆ. — R*ùbus lasiocárpus* Royle Illust. p. 203. A free-growing hardy species from the Himalayas, which bears a grateful fruit.

C*ratæ'gus* P*yracántha.* A variety with white fruit, in every other respect like the species.

C*ratæ'gus sp.* A species from the Himalayas, belonging to the *P*yracántha section, evergreen, and no doubt hardy. The late frosts do not appear to have in the least degree affected it.

POMA'CEÆ. — *Cotoneáster denticulàta*? Kunth. H. et B. N. Gen. Am., 6. t. 566.; Arb. Brit., abridged edit., fig. 741. A very pretty species with roundish obcordate leaves, pubescent underneath, and glabrous above. A very distinct species, allied to C. nummulària *Lindl.*, and quite hardy.

GROSSULA'CEÆ. — Rìbes *Menziès*ii? Nearly allied to *R.* speciòsum by its leaves and spines. I have not seen the flowers (See *Arb. Brit.*, abridged ed., p. 475. fig. 855.)

ARALIA'CEÆ. — *Aràlia japónica.* A fine plant. See *Arb. Brit.* abr. ed. p. 1108. fig. 2093.

*S*AMBU'CEÆ.—V*ibúrnum* Awafùki *Sieb.*? (*V.* japónicum *Hort.*) As this plant agrees in many respects with the *Coffèa* monospérma of Hook. et Arn., I am not certain whether it may not be the same, as I have never seen the flowers or the seeds. Leaves opposite, shining, ovate, somewhat waved on the margin. A beautiful evergreen, which, I have no doubt, will prove quite hardy. There is a plant here out of doors, from which I took the specimen sent. There is no doubt this will find its way into every collection very soon. Easily propagated by cuttings at any season.

V. *sinénse* Zeyh. Whether this may not be the *Coffèa* monospérma, I am unable to determine, but it answers the description better, and I incline to think it is. Leaves ovate, acuminate, subdentate, opposite; margins subreflexed. Although this is not such a fine shrub as the last, yet it deserves a prominent place in every collection. A hardy evergreen, easily propagated by cuttings at any season.

V. Mullàha *Ham.* Royle Illust., p. 236. (Synon. *V.* stellulàtum *Wall.*) Leaves rotund, subrugose, bluntly dentate, woolly beneath. A shrub from elevated situations in the Himalayas,

where the fruit is eaten. Nearly allied to *V. cotinifòlia D. Don.* A very desirable species, and very likely to prove quite hardy.

V. *pygmæ'a* Royle. Leaves opposite, trilobate, subserrate. A very curious dwarf deciduous shrub, from 1 ft. to 1 ft. 6 in. in height; native of the Himalayas. A most desirable plant to represent the section *O'pulus* in a miniature arboretum. Quite hardy. Sent two or three years ago to the Tooting Nursery, by Dr. Royle.

JASMI'NEÆ. — *Jasmìnum chrysánthum* Royle Illust. p. 268. A species from the Himalayas, nearly allied to *J.* hùmile, and, I have no doubt, as hardy as that species. A very free grower, and (?) evergreen. Dr. Royle states that it is cultivated in the gardens along with *J.* grandiflòrum.

ERICA'CEÆ. — *A'rbutus.* A species received from the Continent in 1841. A beautiful plant, with ovate-lanceolate, glaucous, finely serrated leaves. Should this species prove hardy, it will be the most ornamental of all our arbutuses. Propagated by grafting upon *A. U'nedo.*

A'rbutus. A species from Mexico. I have no doubt but this will prove a truly hardy species, perhaps belonging to Pernétty*a.*

SCROPHULARIA'CEÆ. — *Paulòwn*ia *imperiàlis* Sieb. Arb. Brit., abr. ed., p. 671. figs. 1307–8. This magnificent tree has just arrived in this nursery. Nothing can be finer than the appearance of the young plants, and I am sorry I cannot do justice to a description of so splendid an addition to the British arboretum. Messrs. Rollison have in their possession a leaf equal in size to those of Myatt's Victoria rhubarb, but which is only half the size of some other leaves that were upon the tree from which this was taken. My informant tells me that he saw some plants that had made shoots 14 ft. long in the course of the past summer; and he adds that they had leaves upon them 3 ft. in diameter. How any one could substitute for this tree the *Catálpa syringæ*fòlia I am at a loss to know; but, according to some observations in the *Gard. Chron.*, vol. i. p. 701., such seems to have been the case. To prevent such unfair proceedings (which no respectable nurseryman would have recourse to), it must be borne in mind, that, although the leaves of Paulòwn*ia*, when the tree is planted out, become of an amazing size, especially for the two or three first years (for they afterwards become less, as the tree becomes less rapid in its growth), yet, when confined in a pot, the plant produces leaves, some of them very small, varying from 3 in. to 12 in. in diameter. But, even in this state, they are easily recognised, the shoots being much more hairy on the young wood than those of the *Catálpa.* The leaves of Paulòwn*ia* are also deeply serrated, and slightly ciliated; whilst those of *Catálpa* are not so. Indeed, the differences between

the two plants are so striking, that no one who has ever seen the *Catálpa* need be deceived by it. Any one doubting the size of the leaves of Paulòwn*ia* may, by paying a visit to the Messrs. Rollison, at Tooting, have their doubts dispelled. They have a leaf for public examination.

Mr. Paxton, in the *Gard. Chron.*, vol. i. p. 718., seems to be of opinion that it will not prove hardy in this country, because of its rapid growth. But we have instances of other rapid-growing trees resisting our winters, such as elder, which in a young state makes shoots sometimes 12 ft. long, yet it is not much hurt by our winters; and the near ally of Paulòwn*ia*, the *Catálpa*, I have often seen produce shoots 6 ft. to 8 ft. long; of course these had their tips killed. The same would, or might, happen to Paulòwn*ia*; but the tree as it advanced in growth would eventually produce less and less vigorous shoots, which I have no doubt would resist our severest colds.

From a letter received from Mr. Newman, I learn that the plants of Paulòwn*ia* in the Jardin des Plantes have stood unprotected. One which was planted out whilst I lived in the garden stood the winter of 1838–9 without any covering, and I am told it has now attained the height of 20 ft., producing leaves 2 ft. in diameter. Those at the Trianon are much more rapid in their growth, having made shoots from 12 ft. to 14 ft. long this year; the soil there being much better than it is in the Jardin des Plantes. That it will ultimately become, by its foliage, a "striking feature" in our landscape scenery, I do not for a moment doubt. It is easily propagated by cuttings of the roots put into thumb pots, under a hand-light: those put in here in the end of October are now commencing to push, and by May will make fine plants.

PROTE*A*'CEÆ.—*Quádr*ia *heterophýlla* R. et P. Fl. Per. l. t. 99. f. b. (Syn. *Guevìna A*vellàna *Mol.*) Chile. Leaves pinnate. Leaflets ovate acute, subcymæform, sharply toothed, terminal, one often trilobate. Altogether a beautiful shrub for a conservative wall with slight protection. A plant here, planted against a south wall, has not had the youngest leaves in the slightest degree hurt, although the thermometer stood this morning (Nov. 17. 1841) as low as 24° Fahr., and it has had the sun shining directly against it nearly all day. Easily propagated by cuttings put in, under a hand-light, at any season.

*P*LUMBAGI'NEÆ.—*Státice monopétala.* Good for a conservative wall with protection.

*E*UPHORBI*A*'CEÆ.—*Sàpium heterophýllum.* A good plant for a conservative wall with protection.

CUPULI'FERÆ.—*Quércus confertifòlia* H. et B. Arb. Brit., abr. ed., p. 904. fig. 1686. A fine hardy species, with long rugose entire leaves, wavy at the margins, which turn back.

Q. *xalapénsis* Humb. Arb. Brit., abr. ed., p. 898. fig. 1667. Another fine species, with ovate-lanceolate leaves.

Q. *glàbra* Thunb., Arb. Brit., abr. ed., p. 893.; Q. *dentàta* Thunb., ibid. p. 893.; Q. *rugòsa* Willd., ibid. p. 904. fig. 1691.; a species from Assam; and another from Nepal. These five are very fine plants; and all of them, I think, will live out of doors here. The first three species have already been proved quite hardy, both in England and France.

Tooting Nursery, Nov. 17. 1841.

Art. IV. *Notes upon Mr. Scott's Report.* By G. Gordon, A.L.S.

[We scarcely ever send the communication of one correspondent to be commented on by another before it is published; but we made an exception in this case, with Mr. Scott's consent, in order that we might get all the information we could for the *Supplementary List* to the abridged edition of our *Arboretum Britannicum*, which will be printed and published before the appearance of our February Number.]

Cle'matis *califórnica.* Probably a new species, but a very doubtful name, as I cannot find any such name in Douglas's *Californian Herbarium*, or amongst any of his memorandums; nor is any such name to be found in Steudel's *Nomenclator*, or in any other modern catalogue that I have access to: therefore, I think it very doubtful; for generally when a plant is named after a country, it either is the most common in that country or very plentiful there.

Illícium religiòsum, or *Skimi* of the Japanese, is most probably nothing more than a variety of I. *a*nisàtum, with which the people in Japan ornament their temples; hence the specific name.

V*ìtis heterophýlla* is nearly related to *C*íssus antárctica, with the leaves much more jagged, and variegated with white. The plants bear clusters of small blue fruit, which are very ornamental. It certainly must be a species of *C*íssus, of slender growth, and tender; probably it may be the *V*ìtis heterophýlla of Thunberg, a plant from Java.

I*lex latifòlia* is a splendid hardy evergreen from Japan, which should be in every collection. [In the Epsom Nursery, it is quite hardy, and bears leaves 9 in. long.]

Sophòra *grandiflòra* ?. Is it not Edwárds*ia* grandiflòra, an old plant?

Indigófera nepalénsis. Probably a garden name applied to one of the numerous specimens of Indigófera from the north of

India, where they abound. There is frequently one raised from these seeds which is much hardier than the others, with rather large bright rosy-pink flowers, which stood last winter without any protection in an open border; and Dr. Royle says that there are many which grow very high up the hills, which should be quite hardy in England.

Prùnus Mùme of Sieboldt is a yellow-fruited plum used by the people for pickles, as cucumbers and walnuts are in England, and producing, like the common plum (*P.* doméstica), many hundreds of varieties; therefore, it must be a mistake (or the plants are not true), to suppose this plum belongs to the bird-cherry section (*C. P*àdus), which has long bunches of small berries, not at all likely to be used for pickles. This is the dwarf, or weeping, plum of the Japanese.

Cérasus Laurocérasus var. cólchica. Hardly worth keeping distinct as a variety of the common laurel, though the leaves are more pointed.

Spiræ'a Reevèsii. According to Dr. Lindley, in *Bot. Reg. Miscel.* 93. 1841, this is the *S*piræ'a lanceolàta of M. Cambassedes, a very desirable shrub, with clusters of large white flowers.

Rùbus lasiocárpus. All the plants which I have seen, or raised myself from Indian seeds, under this name, are not different from *R.* pauciflòrus (*R.* micránthus *Arb. Brit.*), a plant with beautifully varnished mahogany-coloured stems.

Cratæ'gus sp. is certainly *C.* crenulàta, or the Himalayan Pyracantha, with rather longer and narrower leaves than the common Pyracantha, but only a variety of that species. It is quite hardy.

Vibúrnum Awafùki I have never seen; but *V.* japónicum of Sprengel is a species of *C*órnus.

Vibúrnum sinénse, or more properly V. *odoratíssimum*, has large leaves, about the size of those of the common laurel, and very like them. It is a very old plant, and tender. There is a variegated var. of it.

V. Mullàha. I have never been able to find any distinction between this and *V.* cotinifòlia, and I have raised plants several times, both from seeds received from Drs. Royle and Wallich; and the plant published in the *Bot. Reg.* bore the name *Mullàha* until published in that work by Dr. Lindley.

V. *pygmæ'a* I have never seen, or heard of from Dr. Royle; but there is a *V.* pygmæ'a in some collections from the nursery of Messrs. Lee of Hammersmith, which is a very dwarf variety of Guelder rose, not growing more than 1 ft. or 18 in. high, and corresponding with this description exactly.

Jasmìnum chrysánthum of Roxb. is the same as *J.* revolùtum of Wallich.

A'rbutus sp. ? from Mexico, may prove tolerably hardy; but, if the plant comes from Mexico, it certainly cannot be a species of Pernétty*a*, as hitherto no species of Pernétty*a* has been found except in Peru, Chili, the Straits of Magellan, &c.

*Paulòwn*ia *imperiàlis.* Certainly nothing can be more distinct than this and *Catálpa;* and it is a very curious idea, that, because the plant makes vigorous shoots and has large leaves, it should not be hardy. As a set-off against such an assertion, I may mention that *Ailántus* glandulòsa, which will make extraordinary shoots when young, and has large leaves, is from the same country, and yet is as hardy as any plant we possess.

Quércus rugòsa is a nursery name applied to the true *Q*uércus spicàta. (See *Gard. Mag.*, vol. xvi. p. 636.)

All the other plants noticed by Mr. Scott are too well known to render necessary any further remarks.

The public are much indebted to Messrs. Rollison and Mr. Scott for this Report, which, I hope, will lead to others of the same kind by the curators of botanic gardens and by nurserymen throughout the country. — *Turnham Green, Dec.* 1841.

Art. V. *On Planting so as to combine Utility and Ornament.* By W. Billington.

I have for a long time had in contemplation a method to insure a permanent undergrowth of evergreen or deciduous trees and shrubs, in belts, clumps, or other plantations, either near the mansion or at a distance from it; and to serve also for screens, blinds, shelter and cover for game, and to insure at the same time the free growth of both profitable and ornamental timber trees. I had an opportunity of putting my plan in practice about two years ago, at Hardwick, near Ellesmere, Salop, the seat of Sir J. R. Kynaston, Bart.; but I am sorry to observe that it has been counteracted, in a great measure, there and at other places, by the advice or suggestions (I firmly believe) of agents, whether attorneys or not, it matters not, who know but little about it themselves, but who have generally plans and views of their own, and say they can do it as well and cheaper with their own common labourers, for they perfectly understand it. However, be that as it may, I shall detail, as briefly as I can, what I have done at Hardwick, with my sentiments thereon.

What I have done there was for a blind to hide a timber yard very near the mansion and principal entrance. I first planted what I designed to be the permanent trees, for blind as well as for ornament, in masses, the plants of each species by

themselves; the sorts were oaks, Spanish chestnuts, and elms. Then others of the same kinds, but of a less size, were planted between them as temporary plants, to effect an immediate blind, by way of filling up the spaces until the principal trees begin to extend their branches, when the supernumerary trees are to be taken out in two, three, or four years, to plant again as single trees, or in groups, hedgerows, or for any other purpose for which they may be wanted, as they will be suitably prepared for such purposes; otherwise they must be cut down or taken out, before they injure the permanent trees. The other spaces should be filled up with beech and hornbeam, which, when headed down, generally retain their foliage through the winter months, when such thick cover is most wanted. Such plants for undergrowth I take care to divest of their leading upright shoots, at from 4 to 6 or 7 feet high, according to their appearance and effect with the side branches of the intended permanent trees. Divesting them of their upright aspiring shoots prevents them from getting up to injure the permanent trees, and increases their lateral or side branches, so as to fill up the blind and keep a permanent undergrowth. This work should be attended to for a few years, to prevent them acquiring fresh leaders, which they are naturally inclined to do.

At the base of the permanent trees I planted young hollies, either common or variegated, for future effect, at from 1 ft. to 2 ft. from the stem, with the head leaning towards it, to allow for the increase of the trunk or stem, as well as to form a surer mark than any other I could think of to know the permanent trees by. Then, round the outsides of the belt, and occasionally in the interior, I planted spruce and silver firs, and Scotch pines, each kind by themselves in groups or masses as it were; the firs from 4 to 6 or 7 feet in height; taking special care to shorten the leading upright shoot, or break out the central leading bud of the upright shoot, at the desired height; also to shorten or break out the central or leading bud of the side branches where necessary, to thicken the blind, and prevent them getting out of bounds and destroying or injuring the fences. The Scotch pines should be principally at or near the outside, as they do not endure under the shade so long as the spruce and silver firs. In front of this belt, viz. the side most in view, were planted various kinds of evergreen, deciduous, and variegated dwarfish flowering trees and shrubs; at least to be kept dwarf so as not to injure the effect of the permanent forest trees in the background; as well as more effectually to insure the main object, an effectual permanent blind, not forgetting embellishment as well. Although I have recommended beech and hornbeam for under-cover, I would prefer common hollies, common laurels, rhododendrons, or other suitable evergreens,

which will endure under the drip and shade of other trees; but they are of such slow growth at first, and are, besides, dearer, and not so easily procured as the beech and hornbeam. At any rate, the evergreens should be planted at the first making of the plantations, and, as they get up, the beech and hornbeam could be removed, if thought desirable; but, in each case, attention must be, for several years, regularly paid to divesting them of their aspiring shoots, and occasionally shortening some of the side branches, to prevent too much straggling, and to insure the permanent undergrowth. I will just observe that beech and hornbeam are best adapted, in distant high exposed situations, for permanent undergrowth in narrow belts or clumps; and evergreens, nearer home, in more sheltered places.

By following up this plan for a few years, we can insure a permanent close and thick undergrowth of evergreen or deciduous trees and shrubs, with the most beautiful, picturesque, and profitable forest trees, instead of those unsightly naked plantations, open at bottom, with nearly valueless timber trees, so frequently to be seen; and which plantations, with a very little trouble or expense, might be made both profitable and ornamental at the same time. But, alas! gentlemen do not see this; or, at least, they will not pursue it, too often, I fear, from the causes I have previously hinted at.

I could say much more on this subject, and on that of pruning and training hedgerow timber trees, but more particularly single evergreen trees, or masses of evergreen trees in noblemen's or gentlemen's parks, with accompanying undergrowth for shelter and protection to the trees. Such parks being generally very deficient in these respects, and having rather a dreary effect in winter, without these accompanying embellishments, when there are hundreds of acres ornamented with only deciduous trees. Such is the case at Hawkstone, the seat of Sir Rowland Hill, Bart.; Powis Castle, the Earl of Powis; Hardwick, Sir J. R. Kynaston, Bart.; Sundorne Castle, A. W. Corbet, Esq.; Porkington, W. Ormsby Gore, Esq., in this neighbourhood: and no doubt this is generally the case; at least, it is so in most places that have come under my own observation. But it would be too long to enlarge on this subject in one article, and therefore I shall reserve it for a future time, should you approve of my continuing the subject. [Which we do.]

Underhill, near Oswestry, Oct. 18. 1841.

Art. VI. *On growing the Thunbergia.* By R. B. Wilson.

I am induced to lay before your readers my method of growing the Thunbergia, acting under the impression that I have been

more than usually successful in the growth of that plant. I had a plant this season 7 ft. in height, and upwards of 8 ft. in circumference, which was one entire mass of bloom from May till the end of September. Under the most favourable circumstances as to care and skilful cultivation, any plant when grown in a pot maintains a habit entirely foreign to what it has when grown in the open ground, where its roots can range at pleasure, with its foliage exposed to the open air and the direct rays of the sun. Taking this into due consideration, it is truly surprising to see the degree of perfection so many of our stove and greenhouse plants have arrived at within the last few years. Nor has the Thunbergia been behind its neighbours in point of improvement, both in respect to culture and the production of varieties, and, when well grown, I consider it to be one of the most showy and, beautiful of all our stove plants, with its rich deep foliage, and white or orange flowers, which form an excellent contrast with them.

I treat my plants in the following manner :—As all the sorts ripen their seeds well, I raise my plants from seeds every year. They are sown in 48-sized pots, in a rich light soil, plunging them to the rim in a cucumber frame in the beginning of February ; and, as soon as they are about 4 in. high, they are potted off singly into 48-sized pots, in the following compost: light turfy loam, black heath soil, good rotten hotbed dung, equal parts, adding a little leaf mould. As soon as the roots fill the pot, the plant is shifted into a 16-sized pot, and is then topped to cause it to throw out lateral branches, repotting it till it has acquired nine shoots; and, when requisite, it is repotted into a 4-sized pot, and removed into a stove or vinery at work, where a trellis is made for it in the following manner :—Eight small green rods are placed round the inside of the pot, 6 ft. long, and one in the centre 7 ft. long, a wire hoop being fastened round the top of the eight outside rods; and from the top of each of these rods a small piece of twine or wire is carried to the top of the centre rod, thereby forming a dome. A shoot is fastened to each of these rods, and frequently stopped, to furnish the trellis completely; and, to keep the plant vigorous, all flower buds are nipped off as soon as they appear, until the trellis is nearly covered; watering frequently with manure water. Of course the pot must be thoroughly drained, which is an important feature in the cultivation of all plants in pots.

With this treatment I have grown different varieties of the Thunbergia, to the admiration of all who saw them; the leaves measuring in general 4 in. in length and 3 in. in breadth, and the flowers $1\frac{1}{2}$ in. in diameter.

Norton, Oct. 14. 1841.

Art. VII. *On the Culture of* Aristolòchia trilobàta. By W. Jones.

In last August I planted out, on a south wall, a plant of *A*ristolòchia trilobàta, which now occupies a considerable portion of the same, and has flowered beautifully, and continues to produce a flower from the axil of every leaf; many of which, with their long tail-like appendages, are upwards of 1 ft. in length. These appendages, and its dark glossy three-lobed leaves, form a pleasing contrast with two of its rambling neighbours, Tropæ`olum adúncum and T. pentaphýllum, and it seems to vie with them in strength and rapid growth.

*A*ristolòchia trilobàta has borne, with equal impunity, cold, high wind, frost, and excessive wet, up to this time (Oct. 29.). If I am able to protect it during winter, it will be a valuable acquisition to a wall of climbers next summer; but, should it fail, I will replace it in April with a large plant of the same species out of a plant-stove, which will flower until killed by the frosts of winter; for every leaf it produces out of doors is accompanied with a flower in embryo. I root plants of it in a week by merely pegging down the extremities of the shoots in the corner of a tan-bed. The compost I grow it in is equal parts of loam, peat, and very old cow-dung, with a little sand. I have on the same wall a plant of Boussingaúlt*ia basello*ìdes, the tubers of which have stood the frosts of last winter without any kind of protection whatever: many of them were almost protruding through the ground. As Boussingaúlt*ia* will be strong next season, I expect abundance of flowers: it is a great rambler.

Booterstown, Oct. 29. 1841.

Art. VIII. *On growing Vines in Pots.* By W. A. L.

As the subject of growing vines in pots has been very freely discussed of late in the *Gardener's Magazine*, it may appear superfluous again to recur to the subject: but as the pot system has its advantages, especially where a few early grapes are wanted to supply the dessert in April and May, I hope I shall be excused by you and my brother gardeners, for again directing their attention to the subject. This I am desirous of doing, as much with a view to elicit remarks and information from those who have successfully adopted the pot system, as to relate my own mode of practice.

I propagate my vines from eyes or buds in February, taken from a shoot of the previous year's growth, selecting such sorts or varieties as are known to be most approved by my employer, and put one cutting or bud in a No. 60 pot. The pots are then

placed in a hotbed frame, or plunged in tan in the hot-house at about 70° of heat; after they are well rooted, they require to be shifted into No. 48 pots. When the shoots are from 2 ft. to 3 ft. in length, I give them their final shifting into No. 6 pots. I give a good drainage to the pot, and plant them low, so that, when finished, the pot may not be above two thirds filled with compost. The pots should now be placed where they are to remain, until such time as the vines have made their full growth. The best situation for them is in the front of a forcing-house for flowers (or if a small house could be appropriated for this purpose, so much the better); and if not placed too close together, the partial shade of the foliage during the hot months of summer will be rather beneficial than otherwise.

It is most desirable that the pots should be raised about 15 in. above the hot-water pipes, if the house is heated by that system; or, if by the common flue, large pans should be placed under the pots, and kept full of water where the flue is hottest. The nearness of the roots to the heated medium will wonderfully accelerate their growth; and, if proper attention is given to airing and watering, short joints and strong canes will be the consequence. Care should be taken to divest them of all laterals as soon as they appear, as this gives a fulness and prominence to the buds, which they would not otherwise obtain.

When the vines have grown of sufficient length, say from 12 ft. to 18 ft., the supply of water should be gradually withheld until the wood is comparatively ripe: they should then be removed from the house, and trained against a south wall, laying the pots upon their sides, to keep the roots dry, and covering the pots with litter or muck. To prevent worms getting into the pots, a layer of dry lime covered with coal-ashes should be put under them.

Having thus grown and ripened the wood of the vines, the next thing to be attended to is the preparing and pruning them for forcing, which ought to be done about four or five weeks before they are put into the forcing-house. Upon examination, it will be found that the largest and best buds are towards the extremity of the shoot; it is therefore to be cut back to these buds. It will be observed, that, in the final shifting, the pots were only two thirds filled with compost, the reason for which was, that space might be left for coiling the vine round the inside of the pot, at the same time divesting it of all the buds except 8, 10, or 12, at the end which is to be left out of the pot, fixing the coil down with pegs, and then filling up the pot with compost. It will be apparent that a great advantage is gained by coiling the vine round the pot, since by this we preserve the elaborated sap, which would otherwise have been lost by cutting back the vine to within 3 or 4 feet of the pot. We have also, by

this practice, the certainty of having numerous strong roots, after the expansion of the leaf, issuing from that part which is coiled, and which will very materially assist to bring the fruit to perfection. Indeed, it is an objection with me to the free adoption of Mr. Mearn's coiling system, that so much of the prepared sap should be excited to the production of roots, instead of its natural destination, the developement of the leaf and embryo bunches of fruit. A few of the vines may be put into the forcing-house in December, and another succession in January, at a heat of 70° at night. It were well to have a good bottom-heat of tan, which should be frequently stirred up, as the moisture arising from this source will keep the atmosphere of the house in a due state of humidity, which is so beneficial in the forcing of the vine, and on this the pots may be placed; or, as before recommended, they may be set above the water-pipes or flue, so as to diffuse a general warmth through the mass of compost in the pot, and to excite the roots that they may afford an abundant supply of sap to the elongating of the young wood and bunches. A third set of plants may remain against the wall, to give a late supply in the autumn. These pots are to be placed in an upright position about the middle of March, and supplied with water. When the temperature of the nights in autumn is rather cool, and while the foliage is yet good, they are to be removed into the house, to bring the fruit to perfection. Before the buds have broken, the position of the vines should be frequently changed, and their shoots bent in various directions, to prevent the determination of the sap to two or three buds only. By attending to this, the buds will all break equally, and produce from one to three bunches each; but of these one only should be left to come to maturity.

Jan. 20. 1837.

Art. IX. *How to plant and prune the Apple Tree, so as to have good Crops on unpropitious Soils.* By R. T.

As the planting of fruit trees seems now to engross the attention of many persons, perhaps you will allow me a corner in your useful work to give a little advice to some of your readers on the planting of apples. There are but few people, I believe, who are not pleased with a good crop of apples; but there are a great many who have been deterred from planting, on account of the numerous disappointments they have formerly met with, and have set it down for certain that the soil of their garden will not grow apples, for they are as sure to canker as ever they plant them; and they cannot afford the expense of making the soil fit for them. Now, sir, I happen to live in a neighbourhood

where there is but little to be found naturally besides clay or gravel, and the ground is usually very wet. When I first came here, we had plenty of old apple trees, but very few apples. We had also some young trees; but, as far as I can recollect, I never saw a crop on any of them. Being fond of seeing good apple trees, as soon as opportunity occurred I began to turn my attention to the subject.

It may be proper to observe that all the trees previously planted were on crab stocks; and I therefore determined on planting none but such as were on paradise stocks, as requiring less room, making less wood, less roots, and bearing more fruit. I accordingly prepared two borders, 5 ft. wide, by trenching them as deep as I had good soil, and making a drain of broken bricks to carry off the water. I then planted one row of trees down the centre of each border, about 8 ft. apart. For the first few years the borders were dug and cropped; but, since the roots have occupied the principal part of the ground, they have not been dug, nor cropped, nor manured in any way, as I am a great enemy to digging fruit tree borders, which, perhaps, you may recollect from a letter of mine which you published some years ago on the evils of that practice.

But to return. The trees were all dwarfs, and were pruned so as to look something like an umbrella turned bottom upwards. In pruning, I generally leave as much young wood as I can at its full length, seldom shortening the shoots till they are about as high as I can reach, by which time they are furnished with fruit and fruit spurs most of the way up; and as soon as they become too thick, I take out the old shoots, and bring up young ones. By this means I have now plenty of apples, of first-rate kinds; and their appearance, when in flower, is beautiful, being that of a wall of flowers on each side. It is true that all sorts will not bear equally well; but, having found which do best, I take up those which do not bear, and substitute other sorts.

Calculating that such trees will not last so long as those on crabs in a good soil, I have planted others to succeed them, which are doing equally well. The first have been planted about fifteen, the others about eight years; and I feel confident that, in most cases, apples may be obtained in this way: that is, use those trees which are on paradise stocks; plant nearly on the surface; do not manure the ground unless very poor, and, even then, fresh soil added is preferable; do not dig the borders after the trees are established; let the borders be well drained, and use the knife sparingly, except to regulate the branches, and shorten them when they are about as high as a man can reach, beyond which never allow them to grow.

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

A CATALOGUE *of select Plants, grown and sold by William May, at Hope Nursery, Leeming Lane, Bedale, Yorkshire.* Pamph. 8vo, pp. 16. 1841.

This catalogue appears to contain most of the useful and new plants at present in cultivation, arranged as Stove Plants, *Cácteæ*, Greenhouse Plants, Pelargoniums, Calceolarias (upwards of 70 sorts), New Chrysanthemums from the South of Spain (50 sorts), Camellias (85 sorts), Ericas, Select and showy hardy Herbaceous Plants, New and Superb Stove Pansies (above 100 sorts), Auriculas, Select Polyanthus, Carnations, Pinks, Roses, and Select and Showy Hardy Shrubs and Ornamental Trees.

All the articles are priced, and as the catalogue is printed on thin paper it may be sent any where for twopence. We learn with great pleasure that Mr. May has "last year planted out a collection of dwarf deciduous flowering shrubs, one of each kind, and all named according to the *Arb. Brit.* The number of species and varieties amounting to about 400, amongst which are some rare specimens of tree pæony, berberis, mahonia, cytisus, &c. They are planted in a piece of ground of near a quarter of an acre, adjoining a main walk, and are arranged according to their families, so far as is practicable consistent with the dwarfest-growing varieties being placed fronting the main walk, and rising to the back to form a sort of amphitheatre. They have now had two seasons' growth, and promise to be very interesting and ornamental. A sufficient space is left between the plants, so that they may attain something of their natural form for at least several years; and, by a little judicious pruning, I think they may be kept so for many years.

"On the opposite side of this walk I intend putting out a similar arrangement of evergreen dwarf shrubs, and to continue with American or peat earth plants; and above, and more in the distance, I intend to plant all the ornamental trees, climbers, and the pine and fir tribes, forming six distinct sections, and so arranged that the whole may be seen from this main walk, which is about 200 yards in length. The idea was suggested by your judicious remarks on such arrangements in the *Arboretum;* and I have no doubt what I have done, and intend to do, will be found of great benefit to purchasers as well as to myself."

Catalogue of Nursery Stock, cultivated and sold by William Gregory, Nurseryman, Seedsman, and Florist, Cirencester, Gloucestershire. One sheet, to go by post.

This is a very ample catalogue, and particularly rich in ornamental trees and shrubs, witness the species or varieties of the following genera, viz. *A*cer 22, *A*rbutus 17, *Bérberis* 15, Mahò*nia* 6, *C*istus 21, *C*lématis 19, Cotoneáster 9, *C*ratæ*gus* 55, *P*ìnus 46, &c. Nothing gives us more pleasure than to see collections of this extent propagated for sale in different parts of the country. We rejoice also to see additions to our hothouse and greenhouse plants, to *O*rchídeæ and to *Cácteæ*; but far more are we gratified by the introduction and general diffusion of hardy flowers, which can be seen in every road-side garden, and hardy trees and shrubs, which may adorn the margin of a plantation or a hedgerow, and be seen and enjoyed by all. Prices are put to all the plants; a most commendable practice, as many persons hesitate to give an order "in the dark." We are quite aware, at the same time, that a weak plant may be dearly bought at a low price, and a good stout well-rooted plant cheap at a high price; still we believe that low prices will be ultimately found best for all parties.

The Fruit-Grower's Instructor; being a Practical Treatise on the Cultivation and Treatment of Fruit Trees. To which is added, full Instructions for Forcing, with a List and Descriptive Account of all the best Fruits cultivated in Great Britain; also Directions for Hothouse Buildings, with the most approved Modes of heating by Fire and Hot-Water. By George Bliss. 8vo, pp. 312. London, 1841.

A practical work, which as such may be depended on so far as it goes. The omission of several of the new pears, the glout morceau, for example, while the green chisel is retained, and other fruits, is a proof to us that the author writes only from his own experience. We shall quote what he says on tying of grafts in the London nurseries, and also his directions for making oiled-paper frames for growing melons.

"*Tying of Grafts.*—Having given the necessary instructions for the grafter, tying of grafts is the next consideration. The tying is done by a man who follows the grafter; he must have his bast or matting cut in lengths about one foot and a half long, or if the stocks are large, it may be longer; this, tied in small bundles, should be taken one at a time (after dipping it in water to make it tough), and tied in the string of the apron, putting one end in the apron to keep it moist: the bast should be strong, otherwise should it break, if the grafter be quick, he will have to wait for the man who ties: the man being now prepared, he should begin to tie about four stocks behind the grafter, and keep about that distance, which will give the grafter room.

"The bast should be placed firm against the botton of the scion, and not let slip, which will prevent the scion from being put out of its place. This is very necessary to be observed, for if the scion is removed by the tying, it is useless for the grafter to be particular about putting the grafts on. He should then tie it tight round till it comes to the top of the stock, where it should have a tight hitch to fasten off; then cut the end of the bast close off, for if the end is left an inch long, which I have often seen, it prevents the clay from being properly closed, consequently admitting the air to the graft, which often proves fatal.

"The next thing is putting on the clay, commonly called dabbing. This is done by a boy who follows the man who ties. Having put his clay into something to carry it with him, he must take a small piece of clay sufficient to cover the whole of the incision, and to come about half an inch above the top of the stock, in order that it may hang well on the shoulder; this he should roll up in his hands nearly in the form of an egg, then make a hollow in one side of it with one hand, sufficiently deep, that, when it is put on the stock, it will enclose it all around alike.

"After the dabber follows another boy, called the closer. He follows with a pot of dry ashes, or dust, to rub his hands with to keep them from sticking to the clay, and closes up every crack, squeezing it tight round the bottom of the clay to keep it from slipping; then making it perfectly smooth, nearly in the form of an egg, it finishes the grafting.

"The above is the general way of grafting in large nurseries about London; but where small quantities only are wanted to be grafted, the grafter may tie his own grafts, and one boy will serve both to dab and close.

"I have treated as fully as possible on grafting of apples, as it will serve for most other fruits, for this practice of grafting is far preferable to saddle or rind grafting for fruit trees.

"*Directions for making Oiled-Paper Frames for growing Melons.*—Fine crops of melons are produced by growing them under oiled-paper frames; the plants being raised the same as directed for hand-glasses, and the beds prepared in the same way: they may either be covered with hand-glasses till June, or, in want of hand-glasses, the paper frames placed over them at once. If first protected with hand-glasses, when the glasses become filled with the runners, remove the glasses, and place over the beds the oiled-paper frames, there to remain during the summer.

"The frames are formed of thin slips of wood, like pantile laths, or poles, similarly constructed to the roof of a house or an archway, ten feet long, by three and a half to four or five wide, and two and a half to three feet high, with two panels made to open on one side with hinges.

"The bottom of the frame is made of slight wood-work, in which the small cross rafters are fixed a foot apart, either in a ridge form or arched; and across these small rafters, pack-thread or strong twine is placed along the frame lengthways, putting it round each rafter about a foot apart, and others drawn across the bed between the rafters, crossing or intersecting the other lines, which will serve to strengthen the rafters, and assist in supporting the paper; then take some strong white demy paper, and paste on the rafters in a regular and neat manner, and when dry, brush the paper all over with linseed oil; this may be done with a soft painting brush, using the oil on the outside only, and that but lightly; when this has become thoroughly dry, the frames will be fit for use.

"Although the oiled paper will be sufficiently water-proof to resist the rain, and keep off the cold, it will form an agreeable shade for the plants, during the scorching rays of the sun in the height of summer, and through which protection the plants thrive exceedingly, and produce good crops of fruit, from the end of July till the beginning of October. After the frame has been placed over the plants, admit air every fine day by opening the side panels of the frame, or if no panels were made to open, raise the frame a few inches at bottom, and, as occasion may require, give moderate waterings when the earth is dry, but be very moderate while the fruit is setting and ripening, for the reasons assigned for early crops.

"I may here remark that in very heavy rains or hail storms, which sometimes occur in the height of summer, it will be advantageous to spread mats over the frames, not only to preserve them from damage, but also to defend the bed as much as possible in very unfavourable weather; and, by proper attention to growing late melons by this practice, not only fine crops are obtained, but the fruit (which for the most part will ripen in August and September) will also be of very good flavour. When melons are wanted for mangoes, they should be gathered while green, about a quarter or half grown, and should be taken from the late crops, selecting those which are not likely to ripen."

To give an idea of the author's scientific views, we quote what he says on the influence of the stock on the scion:—

"Various are the opinions respecting the influence the stock will have on the scion, or graft: many persons (for want of sufficient practice), to this day suppose the stock will affect the scion, and consequently the fruit produced from the tree grafted on a stock whose fruit is different; but during my practice I never have known, in any instance, the fruit to become altered through the stock it was grafted on. In order to illustrate this fact as clearly as possible, I will give my general opinion on the subject.

"It is necessary sometimes to convey our ideas (particularly in writing, where it is subject to every criticism) as plainly as possible; I shall therefore commence from the seed of the stock.

"In the first place, when the seed first appears (say the crab), its spear grows downwards (the same by a common bean or pea), perhaps two inches before we see the green seed leaf above ground; this shows that the fund of vegetable matter above ground must be filtered through the root, for without the root the tree cannot grow, but the root might exist for some time, although the head was cut down; I am therefore most decidedly of opinion, that the stock in some degree partakes of the nature of the scion which is grafted on it; for if we look at the nature and constitution of a tree, and from practice mark its general progress, there cannot be an existing doubt, that the roots, veins, fibres, or whatever they may be called, which strike from the scion into the stock, must take root and run downwards, and that to the very extremity where the sap flows: this I am further convinced of by putting the graft on the centre of the stock instead of the side, for you always find them make a considerably

better growth, and the trees are more durable ; therefore, if the graft sends its roots down to the very extremities of the roots of the stock, if either becomes impregnated, it must be the stock and not the scion.

" The same by budding ; if nature had so ordered it, that the stock should have had any influence on grafting, much more must it have had on budding, where there is nothing left but the mere rind ; yet this small bud has been in no instance ever known to degenerate on account of the stock, if budded on a stock it was fond of.

" What I mean by a bud being fond of a stock, is such stocks as buds and grafts are usually worked on : this is one very necessary branch of a nurseryman's profession, when he has a new fruit, to endeavour to find out such stock as is best suited to its constitution, &c.

" I remember many years back, when quite a boy, a common white jasmine which was growing against the house, and being fond, even from my earliest years, of trying experiments among trees, I took a bud from a striped jasmine, and budded a branch of the green ; the bud grew, and what shoots put forth below the bud, most of them became blotch-leaved : this is a proof the bud or graft must have an effect on the stock."

The New American Orchardist ; or, an Account of the most valuable Varieties of Fruit, of all Climates, adapted to Cultivation in the United States ; with their History, Modes of Culture, Management, Uses, &c. With an Appendix, on Vegetables, Ornamental Trees, Shrubs, and Flowers, the Agricultural Resources of America, and on Silk, &c. By William Kenrick. Third ed. Boston, U. S. Small 8vo, pp. 450. 1841.

A carefully prepared work, which must be of the greatest use in the country in which it was produced. The following quotation on the Belgian mode of obtaining new varieties, as described by Van Mons, may be interesting to the English reader who is not in the habit of perusing French works on horticulture : —

" 'The Belgians give no preference to the seeds of table fruits, when they plant to obtain new ameliorated kinds. When their plants appear, they do not, like us, found their hopes upon individuals exempt from thorns, furnished with large leaves, and remarkable for the size and beauty of their wood ; on the contrary, they prefer the most thorny subjects, provided that the thorns are long, and that the plants are furnished with many buds or eyes, placed very near together. This last circumstance appears to them, and with reason, to be an indication that the tree will speedily produce fruit. As soon as the young individuals which offer these favourable appearances afford grafts or buds capable of being inoculated upon other stocks, these operations are performed (the apples on paradise, and the pears on quince stocks) to hasten their fructification. The first fruit is generally very bad ; but the Belgians do not regard that : whatever it is, they carefully collect the seeds and plant them ; from these a second generation is produced, which commonly shows the commencement of an amelioration. As soon as the young plants of this second generation have scions or buds proper for the purpose, they are transferred to other stocks, as were the preceding ; the third and fourth generations are treated in the same manner, and until there are finally produced ameliorated fruits worthy of being propagated. M. Van Mons asserts that the peach and apricot, treated in this manner, afford excellent fruit in the third generation. The apple does not yield superior fruit before the fourth or fifth generation. The pear is slower in its amelioration ; but M. Van Mons informs us that, in the sixth generation, it no longer produces inferior, but affords excellent fruits, intermixed with those of a middling quality.'

" Intelligent writers, those on whom we may rely, have assured us that the new and numerous class of fruits which have arisen during the last forty years is far more precious and inestimable in point of quality, than all previously known. They refer in this more particularly to pears. Trees of those already most renowned are here."

The Peasantry of the Border. An Appeal in their Behalf. "Give them good Cottages, and help them to educate their Children." By the Rev. Dr. Gilly, Canon of Durham. Pamph. 8vo, 5 plates. 1841.

Dr. Gilly is the incumbent of the parish of Norham, situated in North Northumberland, and the present appeal in behalf of the poor under his spiritual care is greatly to his honour as a man and a Christian. We sincerely hope that it will have the desired effect on the proprietors of that part of the country, which, as we lately saw, exhibits a combination of wealth in the proprietors, and of famine and of misery among the farm labourers, not to be met with, we believe, in any other country except Britain. The following notice of this pamphlet, in the *Times* newspaper, is evidently written by some person who is feelingly alive to the importance of the subject. This is "an appeal on behalf of the peasantry of the Border, in regard to the extremely wretched condition of the cottages in which, for the most part, this class of men and their families are compelled to reside. Dr. Gilly's pamphlet is illustrated with wood-engravings, and a series of statistical tables. His statements respecting the habitations of the peasantry relate chiefly to the parish of Norham, which consists of 14,268 acres, and extends for about seven miles along the southern bank of the Tweed. The population amounts to 2,934, and consists of agriculturists, pitmen, and fishermen. Out of 174 cottages in Norham, which are occupied by the peasantry, 83, according to a statistical table given by Dr. Gilly, or nearly one half, have changed inmates within the last two years; 145 within the last seven years, and 156 within the last ten years. Of the above 83 tenements which have changed inhabitants within the last two years, 54 are described to be buildings deficient in all that is necessary to convenience and cleanliness; and yet the greater part are occupied by families who have done all they can do to give them a decent and comfortable appearance. 'Some of them,' says he, 'are mere hovels, absolutely unfit for the peasantry of a civilised country, and threatening to tumble down about their ears. In many, human beings and cows are littered together under the same roof.' Of the whole number, 174, there are but 27 which have each two rooms. Dr. Gilly describes the general character of the best of the old-fashioned hinds' cottages to be bad at the best, having no byre for their cows, no sties for their pigs, no pumps or wells; nothing, in a word, to promote cleanliness or comfort. Their average size is about 24 ft. by 16 ft., and they are dark and unwholesome. The windows do not open, and many of them are not larger than 20 in. by 16 in.; and into this space are crowded eight, ten, and even twelve persons. 'How they lie down to rest, how they sleep, how they can preserve common decency, how unutterable horrors are avoided, is beyond all conception. The case is aggravated when there is a young woman to be lodged in this confined space, who is not a member of the family, but is hired to do the field work, for which every hind is bound to provide a female. It shocks every feeling of propriety to think that in a room, and within such a space as I have been describing, civilised beings should be herding together without a decent separation of age and sex.' Happily, however, there are many exceptions to this description of the hinds' cottages in North Northumberland given by Dr. Gilly. He speaks very favourably of a group of six cottages recently built by the trustees of Lord Crewe's Institution, on their property at Thornton Park; of the Marquess of Waterford's cottages at Ford; and of those of Mr. Baker Cresswell, on his property at Cresswell and Berwick; but of the cottages at the village of Etall, in the parish of Ford, the residence of Lord Frederick and Lady Augusta Fitzclarence, he speaks in enthusiastic terms. 'To see,' says he, 'what a village in our northern regions may be, and ought to be, go to Etall. There you will find flower-gardens in perfection, with the village-green as smooth as a lawn in the best kept pleasure-ground, and the rustic benches under the spreading branches of elm and sycamore. One fine tree, with a seat around its trunk, is conspicuous, with an inscription which shows the considerate kindness of the noble family now residing in the man-

sion-house, 'Willie Wallace's tree.' I believe the old man is still alive in whose honour the tree is thus devoted to longevity.' The greatest evil arising out of the bad cottages in which, for the most part, the peasantry of North Northumberland (who are an excellent class of persons, intelligent, orderly, and thrifty) are obliged to reside is, that they are driven so frequently to shift their residences from place to place, which interrupts the education of their children, seriously diminishes their own comforts, and impedes their advancement in the world. However, the subject of improving and embellishing the cottages of the peasantry of the Border, and indeed of the whole county of Northumberland, has been taken up by a party in whose hands it is not likely to suffer; a great number of the owners and occupiers of land, and of the clergy in the county, having quite recently formed themselves into a society for the express purpose of promoting this most desirable and benevolent work." (*Times*, Friday, Nov. 12. 1841.)

We hope the Agricultural Society of England will take up the subject of agricultural architecture, and examine not only farm buildings of every description, but the cottages of farm-labourers. Happy would it be for this class of society, both in England and Scotland, if their dwellings were as much cared for by the proprietors as those of dogs, pigs, and horses! There are doubtless many cases where the labourers' cottages are cared for; but, alas, they are "few and far between." We know that there are thousands of labourers' cottages not a whit better than those of Norham. In these days of cooperation and association, it is surprising that a *Society for the Improvement of Labourers' Cottages* has not been established. We feel certain that it has only to be commenced by proper persons to be well supported; for feelings of human sympathy are latent in every human bosom, and only require to be excited. Much of the misery which exists on the estates of the wealthy is not so much owing to their want of feeling, as to these feelings not being called forth by those who frequent their society, and whose representations would be listened to with attention. The persons most competent to represent the true state of the poor to a wealthy proprietor, are clergymen, land agents and stewards, and architects and builders; but how very few of these persons have the necessary courage! Another reason arises from the abject dependent state in which the sufferers feel themselves. They are afraid to complain. This is even the case with gardeners relative to their cottages, which are often miserable enough. While we write this we have received a letter from a very superior gardener, in which he informs us that he is about to give warning on account of the dampness of the room which he occupies in the back sheds, and of which he dare not complain, because his master would, in that case, desire him to live with the other servants in the house, as he wanted him to do at first, he being a single man. Another case is mentioned in an early volume of the *Gardener's Magazine*, in which the gardener, a married man, does not complain of his house, because his predecessor had never complained of it, and because, if he did so, he would be told to leave, and probably not receive a character.

Sporting Architecture. By George Tattersall, Surveyor. London, 1841, 4to, pp. 97, with numerous engravings on copper and wood.

This is an elegant work, and one that will be extremely useful to the breeders of horses, and the possessors of hunters and hounds. It is divided into four parts, viz. 1. The Stud Farm; 2. The Stall; 3. The Kennel; and 4. Race Stands. A few lines from the Introduction will show that such a book was wanted; and when we consider that the author is the brother of one of the most celebrated horse-dealers in Europe, we may give him credit for being a master of his subject.

"Of all the various departments of the builder's art, none has so suffered from the carelessness or prejudice of ages as that which gives the title to this treatise.

"The man who would provide himself with a house describes his wants,

points out his purposes, and makes his meaning plain. But it is only by a close and intimate acquaintance with the nature and the habits of the animal, that the designer of a dwelling for the dumb creation can succeed in rendering it such as may be the most conducive to their comfort, which carries with it what is even of more consequence, their health. Hitherto, however, this care has been considered as unworthy the attention of the professional artist, and animals of great value have either been kept in places rendered wholly unfit for them, by the carelessness of the architect, or consigned to the tender mercies of some country carpenter.

"To rescue, then, if it be possible, this subject from the errors of ignorance, or the omissions of neglect; to raise it in the estimation of my readers to the consideration due to its importance; and to point out the methods whereby an outlay, frequently incurred to little purpose, may be expended to the best advantage, will be the object of the following pages."

A Popular Treatise on Agricultural Chemistry. Intended for the Use of the Practical Farmer. By Charles Squarcy, Chemist. 8vo, pp. 124. London, 1842.

A laudable attempt, for which the author deserves credit; but how far he has succeeded, we leave to a correspondent more competent to judge than ourselves, and whose opinion will, we trust, appear in next Number.

The British Almanack of the Society for the Diffusion of Useful Knowledge, for 1842. Small 8vo, pp. 97. London, 1842. 1*s.*

Companion to the Almanack, or Year-Book of General Information, for 1842. Small 8vo, pp. 244, several woodcuts. London, 1842. 2*s.* 6*d.*

The *Companion*, among much interesting matter, contains an extract from the Act of Parliament authorising the formation of Victoria Park, and notices of a number of very handsome public buildings erected in London and throughout the country, several of them illustrated by engravings. Among these illustrations is an elevation of Streatham new church, in which a style occasionally seen in Venice and other parts of Italy, but never, as far as we know, before in England, is successfully introduced by Mr. Wild. The approach to this church will be through an avenue of *P*inus taúrica, which, with the painted glass, by Willemet, of the windows over the altar, are or will, we believe, be presented by George Fuller, Esq., of Streatham. There is a handsome perspective view of St. Mary's Church, Southwark, which is in the early English style, with high-pitched roof and gable, by Mr. B. Ferrey. Trinity Chapel, Poplar, by Mr. W. Hosking, in the Roman style, is illustrated by two engravings. There is a perspective view of St. George's Hall and the new Assize Court at Liverpool, comprised in one grand building, by Mr. Elmes; a view of Liverpool Collegiate Institution, also by Mr. Elmes; and a view of the Savings' Bank, Bath, the design of Mr. George Alexander, which we think one of the handsomest things in the volume. "A committee having been appointed, architects were invited to send in designs, the estimate being limited to 2500*l.*, and that by Mr. George Alexander (who had previously obtained one of the premiums for St. George's Hall, Liverpool) was selected. We understand that, before being finally appointed architect, Mr. Alexander agreed with the committee, that, in case the building at all exceeded the stipulated sum, they were at liberty to discharge him, without his being entitled to any remuneration; all the drawings remaining in their hands, to do with them as they pleased. Tenders were received from six or seven of the principal builders at Bath, all of which were, with one exception, within the estimate, and that of Mr. D. Aust was taken at 2350*l.*" (p. 231.)

The mere diffusion of these engravings will not be without its effect in cultivating a taste for architecture; and this taste, joined to that of natural history and rural affairs, affords an endless source of interest and enjoyment to the busy as well as the idle, and the poor as well as the rich It is true

that the poor cannot participate in these tastes, but this will be effected in due time, by a comprehensive system of national education, " at the expense of all, and for the benefit of all."

Art. II. *Literary Notice.*

A Treatise on Manures, their Nature, Preparation, and Application; with a Notice of the Useful British Grasses, and a Section on the General Management of a Farm, by J. Donaldson, is in the press, and will appear in the course of January. We anticipate much from this work, knowing Mr. Donaldson to be one of the most scientific agriculturists of the present day, and one who has had much experience, both as a farmer and land-steward, in the best cultivated districts of Scotland, and also in Northumberland, Leicestershire, Kent, and other parts of England.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Godsall's Label for Fruit Trees (*fig.* 1.) consists of a shank, which is an ox's or a horse's rib, and a tablet, which is a square piece of sheet lead of 4 lb. to the foot, suspended from the shank by a piece of copper wire; the lead is covered with a thin coat of black varnish paint, and while wet the name is written with a steel point. Mr. Godsall has used this tally for a number of years, and finds it to be very durable, and the shanks, from their white colour, very conspicuous, which is an advantage when the tallies are placed among green foliage.—*W. G. Hereford, Nov.* 12. 1841.

Fig. 1.
Godsall's Label.

Packing the Larix Godsallii. — I received a plant of this splendid weeper packed round the inside of a hoop of a washing-tub, perfectly safe, though it had travelled from Herefordshire, which is upwards of 300 miles. I took the hint, and sent a plant of the *Crataegus* which you so much admired to our friend the doctor in Dublin.—*T. B. Dec.* 1. 1841.

Progressive Increase of Temperature.—In spring there is a progressive increase of temperature. May not this have something to do with the vegetation of all ultra-tropical seeds, and should we not do well to imitate this in raising plants from seeds of difficult germination?—*N. August*, 1841.

Mr. Cree's Mode of pruning Forest Trees.—" The object of Mr. Cree's mode of pruning is, to throw the whole of the wood produced into one straight stem or trunk; and to increase the rapidity of the growth of this stem, in a greater degree than has been done by any other method of pruning hitherto adopted. To accomplish these objects, Mr. Cree shortens all the side branches soon after they are produced, but does not cut a single bough off close to the stem till the tree is above 18 ft. in height, and not less than 15 in. in circumference at the surface of the ground. A tree thus treated forms a narrow cone, like a cypress or a Lombardy poplar, clothed with branches from the ground to the summit; those at the ground being from 2 ft. to 3 ft. in length, and from ½ in. to 1 in. in diameter close to the trunk, both the length of the branches and their thickness diminishing, of course, as they approach the summit. We repeat, that not one of these branches is cut off close to the stem till the tree has attained 18 or 20 feet in height, when the lower tier of branches is completely removed; and one tier is afterwards cut off annually, always close to the stem, till a sufficient length of clear trunk is produced; that length, of course, varying according to the kind of tree, the soil, and various other circumstances. The branches which are shortened always remain slender; and, when they are cut off close to the

stem, the wound is completely healed over, at the very latest, in the course of three years. The stem being surrounded by foliage fully exposed to light and air, from its base to its summit, an abundant supply of aerated sap is returned from the small branches to the stem; and this is found greatly to increase the growth of the stem both in height and thickness, as compared with the stems of trees either not pruned at all, or pruned in the ordinary manner. Mr. Cree pointed out to us oaks, ash trees, elms, sycamores, poplars, willows, and thorns, which had been planted twenty years ago, and pruned in his manner; and which are now, though in a very exposed situation in poor soil, from 20 ft. to 25 ft. in height, some of them having had only one tier of branches removed, and others two or three. We were most struck with the erect and rapid growth made by the oaks, the Scotch elms, and the common thorns, as compared with other trees of the same kind which had not been pruned; and the heads of which had spread out horizontally. To the pine and fir tribe, Mr. Cree does not apply his method, except partially, and under particular circumstances, as these trees do not naturally produce side branches of a timber size.

"Mr. Cree says that he has found, experimentally, that broad-leaved trees (that is, all trees except the pine and fir tribe), under 18 ft. in height, and 15 in. in circumference, advance at an average as much both in height and circumference in six years, if the branches are properly shortened, as they do in fifteen years, if these are not shortened, or if the trees are improperly pruned. The more trees are pruned up close to the stem, before they are 18 ft. in height, the more, Mr. Cree considers, is their growth retarded; and not only that, but, from the open texture of the wood, the wounds so made, he says, admit damp, and cause the tree to rot at the heart.

"Mr. Cree's mode of pruning has been familiar to us in theory, since an account of it was published, in 1828, in the third volume of the *Quarterly Journal of Agriculture;* but we now acknowledge that this account failed to make the impression on us that it ought to have done, and which the inspection of the trees under Mr. Cree's care, and his conversation on the subject have now done. We are astonished, indeed, that Mr. Cree's system has not been more generally adopted in all plantations made with a view to profit in Scotland, where the results of his practice might have been observed with little trouble; and we can only account for it from the little attention paid to vegetable physiology by foresters, gardeners, and their employers; from the remote situation in which Mr. Cree lives (Biggar), and from the great simplicity and modesty of the man himself. This, indeed, when contrasted with his knowledge of vegetable physiology, practical geometry, land-surveying, engineering, and other matters connected with rural improvement, surprised us almost as much as his trees, till we looked at his books.

"Perhaps it may be necessary to state that Mr. Cree's mode of pruning is adapted solely for plantations made with a view to profit. It is wholly unfit for ornamental plantations, because it reduces all the different natural forms of trees to one form, viz., that of a narrow cone; and it is equally unfit where the object is crooked timber, because, by it, all the timber produced is straight timber. Neither, as already observed, is Mr. Cree's mode adapted for the pine and fir tribe, in which nature may be said to have adopted a mode of growth which is equivalent to his system of pruning." (*Gard. Gaz.* for 1841, p. 500.)

The Canadian and Black Italian Poplars.—As you appear to entertain considerable doubts as to the specific distinction between the Canadian and Black Italian poplars, I will briefly state my conviction that they are specifically distinct; or, at all events, that, if the one is only a variety of the other, the variation is so well marked, and broadly defined, that at no age, from the yearling plant to the mature tree, can they be mistaken. In the Canadian poplar the young shoots are very angular, a sharply winged membrane passing from each eye downwards, giving the whole shoot a furrowed aspect. In the Black Italian, the shoots are longer, rounder, and with very trifling mem-

branes, and those only near the termination of the shoot. This primal difference is shown through all the after stages of the two trees; for, even in the oldest specimens of Canadian poplar, the rugged bark is interlaced in a bold and beautiful manner, which in the Black Italian is never, or but faintly, seen. The Canadian, as I before stated, grows much more slowly than the Italian, forms a bole of less length, and produces magnificent branches, to which those of no plant of Italian that I have ever seen are at all comparable. The footstalk of the leaf also is much flatter, and the leaf itself larger, and its reticulations very different from those of the Black Italian when subjected to maceration, for which all kinds of poplars are eminently calculated.

To the landscape-gardener the Italian is of far less value than the Canadian, for the one never forms so pictorial a tree as the other; and when autumn is approaching, and the foliage begins to show indications of having performed its functions, while the Black Italian is of a dingy and melancholy hue, the other assumes a fine golden tinge, that, with a setting sun, gloriously contrasts with the darker foliage of surrounding Turkey oaks or bristling pines. It may be inferred, that, where length of bole and quickness of growth are sought, the Italian is the more desirable; and accordingly, both in France and in Belgium, where poplars are much grown as timber, we scarcely see any other kind than the Black Italian. In those countries it will yet take many years before trees are grown, as in our parks, for their own diversity and beauty. The pictorial effect, such as it is, of the Italian poplar they contrive wholly to destroy, by carefully pruning all the side shoots as fast as they are produced. — *William Masters. Canterbury Nursery, Nov.* 23. 1841.

Torrèya taxifòlia.—You ask if Torrèya is alive? You may remember that the plant I am indebted to you for had received a wound on the stem near the root; from that injury it never recovered, although the plant lingered for four months after I had received it. Being entirely new, I tried not only to save the specimen, but also to increase it. For this purpose I grafted shoots on larch, on pines, and on firs, as well as on the common and Irish yews. Those on the pines died first; the larch followed; and for a long time I supposed those worked on *A*bies and *P*icea, particularly the latter, would have succeeded; but they, too, perished in their turn. I was now left with grafts upon the yews only, but they were no more willing to favour my views than the rest; and had I not put a shoot or two into sand, the plant would, I believe, not have been alive in Europe at this time. Their progress must necessarily be slow, but I am not without hopes that, ultimately, from that stock we may succeed in adding a new and beautiful specimen to our hardy evergreens.—*Id.*

A Substitute for early Potatoes. — Messrs. Chapman, market-gardeners, Brentford End, Middlesex, are advertising a potato which, they say, if planted in May or June, and taken up in autumn and kept in moist soil, will retain all the qualities of new potatoes till the June following. We have tried some of them on Nov. 23., and we have buried three parcels to be tasted on March 1., April 1., and May 1. Should they prove as good in April and May as they did in November, those who are fond of that peculiar delicacy of flavour and tenderness of texture which are so much admired in early potatoes by amateurs, will have obtained the means of gratifying their tastes at much less expense than by the usual mode of obtaining early potatoes by forcing.—*Cond.*

Artesian Wells.—Professor Sedgwick, at the Plymouth Meeting of the British Association, after reviewing the general principle of Artesian wells, described two districts in which these operations were attended with very different results. "In the eastern part of Essex, the chalk is covered by sandy beds of the plastic clay, and these by several hundred feet of impervious strata of London clay, all dipping together towards the east. The arenaceous beds below the London clay rise higher towards the chalk than the clay does, and absorb a considerable part of the water from the high grounds. By boring through the clays to this sand, springs of water immediately rise above the surface, and are carried off by natural channels. By this supply of water, the value of the land has been materially increased, since the country,

though abounding in peat bogs and stagnant ponds during winter, suffers much from the summer drought. The other attempts to form Artesian wells, referred to by Mr. Sedgwick, were made near Lincoln, which, though surrounded by fens covered with water in the winter, is not sufficiently supplied during the summer. But the clays supporting the fens of the Bedford Level are below the chalk ; and though there are pervious beds beneath them, which rise to the north-west, yet the clays are of such enormous thickness that they have never been penetrated ; and even were that accomplished, the high land is so distant that intervening fissures, filled up with impervious materials, might intercept the supply. Expensive sinkings have been made at Lynn, and also at Boston, but, after boring through many hundred feet of clay, they have utterly failed ; and, in any future operations in this district, the chance of success would be very remote." (*Edin. Phil. Journ.*, vol. xxxi. p. 426.)

The Fire at the Tower of London.—The opinion generally entertained by those who are deemed competent to judge in the matter is, that the fire originated with the stoves used for heating, and that it is not at all improbable but calamities of a similar fearful nature may be anticipated. The reasons assigned are, that new modes of heating being introduced into buildings not at all fitted for them, their destruction is consequently almost certain. Flues and chimneys, with their adjacent walls, which stood unscathed when wood or coal were used as fuel, and the security of which might be guaranteed for many ages, are not suitable for these modern introductions, in which large quantities of heated air are elicited as elements of destruction. Besides this, the conductive power of the bricks and cement undergoes a great change from the constant operation of heat and air, so that heat is retained and conducted with greater facility. In this, in the opinion of a gentleman of science, who informed the reporter he had memorialised the Board of Ordnance upon the subject, to a great extent consists the secret of many of those recent conflagrations which have appalled the public and destroyed so many of our public buildings. (*Times*, Nov. 16. 1841.)

Merthyr Coal is strongly recommended for hothouse furnaces, and for open fires where the object is a steady powerful heat without much flame, and without the trouble of stirring. This coal makes no smoke, no clinkers, 80 tons produce as much steam as 100 tons of Newcastle coal, and it requires less attendance, as it must not be stirred. The price is the same as that of Newcastle coal. It is used by the Rev. Theo. Williams, Hendon; George Byng, Esq., Wrotham Park ; Thomas Harris, Esq., Kingsbury ; and Captain Trotter, Dyrham Park.—*Cond.*

Improved Draining-Tiles.—Agreeably to your request, I send you one of my improved draining-tiles (*fig.* 2.), and also one of the connecting tiles, and a tile with a hole in its side (*fig.* 3.) for joining the connecting tile, de-

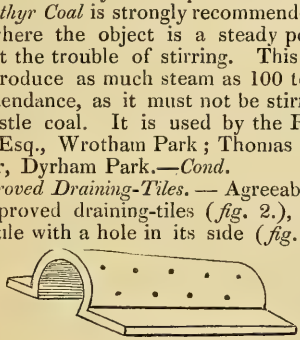

Fig. 2. *Munro's Draining-Tile*

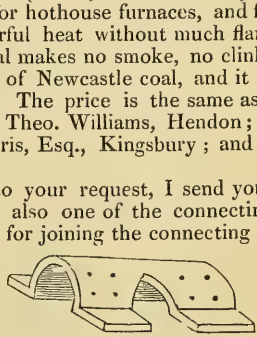

Fig. 3. *Munro's connecting Tile.*

scribed in a communication of mine to the president of the Northamptonshire Agricultural Society, and afterwards published in the *Northampton Mercury.* I likewise send you some pieces of offal wood (short pieces between 9 in. and 1 ft. in length), which I propose being used as drain covers. You will observe that they are intended as covers for the mouth of a chad, or groove, or gutter, in the bottom of a drain, such as is made in this county, and which I shall try to describe. First, a trench of the width of 10 in. or 1 ft. is dug out to nearly the same depth with a common spade ; then, in the middle of this trench the workman commences with a long-bladed spade-like instrument, 3½ in. to 4 in. broad ; the depth of this second opening, which is called the chad, will, of course, be regulated according to the nature of the ground. Sometimes it may be 20 in. deep, and sometimes less. Then those pieces of

wood are to be laid side by side, across the mouth of the chad, and the earth immediately laid over them, until the upper trench is full, and level with the surface of the ground around. But since I addressed my letter to Mr. Hylliard, I have thought of a new material for drain covers, which must ultimately be of great importance to farming, where the absence of clay, and the distance to the tile-yard, amounts to an absolute prohibition of the use of tiles. This material is peat, an article hitherto considered fit for nothing but fuel. By the aid of a peat-compressing machine, compact bodies of peat, in the shape of blocks of a wedge form, to be inserted into the opening of the chad, will answer the purpose admirably. I think I have read some where lately, that when peat is once thoroughly dry, it becomes impervious to moisture, and, if this is true, then peat will answer for any sort of draining. For instance, nothing could be better for couple draining than compressed slabs of peat. What a saving would it not make on carriage alone, compared with that of stones? I have no such thing here as peat to experiment upon, else I should have tried whether it would undergo a process of charring in a metallic cylinder. My impression is, that something might be done with it in this way. — *James Munro. Castle Ashby, Northamptonshire, Oct.* 9. 1839.

Composition Floors for Cottages. — I fear I can say but little that will serve your purpose; but what I do know you are welcome to. When I came to this place some years ago, I found all the malting floors, and also those of other rooms detached from the main buildings, formed of a species of plaster [? gypsum], which, on enquiry, I found was procured from Retford, Notts, in powder, and prepared by mixing with it certain quantities of cinder dirt and sand. I cannot say the proportions. All I know is, that, though apparently rough and harsh to the eye, it made capital malting-floors, inasmuch as it both imbibed and gave out moisture freely, thereby preserving a degree of smoothness and even softness, essential to the operations of turning, ploughing, &c. the pieces [of barley] on the floors. So far so good; but take the same material, and deprive it of any moisture, I fear you would not find it wear well at all. It would crumble away, and would not stand the fag of a cottage family. But even for the maltings we have discontinued the use of this article; the floors, as they require mending, being repaired with a cheaper, and apparently a more durable material; composed of equal parts of lime, sand, and cinder dirt. If I think of it, I will enclose a sample ready mixed for working. It comes up, as you will find, to a very good smooth face; but, I doubt, will not wear without the occasional use of water; consequently, is not well suited for cottage floors. — *S. T. Norfolk, Dec.* 13. 1841.

Repairing Wet Roads. — For roads it is still less applicable. I recollect, some dozen years ago, seeing a part of the road above Highgate Archway, which, I dare say you are aware, was very wet and springy, repaired after the following fashion. The banks rising on each side pretty high, a deep tile-drain was first inserted at the foot, so as to intercept the water in that direction. This no doubt it did; but as water might, and probably would, spring up underneath, and perhaps in the very centre of the road itself, the surveyor determined to form a bottom which should be water-tight, as the only means to prevent the wear and tear of a piece of road subject to such heavy and constant traffic. He set about the work, as nearly as I can remember, as follows. The old materials were removed, even to a considerable depth; and their place was supplied by a complete grouting of Roman cement and pebbles, forming a bed or crust thick enough to bear the materials of which the surface or upper crust was intended to be composed. The cement was very carefully and evenly spread, sloping gradually towards the side drains; and the better to facilitate the passage of rain, or other water, as well as to afford a sort of hold for the upper materials, grooves were made in the cement before it hardened with a triangular-formed spline, thus (see *fig.* 4.); which spline being laid in the direction wanted, was pressed down into the cement, by blows of a mallet or hammer. A very short time sufficed to render this bed, so prepared, hard enough to admit


Fig. 4.

of the addition of a tolerably thick stratum of broken granite and other stone; and the whole being impervious to wet from beneath, and so well prepared for surface moisture, I have no doubt, heavy as was the expense in the first instance, it would hardly fail to answer.—*S. T. Norfolk, Dec.* 13. 1841.

Rendering Cottages Fire and Water-proof. — You talk of making cottages fire-proof. Were you in this neighbourhood just now, it strikes me you would be more interested in making them water-proof. What a state many of the poor inhabitants are in to be sure! The dwellers in and about the fens never seem to have thought it worth their while to keep their houses above the ground level, some of them are even below it; the natural and inevitable consequence of which is, constant damp, and often standing water. A double cottage near me is, and has been for a long time, several inches deep on the lower floor, nor have they the means of avoiding it, seeing that the cottages hereabouts have no fireplaces on the chamber floors. This is what I particularly wish to direct your attention to: it is a most important point, and one which, here at least, has been grossly neglected. I pray you consider it. — *Id.*

Art. II. *Foreign Notices.*

FRANCE.

Chateau de Talhouet, near L'Orient, France, Nov. 30. 1841. — I have been fortunate in getting a most comfortable and convenient château here, beautifully situated, and with every thing in the shooting and fishing line any man can desire. Nothing can exceed the barbarous looks, habits, and drunkenness of the people, and even their priests, but they are quite harmless. Their agriculture, their cattle, pigs, sheep, and houses are all indescribably bad, quite caricatures of all we have in England; yet the climate and soil are the best, perhaps, in all Europe for agricultural purposes. I have taken a good deal of land, and shall show them how to grow Skirving's Swedes, lucerne, carrots, Belgium parsneps (Guernsey), rape, flax, *Màdia* satìva, hemp, clover, and perhaps not lose my money in giving lessons. Italian rye-grass does wonderfully well here; and a kind of rye from Poland is just introduced, 8 ft. high, and the ears from 8 in. to 15 in. long, of which I shall send specimens to England, as, when sown here in June, it is cut by the middle of August. Notwithstanding the general gross ignorance, a few of the better classes possess a great degree of intelligence, and I saw one quite a Lincolnshire farm on a small scale, near Rennes. There is a *noir animal* factory near me, to manufacture dead horses into manure, and a potato flour mill, which had an order for 2000*l.* worth of it from a Mr. Walker of London. I am just getting a capital eight-horse-power steam-engine, in aid of my water thrashing-mill, and to bruise barley and beans, and with linseed oil to form it into cakes for feeding cattle and sheep. To this I have fortunately got in time enough the *noir animal* and potato flour machinery, which shall be added to the cake machinery, so as to render it the most complete thing of the kind in Europe. — *F. A. M'K.*

ITALY.

Seeds collected in 1840 *by Professor Visiani of Pavia.* — *O'*cymum citriodòrum *Vis.* from Nubia; Veslíng*ia* sp. *Vis.*; Vià*lia* macrophýlla *Vis.* — *G. Manetti. Monza, Aug.* 21. 1841.

Monza, Dec. 6. 1841. — I find the *Suburban Horticulturist* so useful, that I make it serve as a text-book to the lessons in horticulture, which I give to the pupils in the Imperial and Royal Gardens. Being obliged to translate it for this purpose, I shall afterwards print it, certain of doing a great service to my countrymen, as we have no book that can serve so well

as a guide in performing gardening operations. You shall, therefore, be the Mentor to guide my pupils in the art of cultivation.

I shall now give you a notice which I think will interest you, and perhaps, also, the readers of your excellent periodical.

The Abbé Ambrozio Longoni, residing in Monza, formerly professor of philosophy, distinguished for his profound knowledge, not only in the belles lettres, but also in mechanics and natural sciences, who wrote a manual on the cultivation of the pistacchios di terra (*A'rachis hypogæ'a*), which I formerly mentioned (*Gardener's Magazine*, vol. xvi. p. 309.), and who spares neither means nor trouble to render himself useful to society, has now discovered a new oleaginous seed. Under the windows of his house there was a garden, in which grew a tree of *Negúndo fraxinifòlium*, of about 6 in. in diameter. Looking at this tree loaded with seed, he said to himself: Cannot all this quantity of seed, which Providence has bestowed on this tree, be brought to some use? With this view, it occurred to him to try whether it would produce oil; he set to work, and obtained the following results: —

From a bag containing eight bushels of keys, one bushel of clean seed was obtained; and, therefore, there is one bag of clean seed from eight bags of samaræ. A bag of clean seed weighs about 96 lb. small Milanese of 12 oz. From a bag of clean seed, 42 lb. 8 oz. of oleaginous powder were obtained. One pound of powder produces not less than 50 denari of oil, without reckoning the loss that takes place in expressing it; that is, a product of 17·3 per cent. Therefore, from a bag of clean seeds there are 7 lb. 5 oz. of oil, and about 32 lb. of husks or refuse. Supposing the price of this oil to be sixpence * for every pound-weight, and about a halfpenny a pound for the husks, we shall have for 7 lb. 5 oz. of oil, at sixpence, 3*s.* 8*d.*; for 32 lb. of husks, at a halfpenny, 1*s.* 4*d.*; making the produce of a bag of clean seed, 5*s.*

Deducting the expenses for gathering the seeds, separating them, grinding them, taking out the kernels, and for the preparation of the oil, which may be supposed to amount to three fifths of the produce, that is, to 3*s.*; there remains of the net produce, 2*s.*

From one of these trees, 6 in. in diameter, more than two bags of seeds have been gathered: hence, from 1000 trees, taking large and small together, we may have an average produce of 2000 bags of keys, and 250 bags of clean seed, giving a net product of 21*l.*

The oil produced is not suitable for cookery, as it retains the taste of the bark itself; but it is good for burning, gives a redder light than olive or other oil; and has the advantage above all other oils, of making less smoke.

For some years past, owing either to the deficiency of the crops of oleaginous plants, caused by drought or some other malignant influence, or to the great consumption of oil for machinery, oil has been rising in price annually; so much so, that superfine olive oil, that is, what is used for culinary purposes, which, ten years ago was sold for 7*d.* for a pound of 12 oz. now costs 9*d.*; and oil for burning, which cost 3½*d.*, now costs 6*d.*

From what has been said, you will see how useful this discovery may prove. I do not mean to say that I recommend the planting of the negundo for the expression of oil, to the injury of other branches of agriculture; but I only mean that in Lombardy, where so many of these trees grow already (and, I think, it is the same with you) that they appear more like indigenous than exotic plants, instead of allowing the seed (and they are very prolific with us) to run to waste as formerly, it might be gathered, and thus a new branch opened for industry. Allowing the utility of the negundo, instead of making plantations of less useful trees, such as the horsechesnut, in situations

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* [In reducing the Venetian to English money, we have had recourse to Murray's *Hand-Book for Travellers on the Continent;* by far the most useful work of the kind that has ever been published.]

suitable for the cultivation of the negundo, could not this tree be planted, which, besides being ornamental, is useful also for its timber.

[The negundo, in Britain, is not a very hardy nor a very long-lived tree; and as the sexes are on different plants, a plantation of seedlings must necessarily contain a number of males, which, of course, yield no seeds, and yet are necessary to the maturity of the seeds of the females. Hence, we would suggest a trial to be made of the seeds of the common sycamore. *A*cer Pseudo-*Pl*átanus, which produces seeds in immense quantities in every part of the country, and in every year.]

You will have already seen the first part of a monograph of the genus *M*òrus, by the excellent Dr. Giuseppe Moretti, professor of botany in the university of Pavia, in which there is a notice of your *Arboretum et Fruticetum.* If you have not already seen it, write to me immediately, that I may send it to you by some means; and I shall take that opportunity of giving you some information about the increased cultivation of silk worms, according to experiments made by my brother Louis. — *Giuseppe Manetti.*

Remedy for the woolly Aphis. — I have just had a letter from my brother, in which he tells me that a shepherd, of the seven communes of the Rhetian Alps, has discovered a remedy for the A*p*his lanígera, which infests apple trees. It is the most simple that can be imagined, and consists in attaching to the central branch of the infested tree a ring or girdle of sheep's dung. By the next morning, not an aphis is to be seen on the tree. It appears, that the smell of the sheep's dung is so insupportable to these insects, that they retire beyond reach of its odour. — *G. Manetti.*

INDIA.

The Fountain at Barrackpoor, which you recommend for imitation in Kensington Gardens, was erected by the Marquess of Hastings in 1817. The steam-engine was of 18-horse power, and had belonged to an old steam-boat. It raised the water more than 100 ft. high, and was greatly admired; but it was destroyed by Lord William Bentinck, on the principle of economy.— *J. Cooper, Engineer in India for several years.*

Art. III. *Domestic Notices.*

ENGLAND.

Epsom Nursery, Nov. 30. 1841. — *I*lex latifòlia is here perfectly hardy, and some of the plants have leaves 9 in. long. *Q*uércus glàbra, *V*ibúrnum japónicum, and various other rare and beautiful shrubs, make a fine appearance, and there is a variety of Mahòn*ia* fasciculàris which is said to be quite hardy. — *T. C.*

Pine-apples at Branspeth Castle. — I cut a few days ago the two fruits from the two suckers on the same plant that you seemed to admire (rough from the knife), the one weighing 6 lb. 13 oz., the other 6 lb. 9 oz. I showed them, with others, at the Newcastle Horticultural Meeting on Friday last, as a rude specimen of pine-growing, and I was awarded the first and second prizes. The plant which bore these two fruits this year, bore a fine fruit in September last year. I have practised this mode of growing pines from suckers, with good success, for many years. I have had Enville, 6 lb. 4 oz.; Providence, larger, and frequently twins. Should I have a vigorous plant, I am not content with the production of one fruit, provided I have means to my wishes. If you will look into your Magazine for July, 1830, you will find that a pupil of mine had produced in four successive years, from the same plant, four fruits, the sum total of the weight of which was 20 lb. 6 oz. — *G. Dale. Branspeth Castle Gardens, October* 17. 1841.

The Sweeney Nonpareil Apple, grown on a south wall, at Sweeney Hall,

near Oswestry, the seat of Thomas N. Parker, Esq., has this season attained the size of 11¼ in. in circumference. — *T. N. P. Sweeney Hall, Oct.* 29. 1841.

Artificial Ice for skaiting on. — This very singular invention is now exhibiting in a room in Jenkins's Nursery, New Road, where it is every day covered with skaiters, and is found to answer for that purpose as well as natural ice, which it closely resembles in appearance. This artificial ice is totally unaffected by ordinary heat, and may be laid down in a stove or a conservatory, with the same success as in the free air or under an open shed. Henceforth, we may anticipate a skaiting-house being an appendage to a first-rate mansion, almost as essential as a riding-house. — *Cond.*

The Peasantry of France and Northumberland. — "The great body of the peasantry in France have no rents to pay, no landlords but themselves. Compare the well-fed, well-clad, and comfortably-housed cultivators of the Bocage, with the *bondsmen* of your boasted agricultural Northumberland, herded together in the filthy bothies of the monopolisers of a thousand acres, with all their breadth of corn; where you may travel mile after mile and never see a cottage, and where the labourers have not even the idea of a home, but are stabled like the cattle; and then estimate the worth of a political and agricultural system which has no connexion with the welfare of the population." (*Morn. Chron.*, Nov. 8. 1841.) In the pamphlet entitled *The Peasantry of the Border*, by W. S. Gilly, D.D., and reviewed in p. 31., the author observes: "Suppose 70*l.* to be the average cost of a substantial good cottage, will the comfort of a faithful dependant and his family be heavily bought at this price? Why is the happiness of rural life to be nothing more than a romance, a poetical image, when it is in the power of so many land-proprietors to realise all that is imagined of smiling gardens, and snug habitations, and contented cottagers? The true beauty of a landscape, as Gilpin has said in his *Forest Scenery*, consists not 'in the mere mixture of colours and forms, but in the picture of human happiness presented to our imagination and affections in visible and unequivocal signs of comfort.'

"Oh, when will the law of love be felt in its supremacy? When will it be felt that there is no security for property like the affection of those whose labour is our wealth?

"Oftentimes when I see ornamental lodges, and pretty dairies, like fairy bowers, in a cool and sequestered corner of the park — and gardeners' houses, decorated without, and full of accommodation within — and dog-kennels, which may be called canine palaces — and stables, like sacred temples, so totally free from every pollution that you would suppose it profanation to suffer a particle of filth to remain one moment on the pavement — often when I see these things do I indulge the ardent hope that the time will come, when the peasantry on a property will have as much taste and forethought expended on them, and that snug cots and happy-looking inmates will be considered the chief ornaments of an estate." (*The Peasantry, &c.*, p. 30.)

SCOTLAND.

The Gardens at Williamfield, the Residence of Mrs. Fairlie. — Being at Williamfield, near Symington, a few weeks ago, we observed some very fine specimens of tropical plants, bearing fruit abundantly in the stoves, which reflect much credit on the proprietress, Mrs. Fairlie. The laudable endeavours of this lady to elevate the taste for horticulture, by leading the way in one of its highest departments (the cultivation of new tropical fruits) is worthy of the most honourable mention. The gardener, Mr. Alexander Malcolm, is not without his share of merit also, for plants could not have been brought to such a state of perfection without much care and attention on his part.

The banana, or plantain (Mùsa paradisìaca), has long been known in this country. It grows to the height of 20 ft., and bears its fruit at the extremity of the stem. Its inconvenient height has prevented it from being cultivated to

any extent, although it is frequently to be met with. It is considered one of the most useful fruits in the world, and is cultivated in all those countries to which it is found adapted. A very desirable variety or species of Mùs*a* was introduced from the Mauritius into England a few years ago, and was named Mùs*a* Cavendíshii, the specific name being bestowed on it in honour of that munificent encourager of horticulture, the Duke of Devonshire. From its dwarfish mode of growth, it was expected that it would soon come into general cultivation, and the anticipations then formed are being more and more fully realised every day. The following are the dimensions and details of the largest plant at present bearing fruit at Williamfield:—It grows in a large pot; the circumference of the stem at 1 ft. from the ground is 2 ft.; from the surface of the ground to the commencement of the spike of fruit is 4 ft; the spike itself is 4 ft. long; but, in place of growing erect, it forms a curve, and the weight of the fruit causes the spike to hang down. The height of the plant itself is about 5 ft.: 2 ft. only of the spike are covered with fruit; the remainder is occupied with abortive produce, and towards the tip with red-coloured imbricated leaves, called spathes in botanical language. The large and superb leaves, the nodding spike loaded with fruit and tipped with red, give the plant an interesting and peculiar appearance. There are nine two-rowed branches of fruit, amounting to 136 in all. The weight of these may be about 40 lb.; as the produce of another plant which fruited lately was 125, weighing 35 lb. The fruit is triangular, yellow when ripe, soft, and of a peculiarly luscious flavour, superior to that of the old banana. Indeed, the Mùs*a* Cavendíshii is much more calculated for general cultivation. The proprietress has lately erected a house for the cultivation of this species, and there are in it at present ten or twelve plants.

Cárica Papàya, or the papaw tree, is a native of India and South America. Here is a fine plant of this species, about 20 ft. high. It is nine or ten years old; but having reached the glass of the house where it grew, it was cut down at 6 ft. from the ground about 1836. It has fruited three times since. There are this year sixteen fruit on it, of a melon shape, each weighing 1½ lb., or thereabouts. The papaw tree is one of those plants which have male flowers growing on one plant, and female flowers upon another. The female plant alone was at Williamfield. It often flowered, and promised to fruit; but the fruit never swelled, or approached maturity. About 1836 some seeds were received from India. These have fortunately produced several male plants, one of which came into flower in 1839. Being placed in close proximity to the female, so that the flowers might intermingle, the female produced ripe fruit that year for the first time, and has continued to do so ever since. There seem to be two species of the papaw at Williamfield: in one the flowers are sessile in the axils of the leaves, while in the other they are produced in axillary panicles or clusters.

The fruit of the papaw is eaten with pepper and sugar, and when half-grown, if properly pickled, is little inferior to the pickled mango of the East Indies. The acrid milky juice of this plant, when rubbed over the flesh of newly killed animals, is said to render it very tender in a short time; and even if the meat be hung up on the tree for a certain period, the same effect will be produced.

There are here also several fine plants of the coffee tree, raised from seed ripened at Williamfield. They are very handsome plants, clothed with branches regularly from the root upwards. One plant is 5½ ft. high, has fruited for the first time this season, and has 168 fruit on it. The lower or older branches alone bear fruit.

There is also a fine plant of *Bambùsa* arundinàcea, or bamboo cane of the East Indies, which is interesting from the great rapidity of its growth, one of its branches having grown 13 ft. in forty days, or 4 in. a day.

Many more plants might be particularised, such as the passion-flower (Passiflòra edùlis), one plant of which produces 800 fruit each season. There is also a fine plant of the Indian-rubber tree, 20 ft. high. The camellias in the

conservatory are justly celebrated. They were brought down from London at a vast expense when Mrs. Fairlie took up her residence at Williamfield, and have been her companions ever since. They are very large and healthy, and produce hundreds of blossoms yearly. (*Ayr Observer*, Nov. 23. 1841.)

Art. IV. *Retrospective Criticism.*

Different Modes of Glazing Hot-houses, &c. — In our Vol. for 1841, p. 606., last paragraph, second and third lines, for "4¾ in. by 3 in. deep", read "6½ in. by 3 in. deep"; and for "4 in. by 2½ in. deep", read "5½ in., by 2½ in. or 3 in. deep." Add, "Always glaze with the bent side downwards (as the glaziers term it), as by this means the glass lies more even, and comes closer in contact in the middle of the pane." For horticultural purposes generally, I think panes 6 in. by 3 in. the most suitable size. — *James Seymour. Frithsden Gardens, Nov.* 25. 1841.

The Suburban Horticulturist, and Suburban Gardener. — I have received your first Numbers of the *Suburban Horticulturist*, and beg to suggest to you the making such additions to your prospectus as shall render the work, when completed, as applicable to gardens in Australia as to those of England. The climate of that country differs from the climate of England. Your work will, therefore, in order to make it useful in that country, require to contain some information as to the difference in the mode of management, rendered necessary by an average increase of temperature of 12 or 15 degrees. Many fruits which in England require forcing there ripen as open standards. The orange, peach, nectarine, &c. The same, also, with shrubs and flowers, many beautiful kinds of which there flower in the open air which require protection in this country. The field culture of the vine, the Jordan almond, &c., is also of great importance. Australia, indeed, from its fine climate, would appear to be the finest country in the world for an extensive and beautifu lgarden.

The immense benefit you would confer upon that country by taking into your plan the formation and management of gardens there, will occur to you when you consider that the proprietors of land are in a great measure debarred the pleasure of social intercourse, by being distributed at great distances from each other. From the pastoral nature of the country, large tracts of land are required to pasture their flocks; this necessarily scatters them at great distances from each other. What a source, then, of happiness and enjoyment must an extensive garden be to a gentleman and his family, under these circumstances!

From the nature of his pursuits, the country gentleman there has but two busy periods in the year, viz. the lambing and the clipping season. With ample time, therefore, to cultivate a garden, and a beautiful climate to bring every thing to perfection, he wants only such instruction and information as will enable him to form and cultivate it. He has this additional inducement, that being in general situated at a distance from towns, or only near to such as have been newly built, he has no market to which he can apply for his fruits and vegetables, and must therefore either raise his own or go without. Your work is capable of being made extremely beneficial in this respect to your countrymen in Australia; and the amount of experience, talent, and industry which your other works prove you are capable of bringing to bear upon it, renders it to the last degree desirable that you should undertake it.

Should you do so, the first subject that would require to be noticed is, how a person in that country is to set about forming, enclosing, and laying out his garden, shrubbery, &c.; for what you have already said on this subject in the *Suburban Gardener* will scarcely bear on his case. Under this head would come the choice of a site, aspect, &c., which will be different from what would be requisite in England; for instance, shade might there be desirable, or even necessary, for the garden, certainly for most of the walks.

Then, for enclosing. It would perhaps be the most expeditious and the best way, for a gentleman situated any distance from Sydney (the only place where there is at present a botanical or horticultural garden established), to enclose the space fixed on for his garden with a post and rail, and a sheep net, such as is used for folding sheep. This would form a cheap and quick protection from cattle, &c., within which he could commence sowing his seeds, pips, stones, &c., for raising the stocks for his fruit trees, &c.; correct lists of which, together with lists of seeds for raising shrubs and flowers applicable to that climate, would be requisite for the uninitiated, also their culture and management. He could also be raising his culinary vegetables, as well as the materials for permanent hedges, round his lawn and shrubberies, and round the kitchen-garden. In two or three years the materials for forming these hedges would be ready to plant out, and thus his garden would have an effectual boundary, and be ready to receive in their proper places the trees when grafted ; the stocks of which he has been bringing forward. The cuttings for these grafts he would, of course, have to procure from Sydney, when his stocks were ready ; and they could be sent to him without danger, packed in dry earth or sand.

After his hedge had stood a year or more, he could remove his first temporary fence of post and netting ; and by this time he should have felled and cut up a sufficient quantity of timber for forming his garden paling, or wall, 8 or 10 feet high. A brick wall being, of course, out of question in the country parts, at least for many years. This paling he ought, of course, to put up 15 or 20 feet inside of his garden hedge, to leave a place for an outside border, compost heaps, sheds, &c. ; this paling would all be finished by the time his wall trees required nailing to it, they having been headed down close to the graft, after planting them out.

His garden would thus be completed with wall or paling, and outside hedge, and he would have raised his trees from pips, stones, &c., not only in the most expeditious, but also in the most certain and economical, manner.

The foregoing is not given, except to show the kind of information and instruction that emigrants would require to teach them how first to form their gardens in Australia. The great amount of comfort and happiness which you would be the means of dispensing through that vast continent, will, I hope, induce you to take this matter into your consideration.

A gentleman with a square mile or two of land, with 200 or 300 acres of it cleared, though far away from any professional men, architects, gardeners, or builders, might, with the assistance of your two excellent works, so superintend his workmen, as to lay out, enclose, plant, and cultivate his gardens and grounds, shrubbery, &c., to afford him and his family an abundance of comforts, and a high degree of happiness, as well as setting an example and pattern to those who might afterwards settle near him ; and, by such means, a taste would be formed at the first rising of towns, which would remain in them for all time to come, and would soon be taken up by the cottagers and labourers.

It will doubtless occur to you that the knowledge of cultivating a garden will avail but little to an emigrant, unless he first knows how to set about forming it, and also stocking it with the necessary vegetables, fruits, shrubs, and flowers ; and if you imagine him without any garden previously enclosed, any seeds, &c., to put into it when enclosed, and from a week to a fortnight's journey from the only place at which any of these can be procured, you will then see the exact situations of ninety-nine out of every hundred emigrants in Australia. Now, what you yourself would do under these circumstances, in order to form a good garden for fruit, vegetables, and flowers, and in the shortest time possible, is precisely the advice that is needed by the Australian landowner.

I have got your very excellent work the *Suburban Gardener, or Villa Companion ;* and I feel certain that it will be of immense value to the people of

Australia, infinitely more so than it will be to England. Here, professional men, scientific gardeners, &c., can always be consulted ; there, no talent of the kind is available, and consequently any man who purchases 200 or 300 acres of ground must depend on his own unassisted efforts and natural taste in planning, laying out, and planting them. Again, in England, there are few parks and estates requiring laying out and planting; but, in Australia, every day sees fresh lands enclosed, and which are, doubtless, for want of artists, laid out and planted in a most barbarous style. Your *Suburban Gardener* is calculated to do great benefit in that country, in assisting the taste of emigrants.

But to return to the *Suburban Horticulturist.* Should you deem it advisable to treat in it of what might be done by emigrants in Australia, you will at once see the necessity of instructing them in the first formation of their gardens, and of raising their own trees, shrubs, flowers, &c., as it must be quite impossible for them to purchase all the trees, shrubs, &c., that would be required, at Sydney, and cart them for ten days, or, perhaps, three weeks, into the interior, exposed to the weather and other accidents ; but cuttings for grafts could be packed up in any quantity, and forwarded to them without injury.

There is in many parts of Australia a scarcity of water; should you think proper to give in your next edition of the *Suburban Gardener* some hints how tanks, &c., could be constructed, they would, I venture to say, be of great importance to that country, more particularly if they were accompanied by plans for filtering the surface water, and rendering it fit for culinary purposes, on a scale large enough for a farm; and sufficiently simple to be executed by a farmer and his labourers, the information would be still more valuable. I have seen, in your *Manual of Cottage-Gardening*, a suggestion to this effect, but it is not quite explicit enough to be generally understood; it mentions charcoal and sand as the means of effecting the filtration. Every farmer, I believe, has the means of making charcoal, and it is by no means a difficult process, yet there are scarcely any that know how to do it. It is so very useful an article, particularly in warm climates where it is an object to have as small a fire as possible while cooking, that it is to be regretted the manner of making it is not more generally known.

There is one other subject which, in your next edition of the *Suburban Gardener*, would, perhaps, add to it value as regards Australia ; that is, whether manure tanks, drains for water, and from water-closets, could not be formed of wood lined with Roman cement or pitch ; if so, the method of their construction. These, and similar questions will occur to you, if you feel desirous that the benefits of your book should be extended to that country. For many years to come the chief material for the construction of every part of farm buildings at a short distance from the chief towns must be wood. The carriage of a load of bricks and lime would cost ten times their value, if into the interior, where few roads are yet formed.

As you have frequently alluded to Australia in your works, I make no apology for offering these remarks; I feel an interest in that country, and I intend to visit it in another year, if possible. I will not take up more of your time, except to observe that the instructions which would be requisite in your *Suburban Horticulturist*, to suit it to the wants of emigrants in Australia, could either be embodied with the other matter in the progress of the work (that is, in case you should deem it worthy your notice) ; or a chapter or two might be added at its conclusion ; in which latter case, a few useful hints might also be added relative to the construction of dwellings with wood, except the fireplaces and chimneys, and the making of drains, tanks, &c., of the same material. —*H. J. Denny, Lieut. 6th Dragoons. New Bridge Barracks, Ireland, Feb.* 15. 1841.

Pinus palústris.—You state (p. 386.) that this species thrives admirably in the Bois de Boulogne without protection, but that it requires protection at Dropmore during severe winters. I assure you, the tree of this species here has been exposed every season for a number of years past, and was only

somewhat injured in the foliage after the winter of 1837–8, and again after the winter of 1840–1. At present the tree looks as well as ever.—*Philip Frost. Dropmore, Dec.* 8. 1841.

Art. V. *Queries and Answers.*

Mode of preserving Seeds for a Number of Years.— Having been engaged by the committee appointed by the British Association to investigate the growth and vitality of seeds, with the view of ascertaining their comparative longevity, to preserve and distribute seeds of at least one species of as many genera as can be obtained in sufficient quantities for the purpose of carrying on experiments to that effect in the garden of the Horticultural Society at Chiswick, and in the Botanic Gardens of Oxford and Cambridge, I feel anxious at the onset of taking advantage of the already known most effectual mode of preserving them free from the ravages of insects, &c., for a number of years, and for that purpose gladly take advantage of your pages as a ready means of obtaining information ; and there also beg to record the mode, at present in contemplation, of preserving them for the above experiments, trusting that it may induce some one or more of your readers, who may have had experience in this particular, to offer some observations on the same, which might lead to their better preservation.

It is proposed to preserve the seeds in porous earthen jars of various sizes (according to the quantity or bulk of each kind), in the form of common pickle jars, with the exception of there being, in addition to the opening in the top of a common jar, a smaller opening near to the bottom of the jar, with a rim projecting just far enough to admit of its being covered, as well as the top opening, with wire gauze, fine enough to exclude insects, and yet, at the same time, to admit a free circulation of air amongst the seeds. They are then to be stored on shelves in a dry cool room.—*W. H. Baxter. Botanic Garden, Oxford, Nov.* 1841.

Preventive against Snails on Wall Fruit.—In p. 574. of your volume for 1841, an amateur gardener complains of having his crops of nectarines injured by snails. If the various pests ascended the walls from the borders, the plan which you recommend is a surer remedy than either of the two suggested by the writer ; but I consider that was not the case, and that the injury was done by the Hèlix áspera; to be plain, I mean a kind of snails that carry their box on their backs, and lodge in holes in the wall, and behind the stems and foliage of the trees. The best remedy is to search for them; their hiding-places may be discovered by the slime they leave wherever they go. In the winter, a dozen or two may be found packed together behind the stem of a large tree, or in a hole in the wall. Thrushes destroy many of this kind of snail, by breaking their shells against stones or branches of trees. The snails in question are fonder of unripe apricots than nectarines; but there are two other large kinds of snails, without shells, which often attack the latter, the common grey, and one of an orange colour ; both are easily caught by frequenting the trees at night with a lighted candle.—*J. Wighton. Cossey Hall Gardens, Nov.* 13. 1841.

The Dwarf Oak of Australia.— The dwarf oak is a handsome prickly-leaved evergreen, making such a tall close hedge as not only to afford good shelter to the field, but defy either pig or bullock to break through, while it furnishes a good annual crop of pig-food in its acorns, besides a crop of that valuable article in dyeing, the gall-nut. The wonder is, that, from the above qualities, it has not been introduced into England, where it would soon change the whole winter aspect of the country, the hedgerows exhibiting throughout the year the bright green freshness of perpetual spring. (*Cunningham's Hints for Australian Emigrants.*) Can you inform me what plant is alluded to in the above extract?—*W. H. B. Botanic Garden, Oxford, Nov.* 1841.

On sending a copy of the extract to Mr. James Backhouse of York, who has recently returned from Australia, he sent us the following explanation: — "The dwarf oak" referred to in Cunningham's *Hints for Australian Emigrants* is certainly not an Australian plant. His description of the acorn clearly refers it to Quércus, a genus limited to the northern hemisphere. Probably he may mean Q. gramúntia, of the south of Europe; which, I think, is a low bushy species, with large acorns; and of which Acton, in the *Hortus Kewensis*, says, "foliis . . . spinoso-dentatis." Cunningham may intend his hint as a recommendation to emigrants to take out the seeds, on the presumption that they will thrive well in Australia, where the introduced Quércus Cérris thrives well. — *James Backhouse. York, Oct.* 23. 1841.

Chapman's Potatoes. — In answer to various enquiries respecting the substitute for early potatoes advertised for sale by Messrs. Chapman, we refer to the paragraph in p. 36. We know nothing more than what is there stated. — *Cond.*

Art. VI. *Obituary.*

David Don, Esq., Professor of Botany in King's College, and Librarian to the Linnæan Society, died Dec. 8., much regretted by his friends, and, indeed, by all who knew him. The urbanity of his manners, and his readiness to render assistance in the exercise of his duties as librarian, were felt and acknowledged by all who had occasion to consult the library under his care.

Since we sent the foregoing to press, we received the following from Mr. Don's early patron and friend, Dr. Neill, one of the kindest-hearted of men.

"*Professor David Don.* — We regret to have to announce the death of this distinguished naturalist, which took place at the Linnæan Society's apartments, Soho Square, London, on Wednesday the 8th of December. He was the second son of the late Mr. George Don, whom some of our readers will remember as the Curator of the Royal Botanic Garden, Leith Walk. About five and twenty years ago, Mr. David Don went to London, carrying with him an introduction to the celebrated Robert Brown. This gentleman soon perceived and duly appreciated the merits of the young Scotch botanist; and through his powerful recommendation he was successively appointed Keeper of the Lambertian Herbarium and Librarian to the Linnæan Society. In 1821 he accompanied an early friend on a visit to Paris, and thus formed acquaintance with some of the most eminent Continental naturalists, among whom were Humboldt, Cuvier, Kunth, and Delessert. Mr. Don's *Prodromus Floræ Nepalensis*, and various excellent papers in the *Linnæan Transactions*, having brought him prominently into notice in the botanical world, he was chosen Professor of Botany in King's College, Somerset House; and he may be said to have fallen a martyr to his zeal as a lecturer there, for he resolutely delayed till the end of the session an operation recommended by Sir Benjamin Brodie, by which his valuable life might have been saved. At the end of the session, it was found too late to operate."

The above appeared in the *Courant*, the sub-editor having got the particulars from me. Of course, a full and correct notice will appear soon; perhaps in your own pages. When I saw my lamented friend about the 22d of September, I reckoned on his surviving till about the new year, he looked so fresh and stout; but I believe he exerted himself while I was with him. His fortitude and resignation were admirable. — *P. N. Canon Mills, Dec.* 14. 1841.

Mr. Don's remains were interred in the Kensal Green Cemetery on December 15th, followed to the grave by Dr. Brown, Sir W. J. Hooker, Mr. Bentham, Mr. Bowman, his medical attendant, Mr. Anderson of the Chelsea Botanic Garden, and Mr. Smith of Kew.

THE

GARDENER'S MAGAZINE,

FEBRUARY, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the Conductor.

That part of our tour which embraces our route from London to Crosslee Cottage having been given in the *Gardener's Gazette* from the 31st of July to the 30th of October, and our intention being to make on Crosslee Cottage a separate article, we shall at once pass on to Glasgow, where we arrived on the 26th of July. Previously, however, we must make one remark on

The Buildings at the Railway Stations. — We have before (*Gardener's Magazine* for 1839, p. 436.) signified our admiration of the expression of purpose in the bridges and other buildings connected with the railways, and of the freedom from prejudice evinced by the engineers in deviating from established forms, when it became necessary for the purposes of strength or economy. What we now wish to remark is, that we think this expression of purpose, as it may be called, should have been more obvious on the station houses. For example, instead of having the name of the station painted, sometimes on one part of the structure, and sometimes on another, we would have it sculptured on a conspicuous part of the front, especially designed, and peculiarly characterised, for that purpose; and we would have the name itself in sunk or in raised letters, coloured, if it should be thought necessary, but, at all events, formed either by sinking or in relief.

At most of the railroad stations there are large boards, on which are painted regulations, or other information relative to matters connected with the railroad; and as these regulations may be supposed to be occasionally altered, we would still continue to have them painted on boards; but we would form panels on raised surfaces in which these boards should be fixed, in the same way as a picture is a frame. The panels should be made sufficiently large to admit of a larger board than might be

wanted at the time the station house was built, in order to provide room for the additional regulations that may be supposed to become necessary as the traffic on the railway increases; but the board, whether covered with lines or not, should always be sufficiently large to fill the whole of the panel.

We would carry this principle of rendering writing architectural to turnpike houses and gates, and to the signs and names of inns, public-houses, and shops; to names on the gates of manufactories; to those on private doors; to the names of gentlemen's seats, which, we think, ought to be sculptured on sunk or raised panels or shields on their entrance lodges or gates; to the names of cottages and villages; and, in short, to every architectural structure where a name was required, or would be useful.

Had the art of writing been coeval with that of architecture, there is little doubt that writing would have been introduced on buildings in an architectural manner, as ornaments of leaves and flowers have been; but since this could not be done by ancient architects, it is for the modern artist to supply the defect, and introduce writing on edifices artistically, and, in doing so, to produce something superior to the mode of putting the hieroglyphics on the Egyptian tombs or obelisks, or the letters on the jambs of the shop-doors in Pompeii, or over the doors and windows of shops in modern towns.

Glasgow we found greatly increased in extent, even since 1831, when we last saw it, and improved also in its street architecture, which is always a gratifying proof that taste is spreading among the mass of society. The number of manufactories is greatly increased, and such a forest of engine chimneys has been erected in and around the city in consequence of the great increase in the iron manufacture within the last seven years, that the atmosphere, within a circle of two or three miles in diameter, is constantly charged with coal-smoke, in consequence of which trees and shrubs of even the commonest kinds are rarely seen in a thriving state. This cannot be owing to the earthy part of the smoke resting on the leaves, because there is scarcely a day passes without rain to wash it off. The stems are all uniformly black, because on the same surface of bark on these the soot has fallen summer and winter for several years; but the leaves, though thin, ragged, and sickly, are not so black as those of the trees in the London squares. Such, at least, was the impression made on us; heightened, no doubt, by the answer always given when asking why such and such trees, and particularly the Irish yew, the holly, the ivy, &c., were not planted in the different cemeteries now laying out, that these and other evergreens would not grow on account of the smoke. There are three or four large cemeteries, but being pressed for time, and the weather being very unfavourable, we only entered two of them; one was the

Sight Hill cemetery, which is being laid out in the pleasure-ground style, with handsome entrance gates, lodges, and chapels, all in a forward state. The other cemetery which we saw is the

Necropolis. — This is situated adjoining the ancient cathedral and its extensive burying-ground, which occupies a gentle declivity on one side of a valley, while the Necropolis, which may be considered as a continuation of this burying-ground, covers a rather steep rocky hill, sprinkled with trees and modern tombstones, on the other. The impression made by the first view of this hill, studded with trees and tombs and scars of solid rock, when looking from the town, with the cathedral in the foreground, is grand and melancholy; and the effect is heightened as we pass along an elevated road towards a bridge which crosses the valley at the point where the Necropolis commences, and is, as it were, joined to the ancient churchyard, so as to unite the tombs of many generations with those of generations yet unborn. This circumstance is finely noticed in the following inscription on the bridge: —

THIS BRIDGE
WAS ERECTED BY
THE MERCHANTS' HOUSE OF GLASGOW,
TO AFFORD A PROPER ENTRANCE TO THIS NEW CEMETERY,
COMBINING CONVENIENT ACCESS TO THE GROUNDS,
WITH SUITABLE DECORATION TO THE VENERABLE CATHEDRAL
AND THE SURROUNDING SCENERY;
TO UNITE
THE TOMBS OF MANY GENERATIONS WHO HAVE GONE BEFORE,
WITH THE RESTING-PLACES DESTINED FOR GENERATIONS YET UNBORN;
WHERE THE ASHES OF ALL SHALL REPOSE
UNTIL
THE RESURRECTION OF THE JUST;
WHEN THAT WHICH IS SOWN A NATURAL BODY
SHALL BE RAISED A SPIRITUAL BODY,—
WHEN THIS CORRUPTIBLE MUST PUT ON INCORRUPTION,—
WHEN THIS MORTAL MUST PUT ON IMMORTALITY,—
WHEN DEATH IS SWALLOWED UP IN VICTORY.
A.D. MDCCCXXXIII.

"Blessed is the Man who trusteth in God, and whose hope the LORD is."*

The road to this bridge is straight, and on a raised mound nearly level, so as to be considerably above the lower part of the ancient churchyard, and with the hill of the Necropolis

* This, and the inscription over the gate, were kindly procured for us by David Gibson, Esq., the active, intelligent, and enthusiastic secretary of the Glasgow Horticultural Society.

rising boldly in front; so that the spectator, finding himself in a commanding position, and looking down on the one cemetery, and up towards the other, has his mind filled with the subject to the exclusion of every other idea, and feels, in short, the effect on his mind to be sublime.

Before entering the cemetery gates, the first thing which struck us as remarkable was the totally different character from what they are in every other British cemetery that we have ever seen, of the tombs and gravestones, even at a distance: there appears to be no mean, trivial, or vulgar forms among them; the trees among which they are scattered being what may be considered large rather than small, and, at all events, having nothing of the character of young trees, the appearance recalled to mind some of the descriptions of the cemeteries of antiquity.

The Necropolis is entered by a magnificent archway and gates, over which is the following inscription: —

THE NECROPOLIS,
OR
ORNAMENTED PUBLIC CEMETERY,
WAS CONSTRUCTED BY
THE MERCHANTS' HOUSE OF GLASGOW,
IN THEIR PROPERTY,
TO SUPPLY THE ACCOMMODATION REQUIRED
BY A RAPIDLY INCREASING POPULATION,
AND, BY EMBELLISHING THE PLACE OF SEPULTURE,
TO INVEST WITH MORE SOOTHING ASSOCIATIONS
THAT AFFECTIONATE RECOLLECTION OF THE DEPARTED
WHICH IS CHERISHED BY THOSE WHO SURVIVE.
A.D. MDCCCXXXIII.

"E'en from the tomb the voice of Nature cries."

A carriage road commences at this portal, and gradually ascends the hill in a winding direction, so as to exhibit every part of the cemetery to a stranger, without obliging him to quit his carriage. Having reached the summit, we may either return by the same road and gate, or by another road which leads to a gate on a different side of the hill. The principle on which the line of road is traced out is determined by the character of the surface and the end in view, and is therefore unexceptionable. The trees are scattered over the ground at irregular distances, in the manner of a natural grove, but here and there they are more or less grouped, so as to produce occasional scenes of darkness and gloom. There are but few evergreens, but these, we were informed, would not grow; even some old Scotch pines had a scathed appearance. The natural

surface shows rock protruding through it in many places, and rock appears almost at every turn of the road, so that we never for a moment forget that every tombstone has a solid foundation. In consequence of this, every one of the monuments, large and small, as far as we could observe, is perfectly erect; and not like great numbers of those in Père la Chaise and Kensal Green, leaning to one side; and, consequently, when composed of several pieces, with the joints opening to admit the rain and frost, and insure speedy ruin. The design, also, of the monuments is of a very superior kind, there being scarcely one in the whole cemetery of those chair-back-like forms so common in all churchyards; and which, having no base or plinth below to support what is above, appear to have been forced into soft ground, instead of being built up from a solid foundation. All the monuments in the Glasgow cemetery convey the dignified idea of being built, and have not the mean appearance of being thrust in like stakes, or laid down like pavement. Even the lettering is, in many cases, cut in the stone, or raised in metallic forms; modes which, as we have above observed, ought never to be neglected when an architectural character is to be maintained. The family burying-places are bounded in general by low architectural parapets, and not, as is frequently the case, with high iron railings; which seem to us to derogate from the sacredness of the scene, by supposing it possible that the cemetery would be visited by persons incapable of conducting themselves properly.

Many of the monuments are magnificent combinations of architecture and sculpture; others are simple and grand forms, such as pyramids, obelisks, columns, arches, &c.; but perhaps the most instructive of these architectural memorials are those of the commonest kind, which may be considered analogous to common gravestones. These are mostly pedestals of different descriptions, varied in their proportions, magnitude, and decorations, so that no two monuments of this class, or indeed of any other, can be found alike. The greater number of the monuments, both great and small, are so placed with reference to the grave as not to give the idea of preventing the mortal remains from mixing with the earth. This, in our opinion, indicates the true cosmopolitan spirit of interment. Let there be monuments, as durable as rock and architecture can make them, to the mind and character of the deceased; but let not the mortal remains be prevented from returning to the elements from which it originally sprung. Such are our sentiments: but we have also another sentiment which we hold at the same time, viz., that those who think otherwise should have their wishes gratified. Hence, in this cemetery, while we approve of most of the coffins being interred in the free soil, yet we also approve of

some which are deposited in horizontal excavations made in the face of the perpendicular rock.

We observe in this cemetery, that the German custom of planting flowers over the graves is adopted in various instances; the plot over the grave being generally surrounded with kerb-stones, which form a proper architectural separation between the general surface of grass and the dug ground. In some cases, where the family burying-ground is a square of 15 or 20 feet, these little flower-gardens are planted with roses and other shrubs, and if they were kept free from weeds, they might prove pleasing ornaments: but it is always painful to see anything like neglect in a burying-ground, and therefore we think another Continental custom should be adopted (*Gard. Mag.* for 1841, p. 291.), of putting such gardens under the care of the curator of the cemetery; at least so far, as that, when the family to whom the tomb and garden belong neglect to keep it in order, this should be done by the curator at their expense.

One great defect in all the cemeteries that we have ever seen, and to which the Necropolis does not form an exception, is the coarseness of the grass. Where the surface is rough and rocky, smooth short grass can only be obtained by frequent and careful clipping, or by eating with sheep. The former might be accomplished by infirm persons of both sexes; letting the surface out in portions at so much for the season, and teaching the contracting parties that, by never allowing the leaves of the grass to grow more than half an inch or an inch in length, they would so weaken the roots as greatly to reduce their labour. If the mode of grazing by sheep were adopted, a neat wire fence would require to be placed round each of the flower-gardens; but that would be rather ornamental than otherwise. In cemeteries on tolerably even ground, if newly made graves were always finished level with the adjoining surface, as in some of the Edinburgh and Leith burial-grounds, and in several English ones (*Gard. Mag.* for 1841, p. 590.), there would be no difficulty in keeping the grass short and smooth with the scythe. Next to the grass, the walks and roads require attention, and those of the Necropolis have the common fault of deep, irregular, raw edgings, in which the idea of the spade-work necessary to produce this rawness continually obtrudes itself, and destroys the idea of completeness and repose.

Much of beauty and character might be created in churchyards and cemeteries, if curators could be found who had some knowledge of gardening, and especially of trees and shrubs. We could wish that it were considered essential to have a gardener as a curator: but this alone would not be sufficient; it is necessary that the public should know what a churchyard or

a cemetery is capable of being made, in order to stimulate the curator to exertion, and to reward him by praise when he has done his duty with taste and spirit.

(*To be continued.*)

Art. II. *On the Chemical Statics of Organised Beings.* By M. Dumas.

(*Continued from* p. 11.)

III. Let a seed be thrown into the earth, and be left to germinate and develope itself; let the new plant be watched until it has borne flowers and seeds in its turn, and we shall see, by suitable analyses, that the primitive seed, in producing the new being, has fixed carbon, hydrogen, oxygen, azote, and ashes.

Carbon. — The carbon originates essentially in carbonic acid, whether it be borrowed from the carbonic acid of the air, or proceed from that other portion of carbonic acid which the spontaneous decomposition of manures continually gives out in contact with the roots.

But it is from the air especially that plants most frequently derive their carbon. How could it be otherwise, when we see the enormous quantity of carbon which aged trees, for example, have appropriated to themselves, and yet the very limited space within which their roots can extend? Certainly, when a hundred years ago the acorn germinated, which has produced the oak that we now admire, the soil on which it fell did not contain the millionth part of the carbon that the oak itself now contains. It is the carbonic acid of the air which has supplied the rest, that is to say, nearly the whole.

But what can be clearer and more conclusive than the experiment of M. Boussingault, in which peas, sown in sand, watered with distilled water, and having no aliment but air, have found in that air all the carbon necessary for developement, flowering, and fructification?

All plants fix carbon, all borrow it from carbonic acid; whether this be taken directly from the air by the leaves, whether the roots imbibe within the ground the rain water impregnated with carbonic acid, or whether the manures, whilst decomposing in the soil, supply carbonic acid, which the roots also take possession of to transmit it to the leaves.

All these results may be proved without difficulty. M. Boussingault observed that vine leaves which were enclosed in a globe took all the carbonic acid from the air directed across the vessel, however rapid the current. M. Boucherie

also observed enormous quantities of carbonic acid escape from the divided trunk of trees in full sap, evidently drawn by the roots from the soil.

But if the roots imbibe this carbonic acid within the earth, if this passes into the stalk and thence into the leaves, it ends by being exhaled into the atmosphere, without alteration, when no new force intervenes.

Such is the case with plants vegetating in the shade or at night. The carbonic acid of the earth filters through their tissues, and diffuses itself in the air. We say that plants produce carbonic acid during the night; we should say, in such a case, that plants transmit the carbonic acid borrowed from the soil.

But let this carbonic acid, proceeding from the soil or taken from the atmosphere, come into contact with the leaves or the green parts, and let the solar light moreover intervene, then the scene all at once changes.

The carbonic acid disappears; bubbles of free oxygen arise on all the parts of the leaf, and the carbon fixes itself in the tissues of the plant.

It is a circumstance well worthy of interest, that these green parts of plants, the only ones which up to this time manifest this admirable phenomenon of the decomposition of carbonic acid, are also endowed with another property not less peculiar, or less mysterious.

In fact, if their image were to be transferred into the apparatus of M. Daguerre, these green parts are not found to be reproduced there; as if all the chemical rays, essential to the Daguerrian phenomena, had disappeared in the leaf, absorbed and retained by it.

The chemical rays of light disappear, therefore, entirely in the green parts of plants; an extraordinary absorption doubtless, but which explains without difficulty the enormous expense of chemical force necessary for the decomposition of a body so stable as carbonic acid.

What, moreover, is the function of this fixed carbon in the plant? for what is it destined? For the greater part, without doubt, it combines with water or with its elements, thus giving birth to matters of the highest importance for the vegetable.

If twelve molecules of carbonic acid are decomposed and abandon their oxygen, the result will be twelve molecules of carbon; which, with ten molecules of water, may constitute either the cellular tissue of plants, or their ligneous tissue, or the starch and the dextrine which are produced from them.

Thus, in any plant whatever, nearly the entire mass of the structure (charpente), formed as it is of cellular tissue, of ligneous tissue, of starch, or of gummy matters, will be repre-

sented by twelve molecules of carbon united to ten molecules of water.

The ligneous part which is insoluble in water, the starch, which gelatinises (l'amidon, qui fait empois) in boiling water, and the dextrine which dissolves so easily in water cold or hot, constitute therefore, as M. Payen has so well proved, three bodies possessing exactly the same composition, but diversified by a different molecular arrangement.

Thus, with the same elements, in the same proportions, vegetable nature produces the insoluble walls of the cells of cellular tissue and of the vessels, or the starch which she accumulates as nourishment around buds and embryos, or the soluble dextrine which the sap can convey from one place to another for the wants of the plant.

How admirable is this fecundity, which out of the same body can make three different ones, and which allows of their being changed one into the other, with the slightest expense of force, every time occasion requires it!

It is also by means of carbon united with water, that the saccharine matters so frequently deposited in the organs of plants for peculiar purposes, which we shall shortly mention, are produced. Twelve molecules of carbon and eleven molecules of water form the cane sugar. Twelve molecules of carbon and fifteen molecules of water make the sugar of the grape.

These ligneous, amylaceous, gummy, and saccharine matters, which carbon, taken in its nascent state, can produce by uniting with water, play so large a part in the life of plants, that, when they are taken into consideration, it is no longer difficult to understand the important part that the decomposition of carbonic acid performs in plants.

Hydrogen. — In the same manner that plants decompose carbonic acid for the appropriation of its carbon, and in order to form together with it all the neutral bodies which compose nearly their entire mass; in the same way, and for certain products which they form in less abundance, plants decompose water and fix its hydrogen. This appears clearly from M. Boussingault's experiments on the vegetation of peas in closed vessels. It is still more evident from the production of fat or volatile oils so frequent in certain parts of plants, and always so rich in hydrogen. This can only come from water, for the plant receives no other hydrogenated product than the water itself.

These hydrogenated bodies, to which the fixation of the hydrogen borrowed from the water gives birth, are employed by plants for accessory uses. They form, indeed, the volatile oils which serve for defence against the ravages of insects; fat oils or fats, which surround the seed, and which serve to develope heat

by oxidation (en se brûlent) at the moment of germination; waxes with which leaves and fruits are covered so as to become impermeable to water.

But all these uses constitute some accidents only in the life of plants; thus the hydrogenated products are much less necessary, much less common, in the vegetable kingdom, than the neutral products formed of carbon and water.

Azote. — During its life, every plant fixes azote, whether it borrows the azote from the atmosphere, or takes it from the manure. In either case it is probable that the azote enters the plant, and acts its part there only under the form of ammonia or of nitric acid.

M. Boussingault's experiments have proved that certain plants, such as Jerusalem artichokes, borrow a great quantity of azote from the air; that others, such as wheat, are, on the contrary, obliged to derive all theirs from manure: a valuable distinction for agriculture; for it is evident that all cultivation should begin by producing vegetables which assimilate azote from air, to rear by their aid the cattle which will furnish manure, and employ this latter for the cultivation of certain plants which can take azote from the manures only.

One of the most interesting problems of agriculture consists, then, in the art of procuring azote at a cheap rate. As for carbon, no trouble need be taken about it; nature has provided for it; the air and rain water suffice for it: but the azote of the air, that which the water dissolves and brings with it, the ammoniacal salts which rain water itself contains, are not always sufficient. With regard to most plants the cultivation of which is important, their roots should also be surrounded with azotated manure, a permanent source of ammonia or of nitric acid, which the plant appropriates as they are produced. This, as we know, is one of the great expenses of agriculture, one of its great obstacles, for it possesses only the manure which is of its own production. But chemistry is so far advanced in this respect, that the problem of the production of a purely chemical azotated manure cannot be long in being resolved.

M. Schattenman, the skilful director of the manufactories of Bouxvilliers in Alsace, M. Boussingault, and M. Liebig have turned their attention to the functions of ammonia in azotated manures. Recent trials show that the nitric acid of the nitrates also merit particular attention.

But for what purpose is this azote, of which plants seem to have such an imperious want? M. Payen's researches partly teach us; for they have proved that all the organs of the plant, without exception, begin by being formed of an azotated matter analogous to fibrine, with which at a later period are associated the cellular tissue, the ligneous tissue, and the amylaceous tissue

itself. This azotated matter, the real origin of all the parts of the plant, is never destroyed; it is always to be found, however abundant may be the non-azotated matter which has been interposed between its particles.

This azote, fixed by plants, serves, therefore, to produce a concrete fibrinous substance, which constitutes the rudiment of all the organs of the vegetable.

It also serves to produce the liquid albumen which the coagulable juices of all plants contain; and the caseum, so often confounded with albumen, but so easy to recognise in many plants.

Fibrin, albumen, and caseum exist, then, in plants. These three products, identical in their composition, as M. Vogel has long since proved, offer a singular analogy with the ligneous matters, the amidon, and the dextrine.

Indeed, fibrin is, like ligneous matter, insoluble; albumen, like starch, coagulates by heat; caseum, like dextrine, is soluble.

These azotated matters, moreover, are neutral, as well as the three parallel non-azotated matters; and we shall see that by their abundance in the animal kingdom they act the same part that these latter exhibited to us in the vegetable kingdom.

Besides, in like manner as it suffices for the formation of non-azotated neutral matters, to unite carbon with water or with its elements, so, also, for the formation of these azotated neutral matters, it suffices to unite carbon and ammonium with the elements of water; forty-eight molecules of carbon, six of ammonium, and seventeen of water, constitute, or may constitute, fibrin, albumen, and caseum.

Thus, in both cases, reduced bodies, carbon or ammonium, and water, suffice for the formation of the matters which we are considering, and their production enters quite naturally into the circle of reactions, which vegetable nature seems especially adapted to produce.

The function of azote in plants is therefore worthy of the most serious attention, since it is this which serves to form the fibrin which is found as the rudiment in all the organs; since it is this which serves for the production of the albumen and caseum, so largely diffused in so many plants, and which animals assimilate or modify according to the exigencies of their own nature.

It is in plants, then, that the true laboratory of organic chemistry resides. Thus, carbon, hydrogen, ammonium, and water are the principles which plants elaborate: ligneous matter, starch, gums, and sugars on the one part, fibrin, albumen, caseum, and gluten on the other, are, then, the fundamental products of the two kingdoms; products formed in plants, and in plants alone, and transferred by digestion into animals.

Ashes. — An immense quantity of water passes through the vegetable during the period of its existence. This water evaporates at the surface of the leaves, and necessarily leaves, as residue, in the plant the salts which it contained in solution. These salts compose the ashes, products evidently borrowed from the earth, to which, after their death, vegetables give it back again.

As to the form in which these mineral products deposit themselves in the vegetable tissue, nothing can be more variable. We may remark, however, that among the products of this nature, one of the most frequent and most abundant is that pectinate of lime discovered by M. Jacquelain in the ligneous tissue of most plants.

IV. If, in the dark, plants act as simple filters which water and gases pass through; if, under the influence of solar light, they act as reducing apparatus which decompose water, carbonic acid, and oxide of ammonium, there are certain epochs and certain organs in which the plant assumes another, and altogether opposite, part.

Thus, if an embryo is to be made to germinate, a bud to be unfolded, a flower to be fecundated, the plant which absorbed the solar heat, which decomposed carbonic acid and water, all at once changes its course. It burns carbon and hydrogen; it produces heat, that is to say, it takes to itself the principal characters of animal life.

But here a remarkable circumstance reveals itself. If barley or wheat is made to germinate, much heat, carbonic acid, and water are produced. The starch of these grains first changes into gum, then into sugar, then it disappears in producing carbonic acid, which the germ is to assimilate. Does a potato germinate, here, also, it is starch which changes into dextrine, then into sugar, and which at last produces carbonic acid and heat. Sugar, therefore, seems the agent by means of which plants develope heat as they need it.

How is it possible not to be struck from this with the coincidence of the following facts? Fecundation is always accompanied by heat. Flowers as they breathe produce carbonic acid: they therefore consume carbon; and if we ask whence this carbon comes, we see, in the sugar cane, for example, that the sugar accumulated in the stalk has entirely disappeared when the flowering and fructification are accomplished. In the beet root, the sugar continues increasing in the roots until it flowers; the seed-bearing beet contains no trace of sugar in its root. In the parsnep, the turnip, and the carrot, the same phenomena take place.

Thus, at certain epochs, in certain organs, the plant turns into

an animal; it becomes, like it, an apparatus of combustion; it burns carbon and hydrogen; it gives out heat.

But, at these same periods, it destroys in abundance the saccharine matters which it had slowly accumulated and stored up. Sugar, or starch turned into sugar, are, then, the primary substances by means of which plants develope heat as required for the accomplishment of some of their functions.

And if we remark with what instinct animals, and men too, choose for their food just that part of the vegetable in which it has accumulated the sugar and starch which serve it to develope heat, is it not probable, that, in the animal economy, sugar and starch are also destined to act the same part, that is to say, to be burned for the purpose of developing the heat which accompanies the phenomenon of respiration?

To sum up, as long as the vegetable preserves its most habitual character, it draws from the sun heat, light, and chemical rays; from the air it receives carbon; from water it takes hydrogen, azote from the oxide of ammonium, and different salts from the earth. With these mineral or elementary substances, it composes the organised substances which accumulate in its tissues.

They are ternary substances, ligneous matter, starch, gums, and sugars.

They are quaternary substances, fibrin, albumen, caseum, and gluten.

So far, then, the vegetable is an unceasing producer; but if at times, if to satisfy certain wants, the vegetable becomes a consumer, it realises exactly the same phenomena which the animal will now set before us.

V. An animal, in fact, constitutes an apparatus of combustion from which carbonic acid is continually disengaged, in which, consequently, carbon undergoes combustion.

You know that we were not stopped by the expression *cold-blooded animals*, which would seem to designate some animals destitute of the property of producing heat. Iron which burns vividly in oxygen produces a heat which no one would deny; but reflection and some science are necessary in order to perceive that iron which rusts slowly in the air disengages quite as much, although its temperature does not sensibly vary. No one doubts that lighted phosphorus in burning produces a great quantity of heat. Unkindled phosphorus also burns in the air, and yet the heat which it developes in this state was for a long time disputed.

So as to animals, those which are called warm-blooded burn much carbon in a given time, and preserve a sensible excess of heat above the surrounding bodies; those which are termed cold-blooded burn much less carbon, and consequently retain so

slight an excess of heat, that it becomes difficult or impossible to observe it.

But, nevertheless, reflection shows us that the most constant character of animal existence resides in this combustion of carbon, and in the developement of carbonic acid which is the result of it; beginning, also, in the production of heat, which every combustion of carbon occasions.

Whether the question be of superior or inferior animals; whether this carbonic acid be exhaled from the lungs or from the skin, does not signify; it is always the same phenomenon, the same function.

At the same time that animals burn carbon, they also burn hydrogen ; this is a point proved by the constant disappearance of hydrogen which takes place in their respiration.

Besides, they continually exhale azote. I insist upon this point, and principally in order to banish an illusion which I cannot but believe to be one of the most prejudicial to your studies. Some observers have admitted that there is an absorption of azote in respiration, but which never appears unaccompanied by circumstances that render it more than doubtful. The constant phenomenon is the exhalation of gas.

We must therefore conclude with certainty, that we never borrow azote from the air ; that the air is never an aliment to us; and that we merely take from it the oxygen necessary to form carbonic acid with our carbon, and water with our hydrogen.

The azote exhaled proceeds, then, from the aliments, and it originates in them entirely. This, in the general economy of nature, may in thousands of centuries be absorbed by plants which, like Jerusalem artichokes, draw their azote directly from the air.

But this is not all the azote which animals exhale. Every one gives out by the urine, on an average, as M. Lecanu has proved, 230 grains of azote a day, of azote evidently drawn from our food, like the carbon and hydrogen which are oxidised within us (que nous brûlons).

In what form does this azote escape? In the form of ammonia. Here, indeed, one of those observations presents itself which never fail to fill us with admiration for the simplicity of the means which nature puts in operation.

If in the general order of things we return to the air the azote which certain vegetables may sometimes directly make use of, it ought to happen that we should also be bound to return ammonia, a product so necessary to the existence and developement of most vegetables.

Such is the principal result of the urinary secretion. It is an emission of ammonia, which returns to the soil or to the air.

But is there any need to remark here, that the urinary organs would be changed in their functions and in their vitality by the contact of ammonia? the contact of the carbonate of ammonia would even effect this; and so nature causes us to excrete urea.

Urea is carbonate of ammonia, that is to say, carbonic acid like that which we expire, and ammonia such as plants require. But this carbonate of ammonia has lost of hydrogen and oxygen so much as is wanting to constitute two molecules of water.

Deprived of this water the carbonate of ammonia becomes urea; then it is neutral, not acting upon the animal membranes; then it may pass through the kidneys, the ureters, and the bladder, without inflaming them: but, having reached the air, it undergoes a true fermentation, which restores to it these two molecules of water, and which makes of this same urea true carbonate of ammonia; volatile, capable of exhaling in the air; soluble, so that it may be taken up again by rain; and consequently destined thus to travel from the earth to the air, and from the air to the earth, until, pumped up by the roots of a plant and elaborated by it, it is converted anew into an organic matter.

Let us add another feature to this picture. In the urine, along with urea, nature has placed some traces of albuminous or mucous animal matter, traces which are barely sensible to analysis. This, however, when it has reached the air, is there modified, and becomes one of those ferments of which we find so many in organic nature; it is this which determines the conversion of urea into carbonate of ammonia.

These ferments, which have so powerfully attracted our attention, and which preside over the most remarkable metamorphoses of organic chemistry, I reserve for the next year, when I shall give you a still more particular and full account of them.

Thus we discharge urea accompanied by this ferment, by this artifice, which, acting at a given moment, turns this urea into carbonate of ammonia.

If we restore to the general phenomenon of animal combustion that carbonic acid of the carbonate of ammonia which of right belongs to it, there remains ammonia as the characteristic product of urine.

Thus, by the lungs and the skin, carbonic acid, water, azote.

By the urine, ammonia.

Such are the constant and necessary products which exhale from the animal.

These are precisely those which vegetation demands and makes use of, just as the vegetable in its turn gives back to the air the oxygen which the animal has consumed.

Whence come this carbon, this hydrogen burnt by the animal,

this azote which it has exhaled in a free state or converted into ammonia? They evidently come from the aliments.

By studying digestion in this point of view, we have been led to consider it in a manner much more simple than is customary, and which may be summed up in a few words.

In fact, as soon as it was proved to us that the animal creates no organic matter; that it merely assimilates or expends it by burning it (en la brûlant), there was no occasion to seek in digestion all those mysteries which we were quite sure of not finding there.

Thus, digestion is indeed but a simple function of absorption. The soluble matters pass into the blood, for the most part unchanged; the insoluble matters reach the chyle, sufficiently divided to be taken up by the orifices of the chyliferous vessels.

Besides, the evident object of digestion is to restore to the blood a matter proper for supplying our respiration with the ten or fifteen grains of coal, or the equivalent of hydrogen, which each of us burns every hour; and to restore to it the grain of azote which is also hourly exhaled, as well by the lungs or the skin as by the urine.

Thus the amylaceous matters are changed into gum and sugar; the saccharine matters are absorbed.

The fatty matters are divided, and converted into an emulsion, and thus pass into the vessels, in order to form depôts which the blood takes back and burns as it needs.

The neutral azotated substances, fibrin, albumen, and caseum, which are at first dissolved, and then precipitated, pass into the chyle greatly divided or dissolved anew.

The animal thus receives and assimilates almost unaltered the azotated neutral substances which it finds ready formed in the animals or plants upon which it feeds; it receives fatty matters, which come from the same sources; it receives amylaceous or saccharine matters, which are in the same predicament.

These three great orders of matters, whose origin always ascends to the plant, become divided into products capable of being assimilated, fibrin, albumen, caseum, fatty bodies which serve to renew or recruit the organs with the combustible products, sugar and fatty bodies which respiration consumes.

The animal therefore assimilates or destroys organic matters ready formed; it does not create them.

Digestion introduces into the blood organic matters ready formed; assimilation employs those which are azotated; respiration burns the others.

If animals do not possess any peculiar power for producing organic matters, have they at least that special and singular power which has been attributed to them, of producing heat without expenditure of matter?

You have seen, while discussing the experiments of MM. Dulong and Despretz, you have positively seen the contrary result from them. These skilful physicists supposed that an animal placed in a cold water calorimeter comes out of it with the same temperature that it had on entering it; a thing absolutely impossible, as is now well known. It is this cooling of the animal, of which they took no account, that expresses in their *tableaux* the excess of heat attributed by them and by all physiologists to a calorific power peculiar to the animal and independent of respiration.

It is evident to me that all animal heat arises from respiration; that it is measured by the carbon and hydrogen burnt. In a word, it is evident to me that the poetical comparison of a railroad locomotive to an animal is founded on a more serious basis than has, perhaps, been supposed. In each there are combustion, heat, motion; three phenomena connected and proportional.

You see that, thus considering it, the animal machine becomes much easier to understand; it is the intermediary between the vegetable kingdom and the air; it borrows all its aliments from the one, in order to give all its excretions to the other.

Shall I remind you how we viewed respiration, a phenomenon more complex than Laplace and Lavoisier had thought, or even Lagrange had supposed, but which, precisely as it becomes complicated, tends more and more to enter into the general laws of inanimate nature?

You have seen that the venous blood dissolves oxygen and disengages carbonic acid; that it becomes arterial without producing a trace of heat. It is not, then, in becoming arterial, that the blood produces heat.

But under the influence of the oxygen absorbed, the soluble matters of the blood change into lactic acid, as MM. Mitscherlich, Boutron-Charlard, and Fremy observed; the lactic acid is itself converted into lactate of soda; this latter, by a real combustion, into carbonate of soda, which a fresh portion of lactic acid decomposes in its turn. This slow and continued succession of phenomena which constitutes a real combustion, but decomposed at several times, in which we see one of the slow combustions to which M. Chevreul drew attention long ago, this is the true phenomenon of respiration. The blood then becomes oxygenised in the lungs; it really breathes in the capillaries of all the other organs, there where the combustion of carbon and the production of heat principally take place.

A last reflection. To ascend to the summit of Mont Blanc, a man takes two days of twelve hours. During this time he burns at an average 300 grammes of carbon, or the equivalent of

hydrogen. If a steam-engine had been employed to take him there, it would have burnt from 1000 to 1200 to accomplish the same work.

Thus, viewed as a machine, borrowing all its power from the coal that it burns, man is an engine three or four times more perfect than the most perfect steam-engine. Our engineers have, therefore, still much to do; and yet these numbers are quite such as to prove that there is a community of principles between the living engine and the other; for, if we allow for all the inevitable losses in steam-engines which are so carefully avoided in the human machine, the identity of the principle of their respective powers appears manifest and clear.

But we have followed far enough considerations as to which your own reflections are already in advance of me, and where your recollections leave me nothing more to do.

To sum up, then, we see that of the primitive atmosphere of the earth three great parts have been formed:

One which constitutes the actual atmospheric air; the second, which is represented by vegetables; the third, by animals.

Between these three masses, continual exchanges take place: matter descends from the air into plants, enters by this route into animals, and returns to the air according as these make use of it.

Green vegetables constitute the great laboratory of organic chemistry. It is they which, with carbon, hydrogen, azote, water, and oxide of ammonium, slowly build up all the most complex organic matters.

They receive from the solar rays, under the form of heat or of chemical rays, the powers necessary for this work.

Animals assimilate or absorb the organic matters formed by plants. They change them by little and little; they destroy them. In their organs, new organic substances may come into existence, but they are always substances more simple, more akin to the elementary state, than those which they have received. By degrees these decompose the organic matters slowly created by plants; they bring them back, little by little, towards the state of carbonic acid, water, azote, and ammonia, a state which allows them to be returned to the air.

In burning or destroying these organic matters, animals always produce heat, which, radiating from their bodies in space, goes to supply the place of that which vegetables had absorbed.

Thus all that air gives to plants, plants give up to animals, and animals restore to the air; an eternal circle, in which life keeps in motion and manifests itself, but in which matter merely changes place.

The brute matter of air, organised by slow degrees in plants,

comes, then, to perform its part without change in animals, and serves as an instrument for thought; then, vanquished by this effort, and broken as it were, it returns brute matter to the great reservoir whence it came.

Allow me to add, in finishing this picture, which sums up opinions, which, to my mind, are but the necessary consequences and developements of the great path which Lavoisier marked out for modern chemistry; allow me, I say, to express myself as he did with regard to his fellow-labourers and his friends.

If in my lessons, if in this summing up, I have chanced to adopt without mentioning them the experiments or the opinions of M. Boussingault, it is that the habit of communicating to each other our ideas, our observations, our manner of viewing things, has established between us a community of opinions, in which we ourselves, even afterwards, find it difficult to distinguish what belongs to each of us.

In resting these opinions and their consequences on his name and on his authority, in telling you that we work actively, sometimes together, and sometimes apart, in order to verify and to develope all these facts, all these results, by experiment, I do but evince my anxious desire to justify the interest which you have this year taken in my labours.

For this I beg to thank you. It has given me courage to undertake a long course of researches: if anything useful to the progress of humanity should result from them, let all the honour of it redound to the intelligent good-will with which you have constantly surrounded me, and for which I shall ever be profoundly grateful.

Art. III. *The Principles of Gardening physiologically considered.* By G. Regel, Gardener in the Royal Botanic Garden at Berlin.

(Translated from the *Garten Zeitung*, May 2. 1840, p. 148.)

(*Continued from our preceding Volume*, p. 600.)

I. On the Propagation of Plants — *continued.*

Cuttings.

In making cuttings, the cut presents the greatest difficulty; as, to perform it properly, a previous knowledge of the nature of the plant should be acquired; after which, to insure success, the sharpest instrument should be used, so that the vessels that are cut through may not be crushed or squeezed, and thereby cause a cessation of the flow of the sap. In most cases the cut is most advantageously performed where the last shoot proceeds from the stem, and as much is taken away as a

bud has produced. The one-year's lateral shoots, on which such places cannot be mistaken, are therefore the best adapted for propagation; and, as soon as they are ready, the young shoot should be drawn out of the old one with the leaf attached, so as to obtain all the original axillary formation of the bud and the combined vessels of the leaf. The torn surface is then cut smoothly in the direction of the base of the leaf. This method is very successful with plants that are difficult to root, and that have leaves surrounded with prickles, such as Mutís*ia* *i*licifòlia, Berklèy*a* grandiflòra, Logàn*ia* floribúnda, latifòlia, &c.; also with those the leaves of which proceed from the stalk with very strong veins, or where the circumference of the leaf is very strongly defined, such as Bánks*ia* grándis, Berklèy*a* ciliàris, the different species of Davièss*ia*, Chorózema ovàta, &c.; or those that have winged stems, such as *A*càcia alàta; or have stems covered with a woolly tissue, such as several gnaphaliums and helichrysums. Where cuttings of these plants are not made in this manner, it will be found that the lower part of the surface of the cut will become black, and the cutting will die in a short time. This cut is also not only adapted for the above-mentioned plants, but is highly to be recommended for most others that make similar lateral shoots: but many even grow extremely well from the young shoots taken off in this manner, such as the different species of E'pacris, when they form lateral shoots after flowering, and almost all the easily growing species of *E*rìca, on which, however, all the leaves must be left; such are *E*rìca margaritàcea, rùbens, ramentàcea, mucòsa, ténera, tenélla, scabriúscula, *P*ersóluta, pellùcida, and all those of a similar growth. Those ericas, on the contrary, that are more difficult to grow, must be cut from the old wood; such as *E*rìca pínguis, aristàta, ferrugínea, Hartnélli, *c*erinth*oìdes*, *e*mpetrifòlia, pícta, fasciculàta, vérnix, &c. In selecting the shoot, great care ought to be taken not to choose one which has already formed its blossom-bud, as it frequently happens that all the assimilated nourishing matter has been expended for its future support, and no root formation follows. Many plants that have flower-buds at the points are, therefore, very difficult to propagate by cuttings; such as Blaí*ria* *e*ricòìdes; whereas, with some others, it has very little influence, as *E*rìca tenélla, and several species of *P*hýlica, &c. Many plants that have thick evergreen or fleshy leaves may be successfully propagated by merely taking off a leaf with the axillary bud; such, for example, as the Camell*ia*, Ardísia, Ròche*a*, Theophrást*a*, &c.

When the point of a twig is taken for a cutting, no advantage is obtained by making the cut through the node, although this method is frequently practised; because the roots very seldom proceed from the node itself, but rather from its

base, beneath the point of insertion of the petiole of the leaf. Twigs that have opposite leaves should be cut in a direction perpendicular to their axis, right through the wood, either immediately under the base of the petiole, or where its combined vessels distinctly reach the stem, of which we shall speak more fully in another place. Twigs that have alternate leaves should have the knife inserted on the opposite side of the bud, under the node, and the cut should be performed in a slanting downward direction towards the base, or close under the point of the insertion of the leaf, so as to convey away its combined vessels in as perfect a state as possible, which produces the same effect as when a lateral shoot is torn off and then cut clean. This practice is found very successful with many cuttings, such as those of camellias, banksias, and similar plants.

This is all that seems necessary to be said of the cut, but the choice of the twig admits of many modifications, the principal of which we shall briefly mention. Those plants which lose their leaves in winter grow the easiest from young shoots; among which may be mentioned *P*ùnica, *Z*izyphus, and the different species of Mimòsa. Others form roots out of the full-grown shoots as long as they retain their leaves, such as the different species of *S*piræ'a. Many trees and shrubs which have a white pithy wood, such as *S*àlix, *Syrínga*, *P*hiladélphus, *V*ìtis, the different species of *S*piræ'a, and many others, are also easily propagated by cuttings when it is performed late in the autumn, or early in the spring, in the open ground. As soon as the sap begins to flow, the buds begin to shoot out, and they then most generally form roots easily and quickly. All plants which have not woody stems should be propagated by young shoots; and shrubs, when they cannot be propagated by division of the root, succeed as well from shoots of the first spring as from those of the second. All the young shoots of plants that are only one year old may be used successfully before the time of flowering. The one-year's shoot of plants that have a firm woody stem and evergreen leaves is the best adapted for cuttings; but there are exceptions even to this, such as the different species of Bánks*ia*, in which it is better to let the wood be two or three years old. Those plants which do not always strike root from cuttings are frequently propagated with much less trouble by layers. For this purpose the plant is grown in a bed, either in a greenhouse, hotbed, or quite in the open air, according to its nature. The twigs are bent down on this bed, fastened to the ground, and partially covered with earth. Many plants which will not strike root in this way are very successfully propagated by the ring-cut; which is effected by carefully cutting away a ring in the bark as far as the wood, and close under a node which is covered with earth. In branches operated upon in this manner, the

nourishing sap continually flows upwards in the woody body, and the formation sap cannot flow backwards on account of the interruption in the bark by the ring-cut; the root formation is therefore much more easily effected. Even plants the most difficult to strike succeed very well by this operation, particularly when plunged in heat. Several other kinds of cuts and twists are used with plants of quicker growth, with equal success. Plants that are in pots, and sunk in a bed, are not so desirable for this manner of propagating; as the more vigorous growth of those planted in the free soil tends greatly to the success of the operation. Plants the branches of which are too stiff or too brittle to be bent down must have half-pots fastened lengthwise with wire to the most suitable part of the branch; but this method can only succeed when the earth in the suspended pot is continually kept moderately moist.

Art. IV. *On Virgin Soil, and on the Origin of Soils.* By J. Wighton.

Some persons might think that what is commonly called virgin or maiden soil was primitive earth; but this is not the case. In general it is soil of recent formation from animal or vegetable remains, with a small portion of sand, or whatever may happen to be the subsoil. That got from rich pasture land is considered the best; but how it came by the title of virgin I cannot say, except on the supposition that, formerly, it was believed that primitive earth was the best. Indeed, the following extract from a writer in the *Gardener's Gazette* shows that there is still such a notion. He says: "All soils are formed from the debris of rocks, and will, if left to themselves, deprived of the action of the air and roots of plants, have a tendency to consolidate, and return to the state of rock again. Another benefit of new soil is, that, as the disintegration of the rock proceeds, new alkalies are set free from the stone as the decomposition goes on." The writer, I think, falls a little into error: all soils are not from the debris of rocks; that which produces vegetables is not; in short, the greater part of the crust of the earth, commonly called mould, is from vegetable remains; and, although stirring renders it fit for vegetation, without stirring there need be little fear of its again becoming rock. With regard to alkalies, I hardly know what an alkali is, but I guess it to be that which constitutes manures; and if it resides in rocks, why not have them ground for manure? I have nothing to state in favour of getting manure from ground stones, except that I know it can be got from limestone; but, on the contrary, formerly, in

this locality, the scrapings from the highways were considered good manure, and gardeners often planted melons in it; but now none consider it good for any purpose. Indeed, the farmers refuse the scrapings from the roads; the cause is this: the labouring classes are in distress, and the dung which happens to be on the road is eagerly sought by them for their gardens, which renders the scrapings little more than ground stones.

If I mistake not, the writer alluded to in the foregoing extract mentions that when soil becomes what is commonly called worn out, nothing but rest will restore it. Whatever the soil has lost, he cannot think it is alkalies; for, in the extract before noticed, he says the disintegrating of rocks makes them produce alkalies. Various are the opinions why soil becomes in the state just mentioned. It being a very important matter, I shall make a few observations upon it. How is it that some soils, well cultivated, refuse, if I may so call it, to produce a series of the same kind of crops, while other sorts do not? Wherefore is it that some plants or trees will thrive in soil where other trees have grown before, and others will not, especially if they happen to be of the same kind of tree? As regards the first, the common belief that it is owing to the soil is, of course, correct; but the grand question is, what is the material that the land loses by feeding a series of the same kind of crops? Supposing it to be alkalies, how is it that some kinds of soil will not produce a crop of potatoes, except the seed potatoes grew on a different kind of land? This fact is well known to gardeners in the neighbourhood of Edinburgh. It cannot be possible that fresh alkalies were brought by the potatoes.

With regard to the second thing in question, it is considered that each kind, or rather each family, of plants draws a particular nourishment from the soil: this seems in a great measure correct, and, of course, accounts for the failure of trees, especially on land planted over again with the same kinds. Mr. Lymburn, who is a very accurate writer, mentions that the excretions from the roots of some plants will not let other kinds thrive on land where they grew; but it is not clear why a series of the same kind of crops cannot be produced from some soils. After all it appears to me that the "whys" and the "wherefores" are still to be learned.

But to return to the subject of soil from rocks. I have previously stated that the crust of the earth is principally of vegetable remains. It may be asked, If soil from decayed rocks is not favourable for plants, how came their remains at first upon the earth? To answer this, it will be needless for me to go back to the Mosaic era. I shall merely mention that when islands are raised from the bottom of the sea by volcanic agency, or by coral insects, they remain barren for some time, though in

a good climate; and, when vegetation begins, it is with plants of the lowest grade, whose seeds may be carried by the wind: these annually decay, and with the dung left by fowls, mixed with particles from the rocks, form soil to receive seeds of other plants, carried either by the waters, or left in the excrements of fowls. If the island which appeared a few years ago in the Mediterranean Sea had not sunk down, it might have been an example of the former; and it is said that some of the West India Islands are of the latter formation. It would, of course, take ages to form a crust of vegetable soil like that on fertile continents. I see no reason for geologists making a distinction between vegetable soil and that of peat; for the latter contains most of vegetable remains, and only requires heat and pressure to become coal.

Cossey Hall Gardens, Nov. 1841.

Art. V. *On the recent Publications on the Subject of Manures.* By R. Lymburn.

The subject of manures seems now to have fairly engrossed the attention of the public, and assumed the important station which it so fairly merits. What is the food of plants, in what form it is most easily absorbed, and how assimilated in the plant, are questions of vital importance in a country where a dense population presses so severely on the means of support. Conformably with your statement in the December Number of the Magazine, of its being a register of all new improvements and advances made in the science and practice of horticulture, I propose, in the following essay, to notice the works that have been published, as far as they have come to my knowledge, and the experiments that have been recorded, or that I have myself seen, since I last endeavoured to elucidate this subject; and endeavour to deduce therefrom what additional remarks appear to me called forth by these statements, to guide myself and other practical men in our operations. To simplify the subject, so as that the greatest benefits may be obtained at the least possible expense, is the ultimate object that ought to be kept in view; and however far we may be from that object at present, it appears to be, at least, approximating. Most authors incline to give prominence to their own preconceived ideas, and may stretch certain truths to their utmost extent, perhaps often farther than the unprejudiced judgement would approve of; but the confliction of opinion only helps to elicit the truth to the considerate mind, and much valuable information is often got from the keenest controversy, even though there may be errors on both sides.

The small popular treatise lately published by Mr. Squarey, on *Agricultural Chemistry*, will be useful to farmers and gardeners, as a digest of the publications of Liebig, Daubeny, and Johnson on the same subject; and the new matter brought forward on guano and other subjects is very interesting. He dwells much on the value of *nitrogen*. "Animals," he says, "fed on grass produce fat, as they get a greater proportion of carbon than nitrogen; those fed on seeds and grains, which contain more nitrogen or azote, produce more muscular flesh, as muscle, being highly azotised, requires much nitrogen for its formation." He quotes from Professor Daubeny, to show that wheat grown with human urine had as high as 35 per cent of gluten, while that from cow-dung had only 12 per cent; the carbon predominating in the wheat in proportion to the deficiency of gluten. He enters at great length into the subject of urine, showing the vast loss that is incurred annually by the waste of this precious substance, especially *human* urine. As the nitrogen found in the urine is the surplus of what is needed to be fixed in the system of the animal, with that produced from the waste of the system, carnivorous animals, which feed on more highly azotised substances, must always have more nitrogen in the urine than herbivorous animals. He proposes to fix the volatile carbonate of ammonia in urine and gas tar by sulphuric acid, or vitriol, which may be got, he says, at from 2*d.* to 3*d.* per lb.; and every pound of vitriol will form 2 lb. of sulphate of ammonia. He says, the urine should be poured on sawdust, tanner's bark, or dried peat, after lying in the tank or other reservoir till the smell of ammonia denotes that putrefaction has begun; and the compost should be afterwards mixed with sulphuric acid till effervescence ceases. In this way, he thinks, is the urate of commerce formed; or, if poured on stable manure and wood ashes, nitrate of potash (saltpetre), he says, would then be formed.

The great value of nitrogen, as pointed out by Professor Liebig and others, I have before noticed. Professor Dumas says, "chemistry is so far advanced in this respect, that the problem of the production of a *purely* chemical azotated manure cannot be long in being resolved. As for carbon," he says, "the rain water and air suffice for it." He notices, however, that "recent trials show that the nitric acid of the nitrates also merits particular attention." It has lately been carried so far, that it has been reckoned the *only valuable substance* in manures, and tables have been furnished by Boussingault and Payen (see *Gard. Chron.*, Oct. 2.), showing the relative proportions the different kinds of manure bear to cow-dung in value; in which the quantity of ammonia (not nitrogen) they contain is taken as the *sole* basis. There must, however, be some limit to this: nitrogen

is, no doubt, needed as a constituent in plants, perhaps more than has been yet made plain by analysis; from its surrounding the organs in the state of ammonia, in the fluids that bathe them, as Liebig says, it appears also to act as a stimulant to vitality, and must be a *principal* though not the *only* requisite.

In omnivorous animals, to whom a much greater proportion of nitrogen is required, if confined solely or in great part to animal food, it is found to produce a too excitable state of the system, and not to be conducive to health. In plants, also, it has been found to increase the stem and foliage, without a corresponding increase of deposit in the roots, when light and heat and the other requisites of the food are wanting. We shall see, as we proceed in the essay, that carbon is derived from many other substances soluble in water, in the opinion of other eminent chemists; and there are, besides, the salts, and other substances essential to plants, in manures. Nitrogen may be one of the greatest sources of value in a manure, without being the *only* source. If we confine the benefits of food to any one of its constituents, however valuable, we shall arrive at a false conclusion; as all are needed, and will have to be considered in our estimate of the value of manure, as well as ammonia.

Of the substances recommended to make a compost for pouring the urine on, I should think peat the best, and would prefer moist peat to dried peat, as being more easily decomposed. Sawdust, if of fir wood, which it generally is, contains a good deal of resin, which, being an anti-putrescent substance, prevents decomposition from proceeding properly: when got from woods destitute of resin, I should consider it one of the best, as it is then found in practice to rot easily; that of beech wood is the best of any. Tanner's bark, from its possessing tannin, also resists putrefaction. It is customary for people about towns, where these substances abound, to use them as bedding for swine and other animals, and even to mix with the manure, to increase the quantity. Any manure I have purchased, when it happened to be mixed with these substances, I have found so inferior in quality, and the sawdust and bark so fresh and undecomposed after lying a long time in the dung-heap, which they had deteriorated and dried by absorption, that I would rather have paid the price for the diminished quantity of dung by itself, and thrown those substances away. Urine, however, contains more nitrogen than other manure; and as this substance is so necessary in carrying on fermentation, being the basis of the fermenting principle, the sawdust and bark may do better than I anticipate. I cannot speak from experience as to the mixing of urine with these substances, but would prefer peat, which has been found to rot so readily with hot dung; moist peat will rot more readily than dried. One of the

readiest and best of substances, I should think, is the rot heap of weeds and refuse from the garden. It should be kept, as well as other manures, from heavy washing rains, and the full force of the sun; which may be done at a trifling expense by stobs and boards above, leaving it open to the access of air below; and turning over with the spade when the heat of decomposition begins to get excessive (about 100°). When heavy rains cannot be thrown off, the bottom of the heap should rest on a hard surface, to prevent absorption by the soil, and a descent should be made to some reservoir, to collect the liquid manure that flows off. If this were properly attended to, there would be less need for sulphuric acid to fix the ammonia. The soil itself, if in a moderate condition between wet and dry, is capable of absorbing and retaining all the carbonate or ulmate of ammonia needed, as we shall see when treating of Dr. Madden's experiments. Carbonate or ulmate (humate) of ammonia, whichever of these substances may be formed, is certainly a much better food for plants than sulphate of ammonia: it yields both carbon and ammonia, while much sulphuric acid from the other should be rather prejudicial than otherwise. If the rains are so heavy, and the soil so wet, as to wash out and carry off the ulmate or carbonate of ammonia, it will do the same with the sulphate of ammonia. If the water holding the carbonate or ulmate in solution remains in the soil, it will give it off to the roots of the plant if near, or be absorbed again by the particles of the soil if it is not near, the roots; evaporation is not likely to take place to the extent anticipated.

On the subject of *nitrates*, Mr. Squarey says, "they are found in calcareous strata in the East Indies, South America, France, and Spain, in the valleys of rivers and lagoons, and in the soil. In Spain," he says, "the soil in some places is very full of nitrates, which may be washed out, but are found mixed with common salt. They effloresce from limestone, and may be found on the walls of buildings exposed to the vapour of ammonia, and where Roman cement is put on. In France the nitrate of potash is formed from animal and vegetable remains, mixed with calcareous matter, as old plaster, chalk, lime, &c., laid up and fermented in beds protected from the weather, and putrid water or urine poured on them. The lixiviation produced from this consists mostly of nitrate of lime, but wood ashes are added to convert it into nitrate of potash, or saltpetre. From every 100 lb. of materials, 12 lb. of saltpetre," he says, "are generally got." He quotes Dr. Daubeny for the experiments in which wheat grown with the nitrate of soda gave 23¼ per cent of gluten, while that without nitrate had only 19 per cent, to show that the nitrate of soda had been active in producing from its nitrogen more gluten. From the same experiments, it was shown that

3½ lb. of flour, made from the wheat grown with nitrates, produced 4 lb. 14 oz. of bread; while the same quantity of the other produced only 4 lb. 4 oz. The application of these salts, he thinks, acts as a *stimulant* to the *plant;* as in some cases, where the nitrate of soda was applied last spring, and where it had produced a most marked and decided effect, it was found that, after the grass was cut and the produce harvested, the after growth was a long time before it came away: apparently the plant had suffered from over-excitement, as the grass not manured with the nitrate was afterwards, for a considerable time, the more luxuriant. Professor Daubeny has stated his opinion, also, that nitrate acts as a stimulant to the plant, causing more other food to be assimilated. His views on the origin, &c., of ammonia, I noticed in a former essay. Professor Johnston says, the nitrogen in any crop is small in amount, but perhaps not the less essential. The nitrogen, he says, must all have been originally from the air, from which it has been furnished to coal and other matters containing vegetable or animal remains. The nitrogen of the air being partially soluble in water, he thinks part of the nitrogen of plants may be got from this source. He calculates all the water falling on the soil in a year may contain 28 lb. of nitrogen, and probably one third of this is absorbed. Ammonia and nitric acid are both, he thinks, sources of nitrogen to plants: no doubt, he says, more nitric acid enters than is fixed, but it is the same with ammonia. Nitrates, he says, have the same effect applied to the soil as ammonia, in increasing the gluten of wheat; the effect is the same in kind, though less in degree. Great part of the effect of ammonia, he thinks, consists in its aptitude to decompose, yielding at one place of the plant hydrogen, and at another nitrogen, from the circulating fluid, as required, and again forming ammonia where the constituents are not needed: in the same way as water is decomposed, and yields now hydrogen, and now oxygen, as required. On the question, whether leaves absorb nitrogen, the professor notices Boussingault's experiments, in which the nitrogen of the air was not diminished, but rather increased, by the action of the leaves; but absorption and transpiration might both be in action. The increase must have been from the latter, but it might be more than shown. The ammonia in tobacco leaves, he thinks, may be formed from nitrogen.

Of the experiments on manures at Dankeith, the seat of Colonel Kelso, near Symington, when I called there in July, the gardener, Mr. Hay, showed us several which were making with different kinds. Rape dust he used in the proportions which had been used the year before by Mr. Fleming of Barrochan, near Paisley, viz., 11 lb. to the drill of 48 yards long, exclusive of manure, or about 1 lb. to the 4 lineal

yards of the drill of potatoes; nearly 1 ton to the acre. The price at Glasgow, 26*l.* for 3 tons, about 8*s.* 8*d.* per cwt., or rather above 8*l.* per acre; not so much as would have been paid for farm-yard manure. The rape dust yielded more than double the produce of the ordinary manure, as 15 to 7; and the crop of wheat after was very fine. At Dankeith the experiments I saw were on a small scale, in the garden. Some rows of potatoes manured with the above proportion of rape dust had decidedly the largest and most vigorous-looking foliage. Other rows, manured with half the usual quantity of manure and half rape dust, and some others with nitrate of soda in the usual proportion without manure, were all better to appearance than that with the farm-yard manure, which was good dung, he said, though rather new. How the result turned out at digging time I have not yet heard, as the gardener left at Martinmas; but the rape dust he thought undoubtedly would carry through, both from the great produce it had given at Barrochan last year, and from the fact that those planted with the rape dust were latest in coming through, more slow in growth at first, and appeared to be still gaining vigour progressively. He found the potato sets apt to decay when planted with the cut surface next the rape dust, and found it necessary to have a stratum of earth between it and the sets. The rape dust he found also to benefit red beet greatly: it also benefited turnips. To peas it did no good; and cauliflowers and carrots it killed nearly entirely. It seemed to encourage vermin, as he found insects in great abundance about the roots of the cauliflowers, among the rape dust. It appeared to hurt the cauliflowers even when mixed among the soil. In the experiments on grass, the parts dressed with rape dust and nitrate of soda in June made a great advance for about a fortnight: after the first cut of the grass, the effects of the nitrate of soda could hardly be perceived on the second growth, and that of the rape dust only partially. Some nitrate of soda, which he sprinkled on the foliage of plants, killed some and hurt others: he approves of it most diluted with water. Many complaints have this year been made of the nitrate's hurting foliage: being presented to the foliage in a concentrated state, without being so well diluted as that which goes to the roots will be with the water of the soil, may be a cause; as all food in excess is found hurtful. As the upper side of the leaf does not absorb so readily as the under side, nor as the spongioles of the root, the nitrate will also lie longer in contact with the membrane of the cuticle, and may act deleteriously. These salts are not likely to be decomposed before reaching the roots. If the nitrates were decomposed in the soil with the salts of iron, it would render them of no use; and as ammonia has a more feeble affinity for acids than the other alkalies, it is not likely

much of it will be altered in this way, or, if in excess, it would be hurtful as well as the others.

At Shewalton, near Irvine, the seat of the Lord Justice Clerk, now Lord President, Mr. Menzies, the gardener, showed us a part of the lawn which had been dressed with nitrate of soda after the first cut. It had grown more luxuriantly than that not dressed, and promised to yield a very superior second cut in the autumn. At Belisle, near Ayr, the seat of Mrs. Colonel Hamilton, the gardener, Mr. Hunter, showed us a large quarter of onions, which had been found, for some years before, almost a complete failure from vermin, the ground having been long wrought. He had dressed it with the nitrate of soda for two years past; it had been free from insects ever since; the crop of the former year had been very good, and that of this year had a fine deep green healthy appearance.

At Roselle, near Ayr, the seat of Archibald Hamilton, Esq., of Carcluie, where so many agricultural experiments are carried on, the land steward, Mr. Walls, was from home when I called. Mr. Locke, the gardener, showed me, on the farm, some rows of potatoes dressed with nitrate of soda, oil cake, and rape dust, which were all of a fine deep green colour in the foliage, and more vigorous and healthy to appearance than the others without this dressing. Some rows dressed with sulphate of soda, in addition to the manure, were no better, and rather inferior in appearance to the other rows that had no dressing. In the experiments at the garden, and in the outside slips, the rows of potatoes that had got an additional dressing of oil cake, nitrate of soda, and rape dust, besides the manure, were scarcely so high in the stem as those with the same manure without the dressing; but the foliage much darker in the green, and the plants more healthy and vigorous to appearance. In some rows dressed with the sulphate of soda besides manure, those at the rate of 1 cwt. per acre were similar to those with ordinary manure and no dressing; but those dressed at the rate of $\frac{1}{2}$ cwt. per acre were inferior to any, perhaps from some unperceived difference in the quality of the ground or manure. The late cabbage planted in a rich border soil without manure, and dressed in alternate rows with nitrates of soda and potash at the usual rate per acre, showed a decided improvement where the nitrates were applied. In a row where they were purposely applied in excess for experiment, the plants were killed altogether. There was a still more decided improvement on some savoys dressed with nitrates. In Mr. Locke's essay, lately published in the *Ayr Advertiser*, he states that sulphate of soda applied to cauliflowers, cabbages, carrots, potatoes, and turnips, made not the slightest improvement. That in cauliflowers, the soil of the border prepared with manure in the usual way, the

rows in which a little nitrate of soda was dibbled into the hole when the cauliflowers were planted had flowers one third larger than those that got no nitrate; and another portion, in which a little oil cake was dibbled into the holes at planting, had flowers one third larger than those above the nitrates. Cabbages, he says, were benefited by the nitrates; but the greatest improvement was made on leeks. On beans the nitrates had no effect. On turnips the shaws were improved, but not the roots; perhaps from the want of sufficient light in the cloudy dull weather last autumn, to produce the proper effect in the elaboration of the leaves. On rows of potatoes, in a very poor border, 3 rows, with the usual quantity of oil cake, and no manure, produced 38 lb.; 3 rows ditto, nitrate of soda alone, 44 lb.; 3 rows ditto, rape dust ditto, 55 lb.; while 3 rows, with the usual quantity of farm-yard manure, gave 57 lb.; thus showing in this experiment the preponderating effect of the latter. None of the dressings of nitrate, he says, had so powerful an effect this year as the last. At Dankeith, the experiments seemed to be rather in favour of the nitrates and rape dust: the soil there might be richer than that at Roselle, and might yield more food to the plants stimulated by the action of these manures, or there might be a difference in the quality or quantity of the manures. Of sea-kale, which he was forcing, Mr. Locke dressed every alternate stool plant with nitrate; almost every dressed plant failed, and even those that succeeded were much spoiled. Some rows sown with peas, and dressed with nitrates rather abundantly; the peas were destroyed as if they had been boiled, though they grew well sown some time after in the same ground. Some plants sprinkled with nitrate on the leaves were destroyed, as before observed, at Dankeith. To geraniums, in pots, he applied the ashes of burnt wood with great effect. Mr. Hunter also found the ashes beneficial to pot plants, and particularly to beds of pansies. Mr. Locke applied gypsum to turf, but found it produced no effect, and attributed it to the dryness of the ground. If this has been the cause, it may take effect next season; but so many failures have taken place with that article, that it is doubtful if it always acts in the way described by Professor Liebig. It has been said by some to benefit by the sulphate of lime itself becoming a constituent of the plant. Soot, he says, was found of no benefit as a top-dressing, and he ascribes the want of effect to the light dry land. If it were, however, washed into the soil by rain, of which there was no deficiency last year, it is strange it produced no effect. Soot, from the ammonia, charcoal, and saline substances it contains, but especially the reputed abundance of the first, has been found beneficial in all soils. Last year I saw an application of it, in which the effects on onion beds, where it

was sifted on, was so great, that it could be told at many yards distance where the soot ended, by the strength of the onions being so much greater. Mr. Adam, in the *Quarterly Journal of Agriculture* last year, in trials with many different kinds of manures, all the new kinds, found the soot much the cheapest, and the crops of grain very superior. Like the nitrates, however, and other concentrated manures, it will not do if in excess; and when the plants are growing, the time of rain should always be chosen to spread it among the plants: when washed into the soil, divided and diluted, it produces most benefit, but is apt to kill the leaves if the weather is dry; I have seen onions killed with it in dry weather. Cow urine is another powerful manure: if applied to cauliflowers in wet weather, it produces great effect; if applied in dry weather, it generally kills the plant. Some unaccountable results are often produced also by the best of manures, and show the necessity of repeated experiments. Sir Humphry Davy found that nitrate of ammonia, applied in solution to grass, produced no effect, while nitrate of soda on the same piece close at hand did: he expresses astonishment at the result himself, but it does not appear that he repeated it. Others who have tried the nitrate of ammonia say that it has produced great effects: it is not yet an article of commerce as a manure, but, from the great quantity of nitrogen contained, should be very beneficial. Professor Dumas says it is always the product of electric storms. In trials for experiments, if there are any of the pieces of the soil experimented on abounding in oxides of iron, they may, from their great affinity for acids, when in the state of protoxide, decompose the salts; and from their tendency to assume again the state of peroxides, which do not retain the acid, the nitric acid may be given off again to the air and lost. If the proper proportions of food and light are wanting, experiments may give a different result from what they would have done if these were all present. Heavy washing rains may carry off top-dressings; and the above and many other unobserved circumstances may derange the effects of experiments; and we may see here the necessity of frequently repeated trials, and on a large scale, before we can decide on the comparative benefit of manures. From what has been stated on the nitrates, ammonia, &c., we may infer, that, though nitrogen is needed as a constituent, yet it is also much needed as a stimulant, as it is to be found in the latex or circulating fluid of the plant, in the state of ammonia, wherever life is most active; stimulating the action of the organs, and assisting in the decomposition of the food needed to supply every constituent where wanted, and giving the deep green healthy colour of luxuriant vegetation. If this is accompanied by light and heat, and a proper proportion of the other constituents of the food of plants,

great results may be expected; if not accompanied by these, we may have much appearance, with little reality. It is generally found that there is little difference in the present effects of nitrate of soda and potash on the crop. As potash is, however, the base which the vegetable acids generally prefer, it should be more beneficial as a constituent of the plant: as a solvent of undecomposed matter in the soil, the soda, when excreted, should be more active and powerful. Nitrate of lime being most easily produced artificially (there is generally a good deal among the other nitrates), and being one of the most soluble of salts (its attraction for moisture being so great as to cause it to be used in the drying of gases), should also be of great benefit. It possesses the same quantity of nitric acid as the others; and the other salts of lime being very insoluble (the carbonate of lime requiring carbonic acid in the water to dissolve it), this salt may be one of the natural sources of lime to the plant. M. Jacquelaine, Professor Dumas says, has lately found pectinate of lime in the ligneous tissue of most plants; and perhaps more of that substance is needed for plants than is generally imagined.

On guano, or bird's dung, a manure long ago introduced into chemical works, but only lately become an article of commerce in this country, Mr. Squarey has amassed a good deal of information, and for which recourse should be had to the book itself. "The date of the discovery of guano," he says, "is unknown, though it has been used as a manure in Peru from great antiquity. The immense quantities in which it exists, its weight, red colour, and the sand which covers it, have caused it to be thought of mineral origin. That most recently deposited, however, is white, and most in demand, but gets red by exposure to the air, and the sand blown from the hills around; the ammoniacal odour also which it gives off, and the uric, phosphoric, and other acids found in it, determine it to be of animal origin. It has also been observed that, when the birds have been scared away from any place on the coast, the supply has diminished in that place. In the dry climate of Peru, the excrement of the birds is not washed away, as in our damp atmosphere. In some places it is represented as existing to the extent of a quarter of a league in length, and 300 yards in depth. The red and dark grey guano," he says, "is sold at 2*s.* 3*d.* per cwt., and the white at 3*s.* 6*d.* per cwt., in the port of Mollendo; in war it has sometimes been as high as 12*s.* The guano," he says, "is strongly recommended for wheat, barley, oats, turnips, and clover." The quantity per acre he recommends is 1 to 2 cwt., mixed with charcoal powder; price in London, Nov. 1841, 26*s.* per cwt. The excellence of this manure, he says, "depends in great measure on the phosphate of lime it contains, which he estimates at 30½ per cent, the lithic acid and ammonia at 30, and

the other organic matter at 36½ per cent. Bones are also principally valuable on account of the phosphate of lime they contain; and the apatite, or native phosphate of lime, from Spain is about to be introduced as a substitute. How phosphate of lime is rendered soluble, is not yet known; perhaps the salts and gases in the water, or the electricity evolved in the chemical changes going on in the soil, may assist. Phosphate of magnesia, not being discovered native yet, is probably got by carbonate of magnesia being absorbed, decomposed, and united to phosphoric acid in the plant." It is possible that part of both these phosphates may be got in that way: the phosphoric acid of the soil, which, Liebig says, is found as a constituent of all soils, may be absorbed either in that state or as phosphate of ammonia, and united to magnesia there, or to the carbonate of lime held in solution in the sap by carbonic acid. The phosphate of lime, however, in urine, Professor Thomson says, is held in solution by an excess of phosphoric acid. Bones also contain the phosphate in the state of a superphosphate, or an excess of acid there also. To procure phosphate of lime, it is necessary to add pure ammonia, both to the urine and the calcined bones, to take up the excess of acid, before the phosphate of lime can be precipitated. The acetic acid of the urine also, he thinks, keeps the phosphate in solution. From the excess of acid, therefore, in the superphosphate of lime in the bones themselves, assisted by the phosphoric acid of the soil, or by acetic acid, the phosphate of lime is most likely to be dissolved and rendered fit for absorption. Professor Johnston thinks the carbonic acid of the soil may dissolve sufficient of the phosphates, as he found one gallon of water saturated with carbonic acid to take up 30 grs. of phosphate; it will also furnish silica, he says, as it absorbs the alkali of the insoluble silicates of the soil, and liberates the silex in a soluble state. Apatite of lime, Thomson classes as a subphosphate, and it will therefore be more difficult of solution, from its inferior quantity of phosphoric acid, about one third part less than that of the phosphate itself. For grain crops the phosphates will be much wanted, and some have said they are greatly wanted for turnips also. The analysis, however, of the turnip, by Dr. Madden, gave only a small quantity of hydrosulphate of lime. Many repeated analyses of plants, grown in different circumstances, may be needed, before we can decide on what constituents manures ought to furnish: what, however, is not needed, or rejected as excrement by one crop, may be beneficial to the next in the rotation. In bones, the gelatine, from the great quantity of ammonia it furnishes, is very valuable; and the ammonia, and lithic or uric acid, together with the saline substances, about 70 per cent in the guano, must be an important part of its value. Mr. M'Donald, in the

Mark Lane Express, says, 4 bushels of guano (52 lb. per bushel) to the acre, mixed with 1 bushel of charcoal powder and drilled, produced 6 quarters, 2 bushels, 1½ pecks per acre of wheat; when 15 bushels of bone dust yielded only 4½ quarters. Mr. Cuthbert Johnson says that, in St. Helena, 35 bushels of guano are said to produce more potatoes than 35 loads of horse dung. Three cart-loads of guano, he says, are equal to 70 loads of good rotten dung, and its effects are greater on grass than on potatoes. From all accounts, guano appears to be a powerful concentrated manure; and the ammonia in it does not seem to be so volatile as dreaded by some chemical writers.

Blubber of fish and oil, Mr. Squarey says, "yield 70 per cent of carbon, on which their benefit depends; and he proposes to mix these substances with coal ashes and apatite, to absorb them and give them off to the roots as wanted." Coal ashes he thinks valuable, from their yielding sulphate of lime and charcoal: the principal benefits however arise, he thinks, from the absorbing powers of charcoal for ammonia, which is washed out by rain for the roots of plants, and a new quantity again absorbed. The effect is much diminished, he says, "by reducing the coal ashes to powder, as they do not absorb so well." As I stated before, however, practice has led me to adopt a different opinion: I have often seen the bad effects of mixing coal ashes from domestic fires, especially when not well sifted, and the pieces large; they absorb the juices of the dung, reducing it to a dry straw, and I never could see the ashes produce any corresponding effect in consequence of it. The fact of the matter, I believe, is, that when the pieces are large, the ordinary moisture of the soil will not penetrate them so as to extract what is absorbed. When the pieces are small, and when the ashes are reduced as small as possible by sifting and burning well, they are found much more beneficial; and all persons whom I have ever conversed with, who are in the habit of purchasing such manures to a great extent, universally prefer the small powder of well burned, well sifted ashes, to the coarse unsifted kind. The small pieces absorb and give off, the same as the particles of soil do; and, falling into powder, their saline substances and charcoal are in a more soluble and available state. Of what great benefit are absorbents to the soil, when every particle of the soil itself is capable of absorbing, and, by its disintegrating readily, yielding up its absorbed substances easily. The object is not to absorb and lay up manures, it is to make them as speedily available as possible. Of the great tenacity with which some of these absorbents retain the ammonia they absorb, we have a familiar instance in iron. When a large pot of cast iron has been exposed for a long time to the action of the air, it absorbs ammonia to such a degree, that, though cold

water has little effect on it, when boiled on the fire for some hours it will come off as thick as tar, and smelling like a dung-hill; yet, though repeatedly boiled at intervals for weeks on the fire, and even scoured with diluted vitriol, it will come off for many weeks smelling as at first. If the power of absorption is so great, how long would the ordinary temperature of the soil be in effecting the extraction of the ammonia! I should not at all approve of mixing blubber and oil with coarse ashes; if it be wished to absorb them, the soil is quite sufficient. The best way to render these substances soluble, is to mix them with alkalies, and make them into a soluble soap, by mixing with clippings of hedges and young branches (which possess most potash) burned to ashes, and mixed with the oil. If lixiviated and digested with one fourth part of quicklime, and the lie poured off, the ashes will make the oil into a soluble soap and render it available at once. The benefit of soap-suds and the refuse from scoured yarn, are well known. "When ammonia is decomposed in the plant," he says, "and the nitrogen fixed as a constituent, all the hydrogen set free, unless what goes to form the oils, resins, and other hydrogenated products in the plant, will be evaporated; where the hydrogen and oxygen exist in the proportions of water, as in sugar and starch, they are exclusively formed from water." It is likely these substances are mostly formed from water, but it will be difficult to say exclusively; though in the proportion of water, the hydrogen and oxygen in these substances are not in the state of water; and if free hydrogen from ammonia is circulating in the elaborated sap or latex, it should be as eligible for assimilation as that set free from the decomposition of water. It will be the hydrogen in excess, from whatever substance it came, that will be evaporated. When substances yielding the same constituents are absorbed and decomposed in the plant, it will be difficult to say what becomes of them, what are fixed, and what evaporated or excreted. Besides the oxygen furnished by water, oxygen gas is also absorbed in solution in water, and from the air; and what is not needed of these for the peculiar acids of plants, may be assimilated as gum, starch, &c., while the oxygen of the water may be set free and evaporated; though undoubtedly it will most often take place that the oxygen of the water is made use of.

As might have been expected, from his taking Professor Liebig as a basis, Mr. Squarey adheres to the doctrine, that though plants in a young state absorb carbonic acid from the soil, yet afterwards they wholly depend on the air for their carbon: though he allows that all water contains carbonic acid in solution, and admits, as above, that the principal benefit of oils is in the carbon they contain, he also rejects, as Liebig did, the idea of humus forming any part of the food of plants. We shall see good

reason for believing, when we come to what Dr. Madden says on the subject, that humus does ultimately form great part of the food of plants. "Trees," Dr. Madden says, "derive most of their fluid nourishment from the soil, though some kinds can, no doubt, get what they need by the leaves, if this source is stopped." The roots, he thinks, cannot absorb gases as such, but only in solution in water. "The quantity of organic substances buried in the soil undoubtedly increases production," he says, "as crops are always heaviest near towns. It displays the wisdom of Providence, that consumption itself should increase the article consumed. All who write on the function of nutrition are in fault", he thinks, "as they speak only of the elements of the food, and not of the form the elements are presented in. The physician," he says, "knows that all meat consists of the same ultimate elements, but he reckons one kind of food more conducive to health than another. Different kinds of soil," he says, "according to their nature, will modify food differently; as one kind of soil fits wheat best, another turnips." Different results will also be found from different soils, according to the dampness or warmth of the climate, and according as these vary in different seasons. Crops of certain kinds will flourish on dry sandy soils in a wet season; while, in a dry season, they would succeed better on a retentive clay. Even different degrees of pulverisation suit different seasons best, and agriculture may come ultimately to depend much on meteorology, were it once made more certain in its conclusions. Every practical man knows, when he sets about the sowing of a great breadth of ground in small seeds, of how much benefit it would be to know whether dry or wet weather is to succeed. If the weather is to be dry, he should rake fine, and cover deep; if wet, the deep covering will be too weighty, and the finely raked soil will skin on the top, and, in some instances, cause the loss of the whole crop. The palate of animals gives the relish for the different kinds of food; the nervous system of animals gives them, in this respect, an advantage over plants, and, requiring more constituents, they require greater variety in food. We cannot say yet that the spongioles of plants come near to the sensitive perceptions of animals, but they may approach nearer than we imagine, and it is not always the most highly relished food that is beneficial. It is also a favourite doctrine of those who contend that the air is the sole source of nourishment to plants, that organised substances cannot be absorbed and assimilated, till decomposed into their gaseous elements. I noticed before, in my former essay, that it is found that starch, sugar, and gum are laid up as the food of germs and buds in plants in the autumn, and again taken up and decomposed in the plant itself in spring, and become part of the circulating fluid, latex, or blood of the plant, to give off their

constituents to the different organs as required by the necessities of each. The same substances, when in solution, must therefore be the food of plants. The gum and sugar have been reckoned organisable, not organised, products; starch, however, is admitted to be more highly organised; and lignin, the most highly organised of the abundant products of plants, can be reduced to the others by simple chemical processes: there is abundant proof to establish that the vital chemistry of the plant itself far exceeds what can yet be imitated. Sir Humphry Davy exhibited starch, jelly, and other highly organised products to plants, and found they formed food. In an essay of Professor Gazzin of Italy, an eminent chemist, and formerly a pupil of Sir Humphry Davy (as translated by Mr. Crawfurd of Auchindrames, and read to the Ayrshire Agricultural Association, and afterwards published in the *Ayr Advertiser*), it is stated, "that if we dilute a quantity of nearly rotten farm-yard manure in water, and pass it through a coarse sieve, a great deal of straw and undecomposed organic matter is retained; if we pass the liquid again through a closer sieve, straiter in the meshes, we will find still smaller pieces of undecomposed, brown-coloured, organic substances; still smaller pieces will be got from a still straiter sieve; and so on, till we come to pieces," he says, "that are undoubtedly soluble in water, and form the food of plants. Great waste of manure," he thinks, "is thus made by decomposition, and he would have the straw cut and bruised, and deposited in the ground, to decompose there." We see from the above-quoted opinions of the learned professor, good ground for believing that soluble organic substances are, indeed, part of the food of plants. It may be matter of doubt whether the straw would not be broken down and become soluble more easily in the dung-heap: small quantities in the soil do not ferment so readily, and care being used to preserve as much as possible of the products of fermentation, most practical men seem to be in favour of rotting the dung. On this subject I entered at great length in my former essay, which supersedes the necessity of bringing it again forward. As corroborative of the great benefits of manure exhibited in a soluble, or nearly soluble, state, I may notice the great effects of brewers' grains spread on a field in Glamorganshire, which produced four times the quantity usually got from the same soil. Professor Johnston, on the same subject, says, "when we see red-coloured substances absorbed by the hyacinth roots, from the water in which they are growing, and colouring the white flower, till again dispelled by the elaboration of the petal, which returns to its white colour as before; we cannot divest ourselves of the belief, that all organic substances soluble in water are absorbed by the roots, and elaborated in the leaf." On the question whether all the carbon of plants is got from the air, he

says, "the first original plants must have got all their carbon from the air, unless what existed in the water of the soil: on the bare rock, however, vegetation is stunted, and we cannot deny that organic matter deposited in the soil increases the produce, and, if crops are carried off the soil without manuring, it becomes exhausted. Partly it is undoubtedly got from the air, as some plants live suspended in the air, and vegetable matter accumulates in peat bogs, and marshy soils also produce crops without manure. Water is able to absorb 95 times its own bulk of ammonia (some have rated its absorbing powers higher; the temperature of the water increases its powers). Ammonia is also absorbed by porous substances and soils: it has a considerable affinity for acids, but less than the other alkalies; lime sets it free in great quantities. The carbonic acid excreted by the roots, will assist to extract the ammonia from the pores of the soil, and the porous substances in the soil." He thinks Liebig's theory of the action of gypsum on the sulphate of lime insufficient, "as it does not account for all the nitrogen in the excess of crop." The information to be got from the professor's lectures on these subjects is highly interesting: when great chemical knowledge is united to caution in inducing inferences, it is not so apt to lead us astray as when a brilliant imagination carries us to the very verge, if not beyond, the bounds of truth. The chapter on the transformation of the organic substances of plants, so far as chemistry has yet been able to produce them, is of great value. Dr. Madden, on the action of the sulphate of lime, says, "when more than $\frac{1}{2}$ per cent of ammonia is given off to the soil, when more than $\frac{1}{200}$ part of the bulk of the soil is given off at any place by the manure in the soil, if sulphate of lime is present, which it generally is, especially in peaty soils, sulphate of ammonia will be formed. If this is again dissolved in water and brought in contact with carbonate of lime, carbonate of ammonia and sulphate of lime will be produced." In some former essays in the *Quarterly Journal of Agriculture*, apparently from the pen of the same intelligent chemist, great doubts were entertained of the sulphate of lime always acting in the way pointed out by Professor Liebig. There is much to learn yet on many of these subjects, and practical men should balance well the statements brought forward by chemists, before committing themselves to great expense in trials. It is safest to conduct experiments on a small scale, till they are well established.

On the subject of *humus*, "Dr. Madden, in the Prize Essay on Draining, published, in the *Highland Society's Transactions* (*Quarterly Journal of Agriculture* for December, 1841), considers the soluble matter of soil an organised extract, which he denominates humus, but prefers the name of ulmic acid for its product to *humic* acid. He defines ulmic acid as consisting of 1 atom of

oxygen and 1 of hydrogen, united to 2 atoms of carbonic acid. Ulmic acid is always in humus; it is in it, he says, as sugar is in the turnip or beet, but is not it. The strength of ulmic acid is so slight, that he found it took 360 grains of it to neutralise 48 of potash. Sawdust, peat, gum, sugar, starch, and most vegetable or animal substances, will produce ulmic acid, when heated with caustic potash; and therefore it has been said by some that ulmic acid is produced by the action of the potash, and is never found alone or pure; it is, say they, a product, not an educt. It is not, however, always, he says, the product of the potash, but is found ready formed in the soil also; as a cold solution of potash, not strong or digested much with the soil, or even ammonia, will produce it. The more substances are divided in the soil, and exposed to the action of oxygen, the more soluble do they become. One of the very valuable effects of the soil is to divide and separate the organic matter, and expose it to action. In the soluble matter, or humus of the soil, there always is ulmic acid: all that is brown-coloured, and soluble in potash, is not ulmic acid, but it is in it. From 108 grains of lignin, or fibre, can be formed, he says, 22 of carbonic acid, 9 of water, and 77 of ulmic acid. Gum, sugar, and starch, can also form ulmic acid; and it is always to be found, he says, in the dung heap, with carbonic acid, carburetted hydrogen, and sulphuretted hydrogen. Sugar, when fermented by itself, produces alcohol abounding in hydrogen and acetic acid, or vinegar; but when fermented with other substances, he says, other results take place. The products of the mass, therefore, are not always the same as the individuals composing that mass. In these compounds of masses of substances, when ulmic acid is produced, there is also, at the same time, he says, produced a substance-like extract, denominated apotheme, which, by absorption of oxygen, uniting to and abstracting its hydrogen, becomes insoluble. It is probably, he says, a modification of ulmic acid, or some compound of it; it contains much carbon, and is soluble in alkalies. On the question, What becomes of the gases evolved in the soil during dry weather? he found that, by passing ammoniacal gas over 198·6 grains of soil in a glass, it retained 3 per cent of the gas. After exposing it to the air till no smell was found, denoting that escape had ceased, the soil still retained in absorption $\frac{1}{2}$ per cent, or $\frac{1}{200}$ part of its weight in ammonia; which, calculating the depth of the land at 6 in., the ordinary depth of ploughing, would give 4 tons, or 8,960 lb., per imperial acre; capable of dissolving no less than 161,280 lb. of humus. If taken to the depth of 8 in. to 10 in., the ordinary depth of digging, it would be much more. The whole ammonia given off, he says, by 25 to 30 tons of farm-yard manure (the ordinary quantity for an acre), about 2,016 lb., is little more than $\frac{1}{9}$ per cent of the soil, and not $\frac{1}{4}$ part of what the soil is capable of absorbing. When he

added water to the soil, after free exposure to the air for three hours, a brown-coloured matter came off with the water in considerable quantity. This fact he considers of great importance, as giving a clue to the way in which humus may be rendered soluble in soil, and explaining the origin of the dark brown fluid from all dung-hills, &c., which yields ammonia abundantly when treated with caustic potash. The reason why a brown-coloured solution is not obtained by agitating soil with water is, that allowing all the ammonia to be evolved from 30 tons of farm-yard manure to be saturated with humus, still it would at no period form more than $\frac{1}{17200}$ part; a quantity too small to colour solutions made in the usual manner with cold water, without allowing time for the air to act. It was pure ammonia he used above; and as ammonia is generally found in the state of carbonate of ammonia, he tried soil agitated with carbonate of ammonia, and found that it also possessed the power of dissolving humus in the soil, though not nearly to the same extent as the pure alkali. If the 2·016 lb. of ammonia from the 30 tons of manure were pure, it would dissolve, he calculates, 36·288 lb. of humus, which, though only in the state of ulmic acid, would contain 20·684 lb. of carbon; and allowing the ammonia of the manure to be all carbonate, and rating its powers of solution only at one third of the pure alkali, would give carbon for five years' crops, independently of the consideration, that if part of the humus dissolved were apotheme much more carbon would be yielded. In his farther researches on the action of water, he found that pieces of animal substances, as sheep skins, when moistened only with water, and exposed to the action of the air, decomposed much more quickly than when totally under water. In the same way, when carbonate of ammonia was added in solution of water to humus, it produced little effect, only yellowing the water; and, though allowed to lie a time, it did not get very dark; but when he mixed it moist only, and after a few days' action added water, it came off of an intense brown black, showing the immense difference between wet and moist action. Suspecting, also, that the reason why carbonate of lime, and not humate or ulmate of lime, is found in the stalactites of caverns (as pointed out by the opponents of the humus doctrine, to indicate that that acid did not exist in the soil), was, that it was decomposed in the soil in passing through, the soil exerting partly a chemical action on the humus; he poured ulmate of ammonia in solution on a dry soil in a flower-pot till it began to flow out at the bottom, when he found that what came through had lost colour to such an extent, that he reckoned it did not contain one half of its original quantity of organic matter. In this manner, he thinks, is the food preserved in soil: when ammonia is extricated, it acts on the organised matter of the soil, producing carbonate and ulmate of ammonia. When rain occurs it renders these substances soluble, and they would

be carried off by the water, but that the soil decomposes them, and retains the humus, which is insoluble, till acted on again by ammonia, and rendered soluble. If the roots are near, when in this state, it is absorbed; if not, it is decomposed again. These calculations, he says, place in a favourable light the great chemical value of ammonia in soil, and likewise the importance of humus in the process of vegetable nutrition.

'On the opinion that carbonic acid is the only source of carbon to the plant, he experimented, by passing a stream of carbonic acid, dried by traversing a tube filled with fragments of chloride of calcium, over 2072 grains of soil, and found no increase of weight, with a balance indicating as low as $\frac{1}{20}$ of a grain. The soil could not, therefore," he says, "have absorbed $\frac{1}{40}$ per cent of carbonic acid; and the free carbonic acid in the soil must, therefore, exist chiefly in the form of solution in water; though it cannot be said soil does notabsorb that gas at all, as small imperceptible quantities may exist. The saline manures, $1\frac{1}{2}$ cwt. per acre, exhibited with great effect, amounting to less than $\frac{1}{10000}$ part, or less than $\frac{1}{100}$ per cent, of the soil, at 6 in. deep." He preferred using the pure gases in his analysis; as to have dried the impure from the dung-heap, by caustic potash, would have absorbed the carbonic acid; or to have employed the chloride of calcium, would have lost the ammoniacal vapours by absorption; and to have used them moist would have altered the result. He next notices the opinion, that humus, if absorbed, will be returned as humus, without being assimilated; the same as found in sugar and gum by Meyen and others. To test this opinion, he took a plant of common groundsel (*Senècio vulgàris*), washed the roots clean, and divided them into two bundles. He introduced the one bunch of washed roots into a glass of water containing a small quantity of ulmate of ámmonia in solution; the other half he inserted into another glass vessel containing pure water. As the plant grew, he filled up with pure water. At the end of seven days, when the solution of ulmate of ammonia had become much lighter, evidently by absorption, he took the one containing pure water, which should have now contained humus, if again excreted; but, on evaporation, he found it to contain only a highly crystalline substance, of a light brown colour, more resembling gum than humus. Macaire also found, he says, that beans excreted a substance resembling gum: and, as he has proved that ulmate of ammonia must always exist in fertile soil, and as he has found plants cannot refuse anything offered to them in solution, having himself poisoned plants by making them grow in solutions of lead; therefore, beans must have absorbed ulmate of ammonia, and assimilated, not excreted, it. If we can prove, he continues, with one or two plants, that

ulmic acid absorbed by the roots can be assimilated, we may conclude it will be the same with all.

In the appendix he resumes the subject of ulmic acid, and says it is an important fact, resulting from the constitution of organic matter, that all the most abundant proximate principles of the vegetable and animal kingdoms *cannot undergo decay without producing ulmic acid.* During the formation of carbonic acid by the decomposition of any substance, as many atoms of hydrogen, he says, are evolved in the form of water as there are atoms of oxygen required to produce the carbonic acid; and this change cannot take place in any organic compound without the production of ulmic acid. In sugar, for instance, he says, composed of 12 atoms each of carbon, hydrogen, and oxygen, or C. 12, H. 12, O. 12, when 4 atoms of carbonic acid are formed, the result will be (4 C., O. 2) + (8 H., O.) + (C. 8, H. 4, O. 4); or 4 atoms of carbonic acid, 8 of water, and 4 of ulmic acid. In the same way with starch and lignin: for every atom of carbon, 2 of hydrogen and oxygen being evolved, the proportion will ultimately arrive at 2 of carbon for every 1 of hydrogen and oxygen, which is the proportion of ulmic acid. In the same way with animal albumen, composed of C. 15, H. 14, O. 6, N. 2; it is resolved, by the decomposition of 2 atoms of water, into (C., O. 2) + (2 N., H. 3) + (2 C., H. 2) + (C. 12, H. 6, O. 6); or 1 atom of carbonic acid, 2 of ammonia, 2 of carburetted hydrogen, and 6 of ulmic acid. Ulmic acid is, on this account, he says, constantly produced by the slow combustion or decomposition of all organic matter; and ulmate of ammonia, he concludes, is the true food of plants, as obtained from the soil: it contains, he says, $\frac{1}{12}$ part of nitrogen, and in no plant does the nitrogen amount to so great a proportion to the carbon; and it appears probable, he thinks, that no more carbon is obtained from the soil than is obtained in this way; the rest of the carbon is got from the air. Fallow plants thus, he says, regenerate the soil; as they require little nitrogen, and draw their carbon mostly from the air.

I have extracted thus largely from the above-noticed valuable essay on the subject of humus; as the question is much controverted at present, and it was impossible to do justice to the author's views in a more concentrated form. The action of ammonia, and carbonate of ammonia, on the humus in the soil, seems incontrovertibly established, and is very valuable and interesting. The chemical action of the soil on the ulmate of ammonia was not suspected; and if future experiments prove the truth of this conjecture, it will be found greatly to modify previously entertained opinions. In the experiment of pouring the ulmate of ammonia on the soil in the flower-pot, might not the

particles of soil act on the liquid, by absorbing the ulmate of ammonia from its solution in water, retaining it, and letting the water pass, without being decomposed into humus and ammonia? If the oxygen passed through the soil had been moist, not dry, would more not have been absorbed? Liebig says there is an atmosphere of carbonic acid formed in the soil around all the decaying portions of humus. There is much to convince us of the value of humus, and of its derivative, ulmate of ammonia; but it is surely carrying the matter too far, to assume it as the *sole* source of carbon and ammonia from the soil. Chemists seem too apt to deal in exclusives. Nature is seldom confined to one particular method of producing results; and nutritious substances will undoubtedly be exhibited in many different forms to the absorbent vessels of plants: Dr. Madden himself seems to be of that opinion. Carbonate of ammonia is the state in which it is principally found in urine, and the most valuable of manures: it is as soluble as the other in water, and as likely to be absorbed. There are, also, as observed before, the carbonic acid carried down by rain into the soil from the atmosphere, and that absorbed by the water of the soil from the carbonic acid produced by the decomposition of humus by oxygen, stated by Liebig to be in constant action; also, the carbon produced from the soluble organic substances absorbed by the roots, and from the carbonic or ulmic acid absorbed in union with potash and other alkaline substances. From the much slighter affinity of ammonia for acids than the other alkalies, from the large quantity above stated held in solution by potash, 360 gr. to 48 gr., and from the soda being a more powerful solvent still than potash, it is likely that much of the ulmic acid may go to plants in this form. Professor Thomson describes ulmin as it is found in the elm, being always here dissolved in carbonate of potash. The nitrogen, also, cannot *always* be from ulmate of ammonia; it is undoubtedly furnished from the nitric acid of the nitrates, as they are found to increase the gluten in wheat, in the same way as ammonia does; the small quantity of that of the atmosphere soluble in water will likely also give a part; and the carbonate of ammonia from the rain of the atmosphere, and of manures, may be absorbed as such: the possibility only, not the necessity, of its being converted into ulmate of ammonia, has been proved. Professor Dumas says, all the ammonia got from thunder-storms is in the form of nitrate of ammonia. It is, perhaps, not easy to say whether one twelfth part of the plant only is required of nitrogen. Professor Dumas says, M. Payen's researches teach us, that all the organs of the plant, without exception, begin by being formed of an azotated matter, analogous to fibrin; with which, at a later period, the cellular, ligneous, and amylaceous tissues are associated. This concrete fibrinous substance, he says,

constitutes the rudiments of the organs of plants. Liebig says, nitrogen is found in every part of the vegetable structure; if it is not found in the solids themselves, it is found in the fluids that surround them. As to the data given as proof that ulmic acid is *always* the result of decomposing substances, so many different substances are thrown together in the manured heap, and from the many different ways in which decomposition may take place, according to the state of heat and moisture, and their position with regard to each other, and the admission or deprivation of atmospheric air, that it will not be easy to say what may be the exact result. This is pointed out by Dr. Madden himself, in the decomposition of sugar forming the vinous fermentation by itself, and producing a very different result when mixed with other substances. The hydrogen and oxygen in sugar, starch, and lignin, though in the proportions of water, are not in the state of water; and it does not follow in the definition of the decomposition of sugar stated above, that, though 8 atoms of oxygen are absorbed to form 4 of carbonic acid, the sugar must yield 8 of hydrogen at the same time that it yields carbon. The 8 atoms of oxygen may have been got from the atmosphere: it appears, indeed, from the analysis, that either this or the 8 to form water must have been got from the air, or there is some error in the printing, as there is not oxygen sufficient for all in the sugar itself. If the oxygen to form carbonic acid is got from the air, it cannot affect the hydrogen of the sugar; nor, though got from the sugar, does it follow that hydrogen should be evolved, as the hydrogen and oxygen in the sugar are not in the state of water. It is probable, however, that decomposition often does produce ulmic acid: the brown-coloured liquid from all manures is very valuable, and probably contains both carbonate and ulmate of ammonia, besides humus and apotheme; and the further researches of this enterprising chemist will undoubtedly elucidate the subject still more. The water of peat moss contains ulmic acid, Professor Thomson says: it is probably, however, as Dr. Madden says, partly humus and apotheme, as well as ulmic acid, that is in the water; and the solution of tannin it contains is also brown-coloured. If this were poured on the ashes of burnt wood, the smaller the branches and the younger the twigs the better, ulmate of potash, a valuable manure, would be formed by the action of the potash of the wood. This may be partly the cause of the great effects of burnt ashes, applied to soils abounding in refuse of vegetables, and in compost among woods. Ulmate of potash is perhaps more the cause of growth than is at present imagined. The ashes of burnt wood often produce immense effect on the stem and foliage of potatoes and turnips, without a corresponding effect in the root: perhaps the great absorbing powers of charcoal for the ammonia of the

atmosphere may be in action also. If urine is poured on peat, both ulmate and carbonate of ammonia would be formed, and the peat fermented and rendered soluble. Dr. Madden does not say whether ulmate of ammonia is as volatile as the carbonate of ammonia, it probably is as much, from the feebleness of the acid noticed: if kept moderately cool, however, by turning the heap with the spade, when it approaches 100° (fermentation will go on 20° lower), and if kept from washing rains as before observed, a very valuable manure would be produced. In the *Gardener's Chronicle* lately, as copied from the *Bath Chronicle*, immense effects are stated to have been produced on four successive crops of wheat, from very poor land, by manuring with some prepared manure, of which carbonate of ammonia is the basis, at a cost of 20*s*. per pound. The editor, following the directions of Liebig, says it would be better converted into a sulphate of ammonia. The great waste, however, of carbonate of ammonia, if kept cool and mixed in composts till buried in the ground, has not been proved; in the guano, it appears to be long retained, and there is perhaps less waste than is imagined. Carbonate or ulmate of ammonia, producing both carbon and ammonia, must be much more eligible as the food of plants, than sulphuric acid (vitriol) and ammonia.

From the valuable remarks of Dr. Madden on the necessity of air and moisture, not wetness; the effect of water on heat by its evaporation and radiation, and on electricity by its conducting powers; but, above all, its effects on the chemical decomposition going on in the soil, the stomach of the plant; we see the benefits of keeping it in proper condition by draining, &c. "If the soil is too large-grained and sandy it does not combine properly with the organic matter; a proper proportion of clay, chiefly a hydrate of alumina, he says, in the form of an impalpable powder, is wanting; but too much of this prevents the the action of the air. The condition of the soil affects vegetation much." If too open by too much sand, evaporation and heat are both at times destructive and excessive. If too much small impalpable powder is in the soil, it gets close and adhesive, and solidifies too quickly, becoming cold and inactive. It is this clay, however, which absorbs and retains moisture and organic substances or their elements, and is indispensable. The benefits of cultivation are, by separating the soil into small pieces, to retain fixed air and heat, allowing the heat of the sun to penetrate freely, and retaining it by the nonconducting power of confined air. If left in large coarse pieces, the water evaporates and is carried down rapidly, the gaseous substances escape more, and heat is not confined; if in small pieces, the organic substances are more intimately mixed, moisture retained, and heat, to increase the chemical action. If broken up in damp weather, the

pieces are apt to be washed again together with the first heavy rain that occurs, and consolidation takes place. If done in dry weather, the pieces get hardened, the water passes them freely without consolidating; and if the pieces are small and dried, the soil in our damp climate is in the best possible state for a crop. Even where the atmosphere is generally more dry, if dug wet, the pieces get hard and impenetrable with the drought, and digging dry and breaking small will be best even there. The only danger in breaking very small is, that very heavy rains may consolidate more rapidly, and for strong seeds or plants it is generally left more rough, but for small seeds, pulverisation to a very small consistence is indispensable; and if done when the soil is dry, and gets a dry day or two afterwards, it generally keeps open through the summer. In old wrought land, especially if a sandy alluvial loam, the soil, being long worked, loses its tenacity, and the small pieces fall to powder too easily; the grains of soil do not attract one another so strongly as in newly turned up soil, virgin or maiden loam as it is called, in which the disintegration from the original state of stone has not proceeded so far as in worn out soil; the small pieces adhere more tenaciously in the grains of their substance to one another, and the mechanical texture is superior. For over-wrought land there is no remedy but trenching up the subsoil if it is good, or laying down to grass if not, till the soil, by consolidation and pressure, begins to assume the original state of stone from which it was formed, and the grains adhere more perfectly to one another. The pulverisation of the soil has much effect on the crop, and its benefits are immense in all but the most sandy soils. I have seen immense difference in the crops of potatoes, from the soil being well broken and the contrary: even breaking soil well with the rake, when in a sort of moist state between the wet and dry, thus reducing the rough clods to small pieces, I have seen produce great effect. The advantage of digging between the rows of potatoes planted with the plough, at an expense of 40*s.* per acre, has been lately stated in one of our periodicals, as producing an advantage of 15*l.* per acre. By the spade the ground is dug more deep and much better broke, and in populous districts, where labour is cheap, digging will be found nearly as cheap as ploughing; perhaps cheaper, if the depth and pulverisation be considered. Impressed with these ideas, the Highland Society has lately awarded premiums on a large scale, in the Highlands, for the encouragement of digging; and Sir Charles Ferguson of Kilkerran near Maybole, another great patron of agriculture in our county, has done the same at the village of Dailly, in the neighbourhood of his estate. Small pieces let out to cottagers have been found to produce immense returns; and the produce of ground might be very considerably increased, if

cheap digging were in many situations substituted for ploughing. Deep subsoil-ploughing is very expensive, as some who have had experience in that way allow: it has been rated much lower than digging, but I believe it is from want of calculation. Lately, in the *Ayr Advertiser*, a field was thought to have been very economically done, which, after the enclosure was well drained, had been subsoiled 9 in. deep, and the crowns of the ridges levelled with the spade, at an expense of 3*l.* 3*s.* per acre, or nearly $4\frac{3}{4}$*d.* per fall; which, I believe, could have been dug 10 in. deep for that sum, and the ground levelled in the digging.

Since the above was sent off I have seen the fourteenth number, for January, of Professor Johnston's *Lectures on Agricultural Chemistry*, in which there is an Appendix of Experiments for 1841, which may be had separately, at the price of 3*d.*, by any who have not an opportunity of getting the *Lectures* themselves, which are increasing in interest as they progress, and ought to be in the hands of all interested in the cultivation of the soil. The principal part of the experiments are those of Mr. Fleming of Barrochan, the gentleman alluded to in a former part of this essay; who, from his chemical knowledge, and the great variety of soils on his estate, joined to his spirited method of conducting the experiments, is likely to be the means of eliciting much information on these subjects. Some of the results are entirely different from former ones, as also from others in the same appendix, and point out the necessity of reiterated experiments in different situations and on a larger scale, before the action of these saline manures can be properly understood. In portioning off small pieces of land for experiment, it ought to be kept in view, that there is generally much difference in the quality of the ground even in the same park. I have seen in a quarter of potatoes the heads of the drills not to produce half the crop with the same quantity of manure, and the same also occurs often in the middle or bottom of the row. High ridges of stony ochry-coloured gravel will occur at one place, while another portion will be of a heavy stiff clay; and, again, another of a deep fine loam, which, to the depth of 2 ft., may be all put through a sieve: all these different qualities exist in the soil at present managed by myself in the nursery, and greater variety than this is often to be met with. I have seen pieces of a park where the potatoes, though better manured than the rest of the field, did not yield the same bulk of produce as the seed, while, within a few yards the crop was good. Such varieties exist more or less in all soils; and different soils are also more suitable for some seasons than others, and the same with manures. On all these accounts we should draw our inferences with caution, and not blind ourselves by becoming prejudiced to any opinions, till long and firmly established.

At Roselle, neither common salt (muriate of soda, or chloride of sodium) nor sulphate of soda was found to do any good, while at Barrochan the common salt applied to a crop of wheat, at the rate of 160 lb. per acre (the same as the nitrate), produced a much greater increase than the nitrate of soda; about one third part more on the crop, and three times more of increase, as compared with the undressed portion of the field. It produced, however, less than one twentieth part more of produce, as compared with the nitrate of soda and rape-dust mixed, and only one seventh part more of increase. The common salt and lime mixed, at the rate of 28 lb. of salt and 80 bushels of lime to the acre, produced only about one twelfth part more of produce as compared with the undressed portion. These experiments were made on portions of one eighth of an acre, or twenty falls; how far they might have

differed had the portions been larger, future experiments alone will determine. From Mr. Fleming's correct habits of observation, we may infer the quality of the soil would be as nearly equal as possible; but it is difficult to get all these matters properly adjusted. Portions of the manure given the year before to the potatoes may not have been so far decomposed as others; and pieces of open free stony soil may have wasted more of what was given. Causes may have been in operation years before that may have accumulated organic matter more in some portions of the soil than others; and while we see much to induce the likelihood of benefit from salt in some situations, we must limit our expectations till warranted by further trials on a larger scale. At Aske Hall, as we shall see hereafter, salt, at the rate of 6 bushels an acre, produced no corresponding effect. From the proximity of Roselle to the sea, there is likely to be more salt naturally in the soil.

At Barrochan, the sulphate of soda produced 12 per cent increase on the drill of potatoes, while the nitrate of soda produced 20 per cent; the mixture of the two, however, at the rate of two thirds of the sulphate to one third of the nitrate, produced the uncommon increase of 61 per cent. The foliage of the potatoes had here the same deep green healthy appearance of vigour as the nitrates produce, which those dressed with sulphates never have. On some potatoes in the garden an immense effect was produced by the same mixture. In a field of oats, some portions dressed with nitrates and sulphates by themselves produced no effect, while the mixture produced such an immense effect on the growth as might be seen from a great distance. The sulphate may be purchased for half the price of the other, carriage included, in some places for less; and will be a great saving of expense, besides the benefit, especially if further trials confirm the above, and if the more speedy action be not found to exhaust the benefits of the mixture sooner. The sulphate of soda was found to increase the produce of beans and peas a great deal in the garden, causing the stems of the former to tiller out to five or six stems from the same root, and increasing the well-filled pods in all. To leguminous crops the professor thinks the sulphate will be the more valuable. On winter rye the principal benefits were from the nitrates. To peat soil, Mr. Fleming found that, in a crop of oats, bones, especially when dissolved in sulphuric acid, were very valuable, as furnishing the phosphates required for the grain; it being generally found that oats on peat soils often grow more to stem than seed.

At Erskine (Lord Blantyre's), Mr. Wilson found that, on grass dressed with these manures in portions of one twentieth of an acre, he had decidedly the greater benefit from the nitrates, and found that all of the applications had much more effect on light land than on clay; perhaps from the cold inactive nature of the latter, the benefits, however, should last longer if this is the cause. The common salt, vitriol, and gypsum here produced little benefit: the sulphate of soda was next to the nitrates, but much inferior. Mr. Wilson here found the benefit of the nitrates to continue longer than in former experiments by others.

At Aske Hall (Earl of Zetland's), on a thin light soil, on a clay subsoil, and in a high bleak climate, Mr. Thompson found most benefit; to the green crop of hay about 25 per cent, to the dried hay about 23 per cent. The sulphuric acid and sulphate of soda had less produce than the undressed piece. The common salt at the rate of 6 bushels an acre, and the soot at the rate of 20 bushels an acre, produced about 9 to 6 per cent of benefit in the green crop, and 27 to 25 per cent of increase in the dried hay. The nitrates have always most effect at first on the green and succulent growth of the stem and foliage, and in clear light sunny weather to carry on the action of the leaves; we may find this greater in other seasons, as compared with the last, which throughout was dull and cloudy, and would have a powerful influence in lessening the chemical action on the substances in the leaf, thus decreasing the produce.

The modes of action of these saline manures are not well understood yet. If we suppose them to act as food, and limit the meaning of this term to its general acceptation of nutritious substances, the carbonates and nitrates, and the salts of ammonia, will be principally valuable. If we extend the meaning of the term food, so as to include everything absorbed as constituents of the plant, the salts of potash and lime, and the phosphates and silicates, will be the next most valuable; the sulphates and muriates, and the salts of soda, are found only in small quantities in cultivated plants. If we allow part of the action to be as condiments, in the way in which common salt is beneficial to animals, and that they act in assisting the chemical compositions and decompositions going on in the *sap* of the plant, which has not yet been taken into view, we must trust to observation and experiment for a knowledge of their effects in this way; what is not absorbed as a constituent will be excreted, and though great effects may be produced from small quantities, the limits of application will be sooner attained. If, again, we take another view of the subject, and consider these substances to act chemically in the *soil*, the stomach of the plant, dissolving the insoluble organic substances abounding more or less in all soils; the sulphates and muriates, or the acids themselves of these substances, and the salts of soda, potash, and ammonia, especially the first, will have the most powerful effect. The benefits, however, of all these as solvents would cease, as lime does with the applications if long-continued; and in poor soils, as in the border at Roselle, common farm-yard manure would be predominant. As food, except for the nutritious substances, the quantities needed, especially of some sorts, are so small, that a limit in the benefit of their application may be soon arrived at, and in some places sooner than in others. To such as grain crops from peat soils, the phosphates and silicates would be most needed; and the phosphates from bones, and the chaff of grains, which in some places is sold cheap, would be very beneficial; the silicates would be got from the straw of former crops on other soils. The small quantities of sulphuric acid, soda, and common salt, needed as constituents, would likely be found naturally, in sufficient quantity, in the soil and the ordinary manures applied. Analyses of different plants, in different soils, and repeated, are much wanted to enable decisions to be arrived at. On such subjects we are likely to obtain much valuable information from Professor Johnston, as the *Lectures* proceed; from his great chemical knowledge, joined to the accumulation of experiments conducted under his direction, and from the great ardour he displays in the cause, which ought to be fostered and encouraged by every means, as the benefit is a national one in which all are interested. Of guano, the professor gives two analyses of his own, which reduce the quantities of ammonia very much from all formerly published analysations; one of them only about 8 per cent, instead of 30 and upwards as before. He gives also a table and prices of a method of making artificial guano, at a much cheaper rate than the imported.

Art. VI. *The Landscape-Gardening of F. L. von Sckell of Munich,* Translated from the German for the "Gardener's Magazine.

(*Continued from our preceding Volume,* p. 605.)

XI. *When Lakes can be introduced in Gardens they add extremely to their Beauty. How to form and stake them out, &c.*

1. The character of a lake is very different from that of a stream, because the former extends both in length and breadth,

and is provided with deep bays or inlets. The lake again, is very similar to the pond: both are peaceful and still pieces of water, and the difference of character consists in this:—*a.* The lake requires a great extent, not so the pond:—*b.* The lake requires at least on one side an open space and a free horizon; the pond more repose: it should be overhung by shrubs, and its banks veiled in a dull shade:—*c.* The banks of the lake should be scattered here and there with high detached trees, with thick woods and low bushes, and should even be enlivened by buildings. The pond requires a thick plantation, no view from it, and no buildings; its character is loneliness and a quiet imaginative repose, and its true ornament is simplicity.

2. It often happens that in forming lakes in a garden, the necessary extent cannot be given them even with the very best intention, and recourse is therefore had to deception, which can be put in practice in the following manner:—

In open places where the eye is lost in the distance, the banks should be quite low and almost on a level with the water, so that the eye passing over both surfaces, may not perceive a distinct margin and line of separation, by which means the limited size of the lake seems magnified and deceives the eye of the spectator. No trees, shrubs, or buildings should find a place there, because their size being well known might be the means of discovering what is unknown by a comparison. An oak 100 ft. high on the banks of a lake, would make it appear very small; but optics and perspective, with which the landscape-gardener should be well acquainted, show all the causes and effects of these well-known appearances and delusions, a few examples of which I here subjoin:—

a. If the decorations of a theatre for children were made in proportion to their size, as a theatre is for grown up persons, the children would then appear like men and women; and if a grown up man were to make his appearance among the decorations diminished in proportion to the size of the children, he would appear like a giant.

b. A colossal high tower when placed near a small one, will appear still more colossal, and the small one will appear still smaller than it really is.

c. Two men of the same size, the one standing by the side of a stately palace, and the other by the side of the cottage of a peasant, would appear of different magnitudes; the first would appear small, and the second large.

d. Figures either painted or in plastic materials which decorate the interior or exterior façades of buildings, if represented of a colossal size, make the architectural proportions appear on a much smaller scale than they really are. The sun when

rising and setting appears larger, because it can be compared with the smaller terrestrial objects.

e. Every object which approaches the nearest to the spectator's point of sight increases in size, distinctness, and high colouring, while those which are farther from him diminish in form and colour.

f. Trees of the same height also appear in different proportions according as they are near or distant from the point of sight, &c.

Similar deceptions are innumerable, and when such circumstances present themselves, the landscape-gardener should take advantage of them judiciously; but above all things he must avoid having:—

a. A small temple about 50 ft. high, with the pillars not more than 2 ft. in diameter (but which is in the best proportion with the limited-sized garden in which it stands), surrounded by trees of 70 or 80 ft. in height, thus far surmounting the temple itself in height. Such a temple would then appear still smaller than it really is, which would be quite inexcusable.

b. A moderately sized elevated spot of not more than 8 or 10 ft. in height, should not be planted with trees that will grow seven or eight times higher, as such an elevation would by that means be scarcely perceptible, whereas if it were covered with low flowering shrubs, or even if it were quite bare, so that its limited height could not be compared with anything on its surface, it would appear much higher and have a more striking character.

c. Ha-has, which should have no perceptible boundary or limit, ought to be assiduously adopted where the garden scenery is wanting in extent. By this means the beauty of the external landscape is united with the limited garden, and the delusion is effected in the confined space. When the extent admits, the paths should not pass too near the ha-has, as the deception would then be discovered. The landscape-gardener should carefully avoid planting very small gardens with very high trees of the first class, as the gardens would thereby appear diminished in size.

Trees of a lower growth, which belong to the third and fourth classes, and shrubs of the sixth and seventh classes, are more in unison with so limited a space, and they also afford shade.

The landscape-gardener should also avoid deception in buildings, by making them appear at a distance what they are not, but which on closer inspection are found to be impositions. A temple consisting only of a façade, a representation of a bridge over which you cannot pass, are imperfections and falsities, the employment of which I cannot recommend, for in

forming a garden the lovely virtue truth should always be the guide for the landscape-gardener.

Low banks, besides making the surface of a piece of water appear larger than it really is, have also the advantage of not concealing the water from our view; and, if the appearance of low banks is not romantic, it is at least more agreeable than those that are high, steep, and irregular; they are also less expensive, because low banks seldom give way, or are not so liable to do so. When rowing in a boat they do not intercept the view like those that are high, &c.; besides it would not be natural to have a piece of water equally surrounded with high banks. It is necessary, therefore, that the ground should be gently elevated here and there, at about 6 or 12 ft. from the water, so that there be no danger from the banks giving way. There should also be masses of rocks here and there along the banks, as they not only dignify, but give more character, power, and romantic effect.

If hills are formed on the banks of a lake or piece of water, they should be made to appear as natural as possible, so that they may not awaken the idea that they are merely there from the soil being thrown up from the lake when it was formed; this would weaken the deception of both objects. Of all things do not let the size of the lake deceive you when it is empty, as every piece of water appears smaller when full than when it is empty, and *vice versâ;* and the reason of this is, that the concave line of the bed of the water is really larger than the horizontal line described by the surface of the water.

The landscape-gardener must therefore be on his guard, and not allow himself to be deceived with the apparent magnitude of an empty lake or pond. A section will convince him, that, as the concave line of the bed of the water is longer than the horizontal line of the water's surface, his lakes and ponds will appear smaller when filled with water than they would when empty.

3. Lakes admit also of inlets, and these may be allowed to stretch as far into the land as the locality permits.

These inlets should have such a formation that their terminations may not be perceived, so as to give the idea of concealed magnitude and extent of the water's surface, and thus to deceive the imagination. These inlets also produce another very interesting effect if formed as has been already mentioned, so that the ends of them be not seen; and this is, that the belief may thereby be created, that the points of these inlets are perhaps united and thus form islands. When such deceptions are effected, the paths should not pass too near them.

4. Lakes and ponds should be drawn on the ground and

staked out, as much as possible indicating all their essential outlines; and, besides the stakes which are used, there should also be pegs put in to designate the height of the water, without which such a work need not be begun, and the quickest way to ascertain the level for these pegs is by means of the water-level.

5. The places made for the entrance and outlet of the water must be regulated according to the depth of the lake or piece of water, so that no unnecessary or expensive labour in the groundwork may be undertaken; and the bed of the lake should rather incline towards the place for the outlet of the water, so that it can be laid dry either for catching the fish or for clearing away the mud. It is also desirable to let the lake have several places for the outlet of the water, because, by this means and the operation of various currents of wind, the water is preserved much cleaner.

6. Rivers, streams, lakes, and ponds in gardens, should never be more than 3 ft. or at most 4 ft. deep, so that every danger of drowning may be prevented; and, above all, there should be nothing in a garden that is dangerous to those who walk there.

(*To be continued.*)

Art. VII. *On Transplanting large Trees.* By James Munro.

When my method of preparing large trees for transplanting was published in the *Quarterly Journal of Agriculture* for March 1833, it will be in your recollection, that, on republishing the essence of that paper in the *Gardener's Magazine*, you concluded your remarks by expressing a hope that some one of your readers, who might have the opportunity, would give this mode of preparing a more extensive trial, and report to you thereon.

On reading your request, I felt anxious to repeat my experiment on a larger scale, and on different kinds of hard-wooded trees. I was also persuaded that my mode of preparing was susceptible of improvement, whereby the expense of performing the work might be materially diminished. Therefore, in the spring of 1833, I solicited, and readily obtained, permission of Lord Panmure to practise on some trees in the ornamental plantations about Brechin Castle, being, at that time, in the immediate neighbourhood; and having had at all times access and opportunity to observe the progress of my improvements. On the 25th of April, 1833, I selected for my purpose two oaks, one elm, one sycamore, and one beech, for the dimensions of which, with other particulars, I refer to the following table:—

	Diameter of the Balls left.		Extremé Height of the Tree.	Girth at the Ground.		Girth at 5 ft. from he Ground.	
	Ft.	In.	Ft.	Ft.	In.	Ft.	In.
No. 1. Beech, prepared with the trench covered close over	5	1	34½	2	10	1	10
2. Oak, ditto, with trench left exposed - -	5	3	40	2	8	1	10
3. Oak, ditto, ditto -	5	0	37	2	6	1	11
4. Plane, ditto, ditto -	4	9	29	2	3	1	10
5. Elm, Scotch, ditto, ditto -	5	2	36½	3	0	1	10

On performing my experiment, for the first time, in 1824, I had the trench roofed over with old rails, and any other flat pieces of wood that I could get, and I then covered the whole with thick turf. In this state the tree stood for one year, and was then planted out. Subsequent consideration, however, convinced me that trees left with balls of the size mentioned in the above table, could not require the trench to be covered over in the manner described. Upon this conviction I acted in this experiment, except in the case of the beech, even although I had determined that the subjects of this novel essay should remain under the preparing process during the summers of 1833 and 1834. I made frequent visits to the scene of my operations, for the purpose of marking minutely every circumstance connected with this experiment.

The result of my observations was as follows:—In the spring of both seasons the foliage upon these trees was expanded as early as that of the other trees of the same kinds in the plantation. The leaves upon the beech, the sycamore, and the elm, were certainly much smaller than the leaves upon the same sorts around them were: upon the two oaks the preparing seemed to take very little effect, they made more young spray in both the seasons than any of the other three did. But the most defective of all, in appearance, was the beech. Whether I had encroached too far upon the roots of this tree when forming the ball, or whether the accumulation of stagnant air within the trench in consequence of its being closely covered up had produced any bad effects, I cannot at present decide; still, I am strongly of opinion that the latter was the case. Whatever was the cause, the tree looked the most unhealthy and stunted during the whole period of preparation.

On the 3rd of April, 1835, I had pits opened at the distance of 530 yards * from where the trees grew, and, as each was

* Sir Henry Steuart allows half a mile as the medium distance to which large trees are likely to be moved.

brought forward and placed in its respective pit, the earth was well broken and firmly beaten down all round the ball. It may be worthy of notice, that I have my pits made wider at the bottom than at the mouth, and that the mouth of the pit is not much larger than the diameter of the ball to be inserted. Large trees put into pits made after this fashion require no props. It is possible, that in strong clay land during a gale of wind, accompanied with much rain, a tree now and then may be driven a little to one side, but this seldom happens if the work has been properly executed.

In the winter and spring of 1837, I had upwards of 80 large oak trees prepared, and I find that, although I had hotter and drier summers to deal with, still the size of the balls given in the preceding table is quite capable of affording the necessary protection to the roots within for a number of years; at the same time I consider it would be an advantage if the diameter of the balls were increased by from 4 to 6 inches, and such a ball I consider large enough for any tree about to be removed by the preparing process. In short, if the extending roots are to be severed at a greater distance than 3 ft. from the plant all round, transplanting may as well commence at once.

Of the above quantity which I had prepared in 1837, in the course of the two following seasons I removed about 60 to a distance of from two to three miles, and although not one of them may be said to have died, still my success has been but indifferent. Many have, in a great measure, lost their tops, but are beginning to throw out young spray all along some of the principal branches and the stem. My failure, however, will be easily accounted for by practical men, when I mention what I believe to be the chief causes. First, the greater portion of my trees were planted after they had undergone preparation for one year only, and I think for trees upwards of 50 years of age, few, conversant with the subject, will dispute the necessity of such subjects being at least three years under the process. Secondly, having no other resource, I was compelled to take my trees from a sheltered place to an open field where the soil, if any thing, was more sterile than that in which they had been grown, while its surface is the most exposed and bleak of any spot in the county of Forfar. Thirdly, I used no compost or manure in planting: and last, though not least, I omitted, in planting, to place my trees in the same position with regard to aspect as that in which they were grown; at least, the chances are that this was the case.

The planting of large trees in a reversed position, I believe to be more detrimental than many would at first suppose. All practical men are aware of the fact, that, when felling timber trees, the pith, or heart, is seldom found exactly in the centre,

as most people imagine, but is found deviating from the central position, and approximating to that side of the stem facing the south, or, at least, to that side from which the tree has received the greatest amount of warmth and shelter; while, on the contrary, the greater part of the woody fibre has been deposited between the pith, or heart, and that point from which the greatest degree of cold proceeds. Doubtless this enlargement of the fibre towards the coldest aspect is a provision of nature's to guard against the severity of climate, and therefore requires to be attended to if we would transplant successfully.

But to return to preparation. I have still from 20 to 30 that have not been moved, and which have stood since the winter of 1837 with the trenches round the balls open; these I intend to plant out in the course of 1842, some in April, and some in June, when in full leaf. At present, I consider them in the proper condition for removing. They seemingly have received all the benefits that preparing is calculated to bestow. Every season since they underwent the operation they have put forth leaves at the usual period; but it was only last summer that they seemed to have recovered, and began to throw out young twigs all over the surface of the bark, and thereby exhibited signs of active vitality.

As it may interest some of your readers, I may as well notice that the expense of removing the five trees at Brechin Castle amounted to 17*s.* 11*d.* in all, or about 3*s.* 7*d.* per tree. To this I may add, that the soil was light loam and easily worked; the road was also good. Those which I transplanted in 1838 and 1839 were carried a distance of from two to three miles, and cost about 12*s.* a tree; this sum, great as I consider it, would have been still greater if I had not occupied two machines, both of which we loaded in the evening, the horses started in the morning with one of the trees, and as soon as they returned with the empty carriage it was loaded, while the other carriage was on its way, so that no time was lost.

I shall now, in conclusion, for the use of such as may ever remove large trees, state a few observations connected with the subject, which they may keep in view. Equality of soil should, if possible, be studied. If a tree is moved from a dry soil to one that is rather moist, success is almost certain; but it is seldom that a tree taken from a damp soil will succeed on one that is dry. I have had experience of this again and again. Three years ago I removed a large horsechestnut from dry rocky ground into a strong, cold, clay soil, four miles off. Last summer it flowered, and appears never to have felt any effects from its change. I carried back upon the carriage an oak containing 14 ft. cubic of timber, and planted it in the field from which the chestnut was taken; but even with copious watering I could not

save it. All the head died during the first summer after planting, and now life lingers only on one side of the stem.

Similarity of soil and aspect will be found to be the safest guide in the successful removal of grown up trees; but I would say, above all, never attempt to move from a damp to a dry ground, as the chances are fifty to one against success.

Castle Ashby, December, 1841.

Art. VIII. *On warming and moistening, and on preserving Heat and Moisture in Plant Structures.* By N. M. T.

This severe time of the year, when the climate of hothouses is purely artificial, and much force required to counteract the rigour of the natural one, affords the best opportunity to ascertain which of the many devices applied to effect this is really best adapted to the purpose. If a certain degree of heat or any single quality constituted a congenial atmosphere, the question would be of easy solution, and the many claimants of superiority easier brought to the test of proof; but the numerous requisites, and their necessarily accurate proportions, render it a most difficult task. Whatever besides may be required, heat to a certain degree is indispensable; and it is astonishing to think of the progress that was made, particularly in the culture of fruit, when this was held to be almost all that was necessary. Next to heat, moisture holds the most important place; nevertheless, until lately it was in a great measure overlooked, and, when taken up, has, in all probability, been carried too far; at least much has been scientifically urged as of the greatest importance that is of little moment in practice, and to which I cannot entirely subscribe. I allude more particularly to the ruinous drain said to exist upon the moisture of the house, caused by the discrepancy between the external and internal atmospheres.

I object to the extent to which this has been carried, simply because I do not think that it is an evil of the magnitude represented; since, if it were, vegetation would more materially suffer, and preventives properly applied would prove beneficial, which is not the case. The now nearly obsolete brick flue, by absorbing considerable moisture from the air of the house, and carrying it out with the smoke and waste air, is said materially to aggravate the evil. This to me is not evident. I am not going to advocate flues, being convinced that there are substitutes vastly superior; still this is no reason that they should suffer any unfounded imputations. The charge I consider nearly unfounded, for the following reasons. A piece of cast-iron

pipe, heated to the same degree as an equal surface of bricks, will extract the moisture from any substance (a wet cloth, for example) as readily, which must be admitted; and the two bodies will act upon the moisture contained in air in the same manner. But it is said that the moisture extracted by the heated pipe is driven into the body of the house, while the brick surface absorbs, and carries it out of the house. I think not, as the moisture extracted in the process of drying the piece of cloth instanced is turned into palpable vapour, and also palpably driven back into the house; or, rather, being rarefied, it flies upwards until it comes in contact with the radiating and cooling surface of the glass roof, where it is condensed, and falls into the house, or is carried into the gutter outside, as the case may be; but in either case it is driven back by the heated or extracting surface, with which, unless confined, it cannot possibly be brought in contact. Therefore, unless the invisible part of such moisture is governed by laws different from those which govern the grosser, or visible, part, which is improbable, perhaps impossible, the above theory falls to the ground; that is, while the flues are hotter than the air, or substances that surround them, as, if I conclude aright, moisture is repelled (and cannot be absorbed) by any thing hotter than itself. When flues, after being heated and all the moisture they contain driven off, become cold, then, it is true, they will greedily absorb moisture until they are equally saturated with the air, or substances that surround them; but, when heat is again applied, the inside of the flue is first acted upon, and consequently the greatest part of even this moisture is driven back, as may be observed, by the steam created upon the application of heat to a flue in this condition. Thus, as regards moisture, I do not see much to prefer in pipes, to flues heated to the same degree: but the greater objection to which flues must ever be liable, is their aptness to become heated to a destructive extent, while pipes can never be so heated.

Having thus stated why I think the quantity of moisture absorbed of no moment, I will state why I consider that the aridity said to prevail in plant-houses has also been overrated, and mention, in support of this, some simple facts that are every day occurring before the eyes of the observant. Suppose a day of strong sunshine (during hard weather) when air has been freely admitted; then draw up your sashes, and fasten the ends of the cords, or sash-lines, that hold them up, to holdfasts in the wall; then go at midnight, or any other time after strong fires and radiations have (as is held forth) reduced the internal air to a very cinder of its former self. Under such circumstances, aggravate them as you may, examine your sashes,

and mark the result; they, from additional moisture, will have become so contracted, that any sash not pulled quite home at the time of shutting up will be found drawn up possibly an inch, and the lines of those drawn close in the first instance will be so tightened that it is difficult to untie them, tightened in fact, almost to snapping. Yet, recollect that these infallible hygrometers, previously to being fastened, were steeped, if I may so express it, in air containing moisture in its natural proportions; and it appears incredible to me that they should gain this after-excess in an atmosphere destitute of it, nor can I well conceive how living vegetables can be starved for want of that which inert vegetable matters, confined in the same place, receive in such superabundance.

Then, in conclusion, I contend that, were the evil not overrated, the application of perfect preventives would be productive of beneficial results; but this is not the case. I do not speak this unadvisedly, it is a conclusion that has been forced upon me by experience, in defiance of previous prepossessions to the contrary; after a constant trial of five years' duration, and after paying all the attention I am capable of to the subject during that time, I do not consider them beneficial. My predecessor considered them highly injurious; I do not go so far as this, but admit that, without great caution in using them, they would no doubt prove so. The preventives of radiation mentioned consist of well made wooden shutters, fitted as closely as most parlour doors, perfectly water-tight, and all but air-tight, and being, when applied, about 2 in. from the glass. The space between soon becomes filled with heated air, rendering them most economical, and capable of affording a most comfortable security during seasons of extreme severity; and in these respects they have my warmest approbation. But I have only been considering them as auxiliaries to the creation of congenial atmospheres for plants, and finding that they very materially lessen the supposed cause of an ungenial one, without producing a corresponding improvement, I have concluded that the cause is undeserving of the importance that has been attached to it. Without extreme caution in the application of such preventives, the worst effects will soon become apparent. Although I am not prepared to say why, I find that, upon the shutters being put on, the internal temperature is raised about five degrees or thereabouts in ordinary circumstances, in cases of cold rain or high winds more, therefore the injury they cause may probably proceed from this; the plants are enclosed in total darkness, with an almost instantaneous and most unnatural increase of temperature, in some measure maintained through the night, and the same amount of depression when the shutters are

removed, and light admitted in the morning. In houses heated by combustion this can in some measure be guarded against, but in those heated by fermenting substances the evil becomes aggravated; and to structures heated by such materials I cannot see the utility of this application, as economy here cannot be the motive; materials capable of maintaining a sufficient temperature during a sunless winter's day will in all cases be sufficient during night, when a fall of temperature is so beneficial; yet these structures are covered more than all others, the evils not becoming so apparent, possibly because the plants there contained are generally but of annual growth. The debilitating effect of covering houses heated by fire is particularly perceptible in vineries, probably from the position that the plants occupy in the house. Thus, were economy not a material object, heating power at command, and the good of the plants the only consideration, I certainly should add no covering to the glass roof. The scientific may well smile at the homely arguments here used, but they are level to the capacity of many interested, who (like the writer) could not discuss them in a more philosophical manner.

Folkstone, January 14. 1842.

Art. IX. *On a Mode of securely fastening Mats or other wove Coverings on the Sashes of Pits and Frames.* By H. C. Ogle.

The following is the description of a method of securely fastening mats or other coverings on pits and frames: it is superior to any other mode I am acquainted with, and, I believe, requires but to be known, to be generally adopted. It effectually answers the purpose it is intended for, is not expensive, is easy of application, and entirely obviates the necessity of driving some scores of nails every night, or of having a quantity of boards lying in all directions in the melon ground, for the purpose of placing on the covering of the frames, to prevent its being blown away. The breakage of glass by this latter method is usually a large item in the glazier's account, which the plan I am about to describe will be a saving of. This is of great importance, independently altogether of its other merit. There are at this place about fifty lights fitted with wires, and I know of no objection to them whatever.

Three pieces of iron, of the form of *fig.* 5. *a*, are screwed on to the end of the frame, one piece at the top, another at the bottom, and the other in the middle, so that the top of the iron is about 2 in. above the light; on the opposite end, three pieces, of the form of *c*, are screwed on at the same distances as *a*; *b* is

a side view of *a*, and *d* is a side view of *c*. A wire, three eighths of an inch in diameter, and rather longer than the frame it is

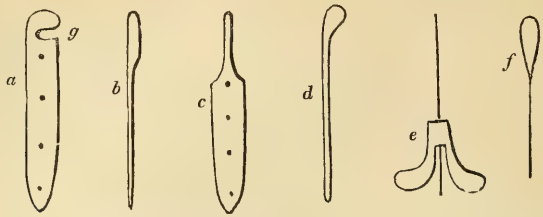

Fig. 5. *Details of Wire Fastenings for keeping Mats on Frames; one sixth of the full size.*

intended for, must be made with a loop at one end (*f*), to place over the iron *d;* the other end must be fitted with a thumb-screw (*e*), to screw up the wire when it is placed in the notch *g*, which should be counter-sunk in the centre. Small hooks should be driven in the frames, either front or back, to lay the wires in when not in use. The irons for the middle wire may be put on so that it may be screwed at the opposite end to the other two.

It may be proper to add that the mode of fastening on mats is the invention of Mr. Smith, my predecessor, and the present steward. — *Rosehill, Sussex, Jan.* 1842.

Art. X. *Notice of some Ornamental Trees and Shrubs recently sent to Britain by Messrs. Booth of Hamburg.* By John Booth.

[Having written to Messrs. Booth for some account of the *A*cer cólchicum, for the *Supplement* to the *Abridgement* of our *Arboretum Britannicum,* they kindly sent us what follows.]

A*cer cólchicum*, named thus by Hartwiss, is indigenous to the Abchasian country, which lies between lat. 42° 30′ and 44° 45′ N., and between long. 37° 3′ and 40° 36′ E. The bark, particularly of the young shoots, has a greenish colour, resembling in this respect that of the *Negúndo f*raxinifòlia, while the leaf resembles that of the *A*cer Lobèl*ii*. Hartwiss and Steven are decided in considering it a distinct species. Along with this species I imported a variety of it, which I have named

A*cer cólchicum var. rùbrum* Booth. In point of appearance, this is the more desirable tree of the two. From the beginning of the season till late in autumn, the leaves are of a bright pinkish purple colour, and the bark is brownish. The first plants that were sent to Europe I received from Professor Hartwiss. Both the species and the variety have here proved hardy. Plants in our arboretum, exposed and unprotected during the winter of 1840–41, sustained no injury whatever.

In order to fill up the sheet, I shall mention a few other desirable trees and shrubs, some of which may not yet be known to you.

A*cer campéstre frúctu rùbro.* This variety has red-coloured keys.

A*cer campéstre heterocárpum.* A variety from Austria, with variously formed and twisted keys.

A*cer campéstre taúricum.* Of more rapid growth than the species with larger leaves.

P*ícea Nordmann*iàna *Steven. Gard. Mag.*, 1839, p. 226.; and *Arb. Brit. Abridged*, p. 1042. fig. 1950. A handsome, and certainly distinct, species of silver fir from the south-western Caucasus. The leaves are about an inch long, and obtuse, thickly crowded, and of a dark green above; beneath they have two silvery glaucous stripes.

The plants in my collection are imported, and about five years old. The branches have a tendency to droop or to become pendulous, which gives the plants a graceful appearance. From its native country and habitat, I expect it will prove hardy.

A*lnus denticulàta* Fischer. A new species from Russia, sent by Dr. Fischer. I have received no description with it, and can therefore only state that it is a tree of vigorous rapid growth, and hardy, with very large and somewhat indented leaves.

F*àgus sylvática var. cochleàta* Booth. A very distinct new variety, with spoon-shaped leaves; curious and ornamental.

Q*uércus rùbra t*araxacifòlia Booth. Raised from seeds imported from North America. The habit of the original plant is slender and graceful; it is five years old and 7 ft. high. The dandelion-shaped leaves give it a highly interesting appearance. It is one of the most distinct varieties I know.

Sophòra *japónica pubéscens* Hort. The upper surface of the leaf is smooth and shining; beneath it is hairy.

G*enísta thyrsiflòra* Booth. Raised from seed from the South of Europe; a very ornamental hardy shrub, growing about 4 ft. high, with large clusters of yellow flowers, quite expressive of the specific name.

C*árpinus* B*étulus heterophýlla* Booth. A curious variety or sub-species. Some branches of the tree are covered with leaves quite similar to the common hornbeam, whilst others on the same tree have small indented leaves.

A*trágene sibírica flòre álbo* Booth. *A.* sibírica *Arb. Brit. Abridged*, p. 17. fig. 27. Raised from seeds of *A*trágene sibírica. Pure white flowers, very ornamental.

H*édera* H*èlix var. taúrica.* A distinct variety, with very small dark green leaves, and of less vigorous growth than the species.

R*hámnus* p*runifòlius* Booth. A shrub from North America, with small curled leaves, and of stinted growth. Quite hardy.

C*ýtisus purpùreus incarnàtus* Booth. This is a beautiful new variety, with large pale flesh-coloured, or blush flowers, between *C.* purpùreus and *C.* p. flòre álbo. Raised here from seed. It is very distinct, and a desirable ornamental shrub.

F*ráxinus oxyphýlla taúrica.* This variety has much smaller and more graceful leaves than the species. It is quite hardy.

Flöttbeck Nurseries, Jan. 4. 1842.

Art. XI. *Remarks on ornamental Forestry.* By A. S. M.

Ornamental trees require not the assistance of the pruner. Their branches should be secure from the unhallowed interference of his chisel and his knife. But, though trees intended for ornament should be thus left to grow as they please as regards pruning, they can never form a pleasing feature in the landscape unless much attention is paid to the manner of grouping them when at first planted. When a piece of ground is planted with an exclusive view to profit, the trees are generally placed at equal distances over the surface of the ground, each one, of course, in the soil it loves best; whereas, in planting for effect, not only have trees to be placed in the soil most favourable to their growth, but the different forms of their heads, their connexion with each other and with the surrounding scenery, must all be considered before a line is staked out or a spade put into the ground. Are you planting in the bottom of a narrow valley by the sides of a running brook, then plant your collection of salixes there, and next them your poplars, that it may be known from a distance that water is there. Take care, however, not to fill all the bottom of the valley with tall-growing trees, else you will make it appear that there is no valley there at all. Leave open spaces here and there, that the surface of the ground may be seen, and the windings of the brook traced from the neighbouring rising grounds. As you ascend the sides of the valley, let the ash and the elm give place to the oak; and so on till you reach the summit of the rocks, where the pine tribes love to strike their roots and wave to the winter's blast. If there is a green knoll at the place, it must be left bare, and surrounded by the beech and the oak, the moonlight screen of the fairy inhabitants of all such green mounds, and mushrooms should be introduced to serve them for tables to sit around on their feast nights.

Perthshire, Dec. 1841.

Art. XII. *On the Cultivation of the Genus Lobèlia.* By G. Fielder.

Having been very successful in the cultivation of this peculiarly interesting family of plants, and thinking my method of growing them may be of service to some of the readers of the *Gardener's Magazine*, I forward it you for insertion in that useful and interesting publication, if you consider it worthy a place there.

About the last week in February, or the first in March, I take off as many suckers from the old stools as I require for bedding out in the summer, and pot them in a mixture of loam, peat, and sand, in 60-sized pots; I then place them in a heat of 65°. When the pots are filled with roots, I pot them in 48-sized, and replace them in the same temperature. In a little time they require to be shifted into 32-sized pots, and should then be placed in a greenhouse for a week or ten days; and afterwards in a cold frame to harden off, where they are to remain till they are turned out in beds in the flower-garden, which are prepared in the following manner. In the beginning of May, the soil is to be taken out to the depth of 1 ft., and the bottom loosened up; the bed is then filled to within 2 in. of the top with one half loam, rather stiff than light, and one half good rotten dung from a cucumber or melon bed; it is afterwards filled up with some of the soil that was taken out, and as soon as settled, the plants are turned out at about 1 ft. apart, the highest in the centre.

The species I have thus cultivated are cardinàlis, spléndens, propínqua, and syphilítica. Plants thus grown begin to flower early in July, and continue to do so through the autumn, in a manner that well repays the extra trouble of this mode of cultivation; as a proof of which, I exhibited a specimen of propínqua, last September, at the Battle and Hastings Horticultural Show, for which I was awarded the first prize for hardy plants: it measured 6 in. in circumference at the base of the stem, and the height of the centre spike was 5 ft.; it attracted the universal admiration of the company present.

Bohemia Park Gardens, January, 1842.

Art. XIII. *On cutting out and naming Labels for French Roses.* By I. Twigg.

I send an economical mode of cutting and naming labels for rose trees for the *Gardeners' Magazine*, if you deem it worthy of a place there.

Fig. 6., of one half the regular size, shows how to cut the labels out with little waste.

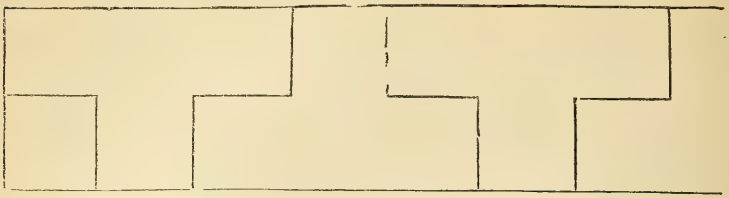

Fig. 6. *A Piece of Zinc or Sheet Lead marked for cutting into Labels.*

Fig. 7. is a label of the full size, which is 3 in. long by 1 in. broad, with a neck 1 in. in length, which gives room for the number and abbreviation, and also the wire to fasten it to the tree. The labels may be cut to any size required, by letting the neck occupy only one third the length of the label; but the size shown at *fig.* 7. will be found sufficient for rose trees. The labels may be cut out of sheet lead, and the names indented with steel types, or out of zinc plate, and painted.

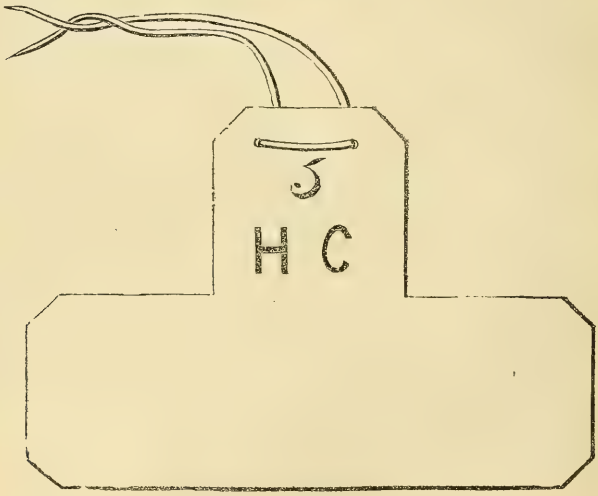

Fig. 7. *Zinc Label.*

Tin labels painted of an invisible green, with white letters, and varnished over with copal varnish, would be more elegant.

Zinc labels would be more durable than tin ones; but I have mentioned the former on account of their being so easily cut with a pair of shears.

As the greater part of the names of roses are French, it would

be better to write them with a hair pencil than to indent them with type, because, in the former case, the accents and cedilla may be added to them with ease; for, if they be left out, it would puzzle a person, not a French scholar, to pronounce them properly. A memorandum book will be required, in which the names must be arranged according to their classes, and each class numbered separately, that is, each class must commence with No. 1.; which number and abbreviation will be found convenient in case of budding. As some of the names are to be found in several of the classes, it is necessary to have an abbreviation of the class and number of the rose on the label, as shown in *fig.* 7.

The following is a list of the abbreviations: —

A.	Alba.	Mic.	Microphylla.
Au. B.	Austrian Briar.	Min.	Miniature.
B.	Bourbon.	Ms.	Moss.
C.	China.	Mk.	Musk.
D.	Damask.	N.	Noisette.
D. Per.	Damask Perpetual.	Per.	Perpetual.
G.	Gallica.	Pr.	Provence.
H. C.	Hybrid China.	S.	Sulphurea.
H. Per.	Hybrid Perpetual.	Sc.	Scotch.
H. Pr.	Hybrid Provence.	S. B.	Sweet Briar.
H. S. B.	Hybrid Sweet Briar.	T.	Tea-scented China.
Mac.	Macartney.		

The following are climbers: —

Cl. A.	Climbing Ayrshire.	Cl. E.	Climbing Evergreen.
Cl. Bk.	— Banksian.	Cl. M.	— Multiflora.
Cl. Br.	— Boursault.	Cl. H.	— Hybrid.

In writing the names, the letters should be placed at equal distances, except between words, which should be a little further apart. Short names will go in one line; but the name should occupy nearly the whole length of the label, and not with the letters crammed in a heap in the middle of the line, which gives them an unsightly appearance.

To the writer of the names, Wood and Son's *Descriptive Catalogue of Roses* would be found very useful, the names being accented according to the French language.

Osberton, December 16. 1841.

Art. XIV. *On forcing the Melon for early Fruit.* By R. B. Wilson.

As it is drawing towards the time when it is necessary to commence forcing the melon for early fruit, I beg leave to lay before your readers a few remarks on that head. The method that I have adopted with success varies, in some respects, from what is

generally recommended, although I cannot boast of producing an artificial climate by means of a *killogie* under my plants, as described by Mr. Forsyth, but rather

> "Of arts disclosed in ancient days I sing,
> And venture to unlock the sacred spring."

I only plant a single seed in a 48-sized pot, filled half full of rich light soil, by which means the plant can be earthed up without repotting, and consequently sustains no check by that process. I also only plant a single plant to each light for a common-sized frame; those I use are 9 ft. by 6 ft. In the second place, I do not use any dung in my soil, for three reasons: viz. it causes the plants to grow too rampant and vigorous to bear well; it impairs the flavour of the fruit they do bear; and the plants are more susceptible of disease when they are so robust; not to mention large foliage, which ought to be avoided in the early part of the season. To some this may appear rather paradoxical, and especially to vegetable physiologists, who will say that one well-developed leaf is worth two small ones. I perfectly coincide in that opinion; nevertheless, a sufficient quantity of light is an indispensable requisite in the early part of the year. I am well aware that a proper quantity of foliage, in a healthy state, is as indispensably necessary to enable the plant to nourish a good crop of fruit; but, without a perfect command of light, we must be content with a medium size of foliage. How frequently do we hear gardeners complaining that their plants have run all over the bed without setting their fruit! and, after properly examining into the case, as often do we find the cause arising from the plants being too luxuriant; and yet they inform us that the seed was old, and the soil well trodden down. But when that soil is examined, it is found to be either too rich, or that the roots have got down into the dung.

The soil I use is the top sward or turf of a pasture that has lain in grass for a considerable number of years, where sheep or other cattle have been kept; it is a strong hazelly loam. This is chopped small, and frequently turned throughout the winter before using. Previously to putting any soil into the bed, I turf the surface of the bed all over, and likewise up the sides of the frame, which prevents the roots from extending into the dung; and the turf up the sides of the frame guards the roots from being burnt by the linings after the frame is raised up, which must be done when the plants are earthed up for the last time, to keep the glass a sufficient distance from the foliage. The depth of soil that I use is 2 ft., whatever structure the plants are grown in.

I keep my young plants as stiff as possible; and, when planted out into the hills, I train one shoot to the front and another to

the back of the frame, never stopping them till they reach to within 1 ft. of the sides, back and front, when that operation is performed: this causes them to produce a lateral shoot at every joint, which must be pegged down in a horizontal direction. These laterals will generally show fruit at the first or second joint, which must be carefully impregnated, and the laterals must be stopped back to one leaf before the fruit a few days afterwards. By leaving them unstopped for a few days after impregnation, the fruit is not so apt to get yellow, and to damp off. If it happens that three or four female flowers expand before the general expansion, they must be nipped off; otherwise they will rob the later ones of their due share of nourishment, and consequently prevent their coming to perfection. When the fruit is all set, I prune off entirely such of the laterals as have no fruit on them; in consequence of which, no more vine is left to exhaust the plants than what is absolutely wanted. The state of the beds will require to be properly attended to from the time of the plants being planted out till they mature their fruit, that they may sustain no injury; for, if they once receive a check, disease is certain to follow.

A brisk growing heat must be kept up, according to the state of the weather; and air must be freely admitted every day, more or less, as the weather will permit; and if any error be committed it had better be on the side of air than otherwise, as the want of it tends greatly to weaken the plants, and melon plants do not fruit well unless they are grown stubby. To guard against cutting winds, which are prevalent in the early part of the season, it will be advisable to fasten a slip of bast matting along the back of the frame to fold over the opening while air is admitted; this will soften the air as it passes into the frame. Water, at the roots of the plants, must be given very sparingly: indeed, when they have the depth of soil that I have recommended, it will not be necessary to give them any more of that element than a slight sprinkling over the foliage occasionally in fine weather, and a little manure water at the roots when their fruit is swelling off, which aids them greatly whilst they are in that stage of their growth. An extreme portion, however, must be guarded against; as there is nothing in the culture of the melon that is so pernicious as an excess of water at the roots; not even excepting the Persian varieties, which, I find, are apt to have their thin and tender skin burst by this means.

I cover the surface of the soil in the bed with fine pit or river sand, in place of the general practice of laying down slates or pantiles, which form a secure harbour for woodlice. The sand answers the same purpose as slates, and also effectually excludes woodlice from the frame. Many cures have been prescribed for

these pests in melon, pine, and other pits, where they harbour in the walls, &c.; there is none better than introducing a few toads into melon pits. In pine pits, they can easily be destroyed by pouring water on the bark and walls while turning, and dashing the walls with hot lime-water.

For all my crops of melons, except the first of each sort, I prefer plants raised from cuttings, of which I plant three in each light; but this method is fully described in a former volume by Mr. Alexander Forsyth.

The sorts that I grow are the Black Siam, and Cuthill's scarlet flesh, as early varieties; the Egyptian green flesh, Donkins's improved, the Ispahan, and Germek Persian, for flavour.

Norton, January 1. 1842.

Art. XV. *On the Cultivation and Management of Pear Trees, prior to their being trained against a Wall, including Horizontal and Fan Training.* By A Lover of Horticulture.

First, for a horizontal-trained tree, which has been one year grafted, containing three shoots of equal strength, the centre shoot should be trained from the graft perpendicularly, and the two side-shoots should also be trained from their earliest appearance; which, if attended to, is so much easier done than by the usual mode of allowing the three shoots to grow up the first year from the graft in their own rude crooked way, which position pears are naturally inclined to pursue. For a fan-trained tree of the first year's growth, I select two shoots of equal strength, not allowing more to grow the first season. Plants of the above description I have removed, in the month of November, from the spot on which they were grafted, to a very different quarter of land, with the best success. The ground in which they are to be replanted should be trenched as deep as practicable, and, if necessary, the subsoil should be moved; but, in general, I think it best to leave it undisturbed. These trees I plant at a distance of 3 ft. apart, and in the course of two years they make fine trees, quite large enough to plant against a wall, where I make a preparation of good loamy maiden earth, from $2\frac{1}{2}$ ft. to 3 ft. deep, and from 10 ft. to 12 ft. wide, for the reception of the trees. If the soil is of a strong clayey substance, it should be thoroughly drained, that it may lie healthy. If gravelly or sandy, I would recommend it to be taken out 1 ft. or more, soil to be substituted, and the 2 ft. to 3 ft. on the top, as before mentioned, of good loamy earth. When these trees are in their places against a wall, they are at a distance of from 12 ft. to 15 ft. apart.

The centre shoot of horizontal trees should be cut back from three to five eyes. The fan trees should be cut back according to their strength, until the wall is filled up with shoots from 9 in. to 15 in. apart. A pear wall, if well managed, may be filled in about seven or nine years; and, by attending to them in the following manner, the trees may in that time be in a good bearing state.

The second year after planting I take up the trees in the month of November, and do not allow a root to be injured. All cross or over-strong roots should be cut away; the border should be well worked up, and a few barrows of good maiden loam should be added to each tree: then be careful, in planting the trees, to spread all their roots out as regularly as you would train their branches, and the nearer the surface the better. If the tree the next year be too strong, pursue the same course; and you will find, by adopting this mode of treatment, in the before-mentioned number of years, you may have a wall covered with good fruitful trees: whereas, nine times out of ten, you see nothing but wood of the most unfruitful description.

I have, in the course of the last twenty years, grown about 250 sorts; and, by constantly removing the trees, I have had a good crop of fine pears on trees not more than four years old. By this method you may remove a tree of twenty years of age. I have made it my constant practice, to make a solution of soft soap and sulphur, mixed with soot and cow-dung, and to have the trees painted with it in the beginning of February, when I always recommend pears to be pruned and nailed.

Exeter, January 2. 1842.

Art. XVI. *Preserving Green Peas from Birds.* By J. Wighton.

Gardeners are well aware that birds often injure their crops of peas by puncturing, or rather ripping up, the pods, for the sake of their contents. The house sparrow and the large titmouse are very mischievous in this respect, and it is difficult to prevent them from doing so either by trapping or shooting; for the former bird is very shy of a trap, and, at the period alluded to, the latter is so adroit amongst rows of peas that he can scarcely be got sight of.

As these birds seldom attack peas until the autumn, I am led to think they are compelled to do so for want of more favourite food. In this opinion I am confirmed by repeated observations. Last season I had a row of wheat standing near to my peas, and

I found that the former was invariably attacked in preference to the latter, so that I conclude that if the simple means alluded to were adopted, our crops of green peas might be preserved uninjured. Many, no doubt, will object to this plan, on the score that it is absurd to feed such destructive enemies to our crops; but when it is known that, with the exception of the bulfinch, the most of birds frequenting our gardens are more useful than otherwise, the objection will be overcome. The good they do as scavengers, and in destroying insects, far outweighs the thefts they commit; and surely their presence adds much to the living beauty of a garden.

I may mention that bee-keepers have a grudge against the large titmouse, on the ground that he eats their bees. I cannot clear him from this charge, still I think it is exaggerated. Mr. Mudie says, "the birds hawk for insects upon the wing; they catch bees in that way, and also hover about and pick them up when they are busy in the nectaries of flowers." In vain have I tried to ascertain if that be fact. I question if the bird attacks bees at all, except in winter, when the weather is severe. He may at that season be seen hovering about apiaries, picking up the dead bees; and when hard pressed, he has the slyness to rap at the entrance of the hives, and snap up the inmates as they appear.

But, to return to my subject, the plan mentioned will not keep off the thievish jays from peas. Shooting or trapping must be resorted to. When caught, it is useless to hang them up, with the view of frightening away their neighbours, for they will perch close beside the dead: neither is the cruel plan of leaving a bird screeching all day in a trap of any use; indeed, it only brings more to see what is amiss. The jay, though a shy bird, is not frightened, like the rook, by this barbarous plan. All kinds of birds soon get used to scarecrows. I differ from those that put faith in coloured yarn being a sure one.

I have forbade the bulfinch a place in the garden, because he destroys the buds of trees and bushes, and does nothing I am aware of to compensate for such a loss. This is not the case with the house sparrow; it is astonishing the quantity of caterpillars he destroys. In the breeding season, it is said, that a pair of these birds will destroy 3,400 in a week. If I am not mistaken, some assert that the bulfinch only attacks buds for the insects they contain, but the havoc he commits is certainly too great to allow of this idea. Still I am of opinion that he only attacks buds when seeds, his favourite food, are scarce. Some blame the sparrow and the large titmouse for picking out the bud of gooseberries, but this I never could discover. During last February, the buds of my gooseberry bushes were

destroyed by birds, and though the individuals just mentioned were blamed for it, I accidentally discovered a pair of bulfinches very busy in committing the mischief.

Cossey Gardens, Jan. 4. 1842.

REVIEWS.

ART. I. *Transactions of the Horticultural Society of London.* Second Series. Vol. II. Part V. 4to. London, 1840.

(*Continued from the "Gardener's Magazine" for* 1840, p. 513.)

38. *METEOROLOGICAL Journal.*

39. *Upon raising Coniferous Plants from Seed.* By Mr. George Gordon, Under Gardener in the Hardy Department of the Society's Garden. Read Dec. 3. 1839.

This is a most valuable and satisfactory article, and will be of great use at the present time, when so many seeds of pines and firs are being sent home from Mexico and the Himalayas. Seedlings of the *Abiétinæ*, more especially of the genus *Pinus* proper, are extremely subject to damping off just above the ground, when they have newly come up, and for a few days afterwards, more particularly in wet weather. To avoid this evil, Mr. Gordon "tried the effect of sowing the seeds in various mixtures of peat, sand, and loam, mixed in various proportions from nearly all sand to nearly all peat or loam, as well as sand, loam, and peat separately, and also leaf mould, a soil strongly recommended by some, but in all respects as bad as peat itself. Different depths, too, were tried, from laying the seeds on the surface of the earth, to covering them three fourths of an inch deep. The pots or pans in which the seeds were sown were placed in various temperatures, from the open air to the hot-bed; some of them were even placed over the hot flue; some were covered with a bell-glass; others were left exposed. The result of my experience is, that the system hereafter detailed is the only certain and sure one for Coniferæ of all kinds."

There are some species, however, which Mr. Gordon finds succeed tolerably well if sown in the open air, provided the seeds are fresh. "These are more especially species of Picea, Abies, Larix, and Cedrus, as well as of Juniperus, Cupressus, and Thuja; but they must be sown as early as possible in the spring or summer, for, if sown in the autumn or winter, they also are subject to damp off, particularly if any artificial heat is used; a thing absolutely necessary if the seeds are sown in winter, or have been long gathered, or damaged by being overheated on the journey."

If the following rules are attended to, many coniferous seeds now rejected as worthless will be found to succeed: —

"1. Always to sow the seeds directly they are received, whether in midwinter or midsummer, or any other time of the year.

"2. Always to sow the seeds in *pure loam;* not to use the least particle of peat, and as little sand as possible. All the seeds experimentally sown in peat, or any mixture in which it was used, damped off, especially when there was more peat than loam used in the mixture. The only chance of saving young plants raised in such a compost is to keep them as dry as possible, and to pot them off the first or second day after they are fairly up; for, if left twenty-four hours longer, it is very probable they will nearly all have damped off, particularly if a little water is given, or it happens to be damp or wet weather at the time.

"3. Always to sow the seeds in dry loam; to give very little water until the seeds are fairly up, and then only sparingly.

"4. To cause the seeds to vegetate as quickly as possible after sowing, more particularly if the seeds are old or damaged, taking great care, however, that, before they are fairly above ground, they are removed to a much cooler place, where there is plenty of light and air, and they can be secured from frost.

"5. Not to let the young seedlings remain very long in the seed-pots before they are potted off, and to give plenty of air to them after they are potted, with as little artificial heat as possible.

"6. Always to plant them out in the open ground after the second year. If pines are kept any length of time in pots, especially if not regularly shifted twice a year, their roots become pot-bound; and as they are a race of plants which make few roots, and those always near the surface of the ground, they are almost sure, if confined many years in pots, to be blown over or to one side; and, when this has once happened, they hardly ever become firm, or make handsome trees."

40. *On the Improvement of the Wild Carrot.* By M. Vilmorin, F.M.H.S. Read March 3. 1840.

This paper contains the history of an experiment noticed in our Volume for 1840, p. 296., by which M. Vilmorin, in the course of four generations, raised between 1833 and 1839, succeeded in obtaining carrots from the wild carrot nearly as good as those in cultivation. M. Vilmorin began by sowing seeds of the wild carrot in rich soil, and transplanting the roots, and saving seeds from them; and he repeated the operation four times, always choosing the plants which had the largest and most succulent roots. The experiment is interesting, as showing how readily some plants may be civilised; and it is impossible to say to what extent this may be carried in the vegetable kingdom.

41. *Upon forcing the Peach Tree.* By Mr. Robert Errington, Gardener to Sir Philip De Malpas Grey Egerton, Bart., M.P., F.H.S., Oulton Park, Cheshire. Read Jan. 21. 1840.

The house has metallic sash-bars, is 30 ft. long, 12 ft. wide, and 3 ft. high in front, with a trellis under the roof, and 14 in. from it; except at the base of the trellis, which is 3 ft. from the front sashes, in order to allow of a walk to give air. The roof is at an angle of 50°, and is consequently rather steep than flat. The front sashes rest on a low wall, built on arches, and the tree, a noblesse peach, is planted inside; consequently, it has roots both within the house and without. The house, built by Mr. Jones of Birmingham, is heated by him with hot water. The lap of the glass is curvilinear and closed, except a small hole in the centre of the curve for the escape of condensed steam. The border was excavated to the depth of 42 in., and the width of 21 ft. The subsoil is a clean red sand, presenting an inclined surface of nearly 1 in. to 1 ft.

"After laying a complete system of drainage, the whole surface was covered 1 ft. in depth with old bricks and stones; on this was laid 3 in. of lime rubbish, out of which all small particles had been carefully sifted. The lime rubbish being formed to an even surface, was covered entirely over with thin turfs of heath soil, cut about 1 ft. square, and placed horizontally, barely touching each other; and, finally, a sprinkling of small gravel stones was swept into all the crevices: the whole was now covered to the depth of 24 in. with a compost as follows:

"Good maiden loam, fresh from an old pasture, half-way between strong and light, of a yellow colour, 12; leaves from the park, in a fresh state, 3; horse-dung, 2; sharp sand, 1; bone waste, 2. These ingredients were, of course, thoroughly blended together.

"The largest, cleanest, and best-formed tree on the open walls was selected; and the roots, having been cut the year previous to check luxuriance, were, of course, in good condition for removal. The greatest care was taken during the process of removal, as to preserving the roots free from wounds, &c., but no soil was left adhering to them; they were, however, kept continually wet until the tree was fixed in its proper situation. The tree was so large that it required ten men to carry it to the hole; and, after having all the wood carefully strapped together in groups, it was lifted through the roof of the house, and thence lowered into its situation. The time of removal was the end of January. The pruning-knife had been most severely applied to the young wood previously to removal, more especially as regards thinning; but the old wood was not interfered with, as I have a strong objection to cutting large or old wood from peach trees, unless in cases of strong necessity.

"The tree, once placed in its situation, every fibre was of course as carefully trained as the shoots, taking care to carry a large portion of the superior roots through the front arches into the outside border. In the first week of February the tree was dressed all over with a mixture of soft soap, sulphur, and tobacco-water, rubbed carefully into every crevice; and, when perfectly dry, the wounds caused by pruning were coated over with thick paint."

About the middle of February forcing commenced, with 50° of heat by day, and 36° by night. Morning and evening, all the season, the house was profusely steamed, except at the flowering time, and during the ripening of the fruit. After the blossoms were set, the temperature was increased slowly, and for some weeks was about 60° as the highest by day, and 38° generally as the lowest by night. Sometimes it was as low as 34° at night, when the fruit were as large as peas, without any mischief being done. "The tree ripened about eight dozen of very good peaches in the same summer in which it was planted; and during that, with the succeeding seven years, it has produced at least 2400 large and fine fruit. The largest peach Mr. Errington gathered from this tree weighed 12½ oz.; but he gathered hundreds of from 9 oz. to 11 oz. in weight. The tree, in December, 1839, when Mr. Errington wrote his paper, was exposed to the weather, and was full of excellent wood, covering completely the trellis, a surface of 480 ft."

The following account of the general management of the peach tree, as practised at Oulton Park, is so excellent that we give it entire, in Mr. Errington's own words: —

"I will begin with the root; and this leads me to remark that the peach, in my opinion, as well as most other tender fruit trees, is planted in borders far too deep, as well as too rich. It is, of course, imperative on the planter to take the utmost care that no stagnation of any kind be permitted to take place, not only as regards drainage, but in choosing soil of a proper texture. A loam, about half-way between stiff and sandy, I find the best; and, in my opinion, the less manure is mixed with it the better, providing the loam be what is termed 'maiden soil,' from old rest land. If any manure be considered necessary, it should be chiefly bone manure, on account of its decomposing very slowly, and, of course, gradually enriching the soil. It is by the wasteful and indiscreet use of dung that the peach is forced to produce 'robbers,' or over-luxuriant wood; and if these robbers are not stopped with the finger and thumb, when only a few eyes in length, the necessary consequence is, that the true bearing wood is both robbed of its due share of sap, by the exclusion of light, and prevented from attaining a due degree of ripeness. If peach trees show any signs of weakness after bearing a few years in soil of the description I have recommended, the remedy is quite simple; it is only having recourse to top-dressing, laying it on heavily in the winter, and removing a portion in the spring: heavy top-dressing is, in my opinion, extremely pernicious in the growing season. If this is not sufficient to renovate the tree, it is easy to add a prepared compost in a trench at the extremity of the roots. If any unnecessary luxuriance takes place in any of the fruit

trees under my care, I cut the points of the roots without hesitation, taking care to reduce them in proportion to the degree of superfluous luxuriance. This root-cutting system I have pursued for seven years at least, and find it every thing that can be desired.

"With regard to winter pruning, I am not aware that there is anything peculiar in my practice, unless it be that I thin my young wood to a very great extent. This may alarm some persons, who may be afraid of not getting sufficient fruit; but this plan, with a continual thinning and disbudding in summer, so as to lose no sunshine on the leaves of the shoots intended for the next year's crop, renders the buds so plump and well ripened that there need be no fear in that respect.

"After the winter pruning, I immediately stop every wound made by the knife, and every place whence proceeds gummy exudations, with a coat of thick white paint: this painting, if I may so term it, is repeated, and perhaps a third time, on all the larger wounds. This I have found of eminent use; for I believe it is a tolerably well known fact, that the entrance of air and moisture into such wounds is, in many cases, the cause of premature decay. The wounds being dressed in this manner, I immediately stove the house with sulphur, blended with sawdust, and burnt in shallow pans, and afterwards dress the tree over two or three times with soft soap, sulphur, and tobacco-water, brushing it carefully into every bud and crevice with a painting brush. This mixture is not made so strong as recommended by some of our gardening authors, as I depend much on the careful brushing and flooding every part of the tree.

"At the commencement of forcing, the same routine is pursued as before described: and I may here remark on the evil effects of high temperature at night; for, as I before observed, I have had my thermometer as low as 34° at night, when the fruit was as large as peas, without any injury whatever. Now this has been through sheer necessity; for, in my anxiety to get fruit early, I should have kept it probably to nearly 50°, could I have obtained that heat; but I am convinced that it would have been worse for the tree; for one of the necessary consequences that ensues in a case of the kind is the elongation of the internode, as botanists term it, which lengthening, if it be not the cause, is well known as a sign of barrenness. From the period that the fruit are beginning to swell off, until they commence ripening, my trees have most copious syringings and steamings; excepting that, in the months of February or March, in cold dull weather, I am a little more niggardly of water, taking care especially, that, if I syringe in the afternoon, it be done early, so as to have the leaves dry by the evening; as a temperature of 34° to 40° by night and a wet leaf would by no means agree. The house is, of course, fumigated twice or thrice, or, in fact, on the very first appearance of green fly. As for red spider, I seldom, by this management, see one.

"The young wood, through all the growing period, receives the utmost attention. Every robber is stopped with the finger and thumb as soon as about four eyes or buds long; every superfluous shoot that is not wanted for the next year's bearing is taken away; and all the inferior shoots, which are much below the proper strength, are trained with the growing points as nearly perpendicular as possible, in order to decoy the sap into them.

"As soon as I perceive the least change towards ripening in the fruit, I stop the points of all the young wood, with the exception of a few of the weaker shoots at the lower part of the tree; and these I keep growing until the end of the season, in order to get, as I before observed, as much sap in them as possible. In the course of their ripening, abundance of air is given, both night and day, and every leaf which shades the fruit is entirely removed. I need scarcely add, that they cannot ripen too slowly: the slower they ripen, if not absolutely starved, the better. Syringing is, of course, withheld altogether, as well as the steaming; but, as soon as the last fruit is gathered, the tree is completely battered with water, morning and evening, and the house shut up early in the afternoon, with a thermometer of 90° to 95° of

sun-heat when it can be obtained; and this course is persisted in until the leaves turn colour, when the heat by sunshine is allowed to range even higher still: I have had it as high as 100° at from three to four o'clock in the afternoon. By these means the wood is most completely ripened, and, in pruning, cuts more like oak than peach wood. During all the ripening process, the border inside the house is allowed to become very dry indeed; in fact, water is entirely withheld from the moment the least appearance of change in a single peach is perceived towards ripening.

"An opinion once prevailed very generally, that peaches would not answer long under glass, unless the lights were removed during the rest season; this is, however, quite erroneous, as the lights have never been taken off the tree in question since it was planted. Before I conclude, I must just observe, that, without cleanliness in the leaf and wood, no soil or mode of training whatever can answer long for the peach."

(*To be continued.*)

Art. II. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

The Book of the Farm. By Henry Stephens, Editor of the "Quarterly Journal of Agriculture." 8vo. Part I. To be completed in 12 Parts. Numerous copper-plate engravings, and above 200 woodcuts. Edinburgh, 1842.

This work, its author informs us, is intended as a guide to those who wish to become practical farmers. It will be divided into three portions: the first showing the pupil the difficulties which he has to encounter in acquiring a competent knowledge of farming as a profession; the second, details of various kinds of British farming, pointing out that which the author reckons the best under given circumstances; and the third accompanies the young farmer into the world, and acquaints him how to look about for a proper farm.

From this skeleton of the plan our readers will see that the work promises to be one of an original description. The only book of the kind that we recollect is one that was commenced, about forty-five years ago, by Mr. Skirving of Strathruddy, but which was never completed. The reader will not expect, in the *Book of the Farm*, discussions on the new specific manures, or recommendations of practices not already tried and proved; nevertheless, "the applications of chemistry and vegetable physiology," in explanation of the various phenomena developed in the operations of husbandry, will be given by Dr. Henry R. Madden.

The number before us consists of fourteen articles, with the following titles: —

1. Of the Difficulties which the young Farmer has to encounter at the Outset of learning practical Husbandry. 2. Of the Means of overcoming those Difficulties. 3. Of the Kind of Information to be found in existent Works on Agriculture. 4. Of the Construction of the *Book of the Farm.* 5. Of the existing Methods of learning practical Husbandry. 6. Of the Establishment of Scientific Institutions of practical Agriculture. 7. Of the Evils attendant on Landowners neglecting to learn practical Agriculture. 8. Of Experimental Farms as Places for Instruction in Farming. 9. A few Words to young Farmers who intend emigrating as agricultural Settlers to the Colonies. 10. Of the Kind of Education best suited to young Farmers. 11. Of the different Kinds of Farming. 12. Of choosing the Kind of Farming. 13. Of selecting a Tutor-Farmer for teaching Farming. 14. Of the Pupilage.

From the author's knowledge and experience, the work may be safely and strongly recommended as likely to answer the end in view; notwithstanding its quaint title, the fanciful unfarmer-like titlepage, and the quotations from Shakspeare at the head of each article; all which, we certainly think, are not in good taste.

Liebig's Chemistry, in its Application to Agriculture and Physiology. 2d edition, with very numerous additions.

"The author has enriched the present edition with many valuable additions; allusion may be particularly made to the practical illustration of his principles furnished in the supplementary Chapter on Soils. The analyses of soils contained in that chapter will serve to point out the culpable negligence exhibited in the examination of English soils. Even in the analyses of professional chemists, published in detail, and with every affectation of accuracy, the estimation of the most important ingredients is neglected. How rarely do we find phosphoric acid among the products of their analyses? potash and soda would appear to be absent from all soils in the British territories! Yet these are invariable constituents of fertile soils, and are conditions indispensable to their fertility."

The following are extracts from the supplementary Chapter on Soils:—

"The fertility of a soil is much influenced by its physical properties, such as its porosity, colour, attraction for moisture, or state of disintegration. But independently of these conditions, the fertility depends upon the chemical constituents of which the soil is composed.

"We have already shown, at considerable length, that those alkalies, earths, and phosphates which constitute the ashes of plants are perfectly indispensable for their development; and that plants cannot flourish upon soils from which these compounds are absent. The necessity of alkalies for the vital processes of plants will be obvious, when we consider that almost all the different families of plants are distinguished by containing certain acids, differing very much in composition; and further, that these acids do not exist in the juice in an isolated state, but generally in combination with certain alkaline or earthy bases. The juice of the vine contains tartaric acid, that of the sorrel oxalic acid. It is quite obvious that a peculiar action must be in operation in the organisation of the vine and sorrel, by means of which the generation of tartaric and oxalic acid is effected; and also that the same action must exist in all plants of the same genus. A similar cause forces corn plants to extract silicic acid from the soil. The number of acids found in different plants is very numerous, but the most common are those which we have already mentioned; to which may be added acetic, malic, citric, aconitic, maleic, kinovic acids, &c.

"When we observe that the proper acids of each family of plants are never absent from it, we must admit that the plants belonging to that family could not attain perfection, if the generation of their peculiar acids were prevented. Hence, if the production of tartaric acid in the vine were rendered impossible, it could not produce grapes, or, in other words, would not fructify. Now the generation of organic acids is prevented in the vine, and, indeed, in all plants which yield nourishment to men and animals, when alkalies are absent from the soil in which they grow. The organic acids in plants are very rarely found in a free state; in general, they are in combination with potash, soda, lime, or magnesia. Thus, silicic acid is found as silicate of potash; acetic acid as acetate of potash or soda; oxalic acid as oxalate of potash, soda, or lime; tartaric acid as bitartrate of potash, &c. The potash, soda, lime, and magnesia in these plants are, therefore, as indispensable for their existence, as the carbon from which their organic acids are produced.

"In order not to form an erroneous conclusion regarding the processes of vegetable nutrition, it must be admitted that plants require certain salts for the sustenance of their vital functions, the acids of which salts exist either in

the soil (such as silicic or phosphoric acids) or are generated from nutriment derived from the atmosphere. Hence, if these salts are not contained in the soil, or if the bases necessary for their production be absent, they cannot be formed; or, in other words, plants cannot grow in such a soil. The juice, fruit, and leaves of a plant cannot attain maturity, if the constituents necessary for their formation are wanting, and salts must be viewed as such. These salts do not, however, occur simultaneously in all plants. Thus, in saline plants, soda is the only alkali found; in corn plants, lime and potash form constituents. Several contain both soda and potash, some both potash and lime, whilst others contain potash and magnesia. The acids vary in a similar manner. Thus one plant may contain phosphate of lime; a second, phosphate of magnesia; a third, an alkali combined with silicic acid; and a fourth, an alkali in combination with a vegetable acid. The respective quantities of the salts required by plants are very unequal. The aptitude of a soil to produce one, but not another, kind of plant, is due to the presence of a base which the former requires, and the absence of that indispensable for the development of the latter. Upon the correct knowledge of the bases and salts requisite for the sustenance of each plant, and of the composition of the soil upon which it grows, depends the whole system of a rational theory of agriculture; and that knowledge alone can explain the process of fallow, or furnish us with the most advantageous methods of affording plants their proper nourishment.

"Give—so says the rational theory—to one plant such substances as are necessary for its development; but spare those which are not requisite, for the production of other plants that require them.

"It is the same with regard to these bases as it is with the water which is necessary for the roots of various plants. Thus, whilst one plant flourishes luxuriantly in an arid soil, a second requires much moisture, a third finds necessary this moisture at the commencement of its development, and a fourth (such as potatoes) after the appearance of the blossom. It would be very erroneous to present the same quantity of water to all plants indiscriminately. Yet this obvious principle is lost sight of in the manuring of plants. An empirical system of agriculture has administered the same kind of manures to all plants; or, when a selection has been made, it was not based upon a knowledge of their peculiar characters or composition.

"The most important growth in England is that of wheat; then of barley, oats, beans, and turnips. Potatoes are only cultivated to a great extent in certain localities; rye, beet-root, and rape-seed, not very generally. Lucern is only known in a few districts, whilst red clover is found universally. Now, the selection of inorganic manures for these plants may be fixed upon by an examination of the composition of their ashes. Thus, wheat must be cultivated in a soil rich in silicate of potash. If this soil is formed from feldspar, mica, basalt, clinkstone, or indeed of any materials which disintegrate with facility, crops of wheat and barley may be grown upon it for many centuries in succession. But, in order to support an uninterrupted succession, the annual disintegration must be sufficiently great to render soluble a quantity of silicate of potash sufficient for the supply of a full crop of wheat or barley. If this is not the case, the soil must either be allowed to lie fallow from time to time, or plants may be cultivated upon it which contain little silicate of potash, or the roots of which are enabled to penetrate deeper into the soil than corn plants in search of this salt. During this interval of repose, the materials of the soil disintegrate, and potash in a soluble state is liberated on the layers exposed to the action of the atmosphere. When this has taken place, rich crops of wheat may be again expected.

"The alkaline phosphates, as well as the phosphates of magnesia and lime, are necessary for the production of all corn plants. Now, bones contain the latter, but none of the former, salts. These must, therefore, be furnished by means of night-soil, or of urine, a manure which is particularly rich in them. Wood ashes have been found very useful for wheat in calcareous soils; for these ashes contain both phosphate of lime and silicate of potash. In like manner

stable manure and night-soil render clayey soils fertile, by furnishing the magnesia in which they are deficient. The ashes of all kinds of herbs and decayed straw are capable of replacing wood ashes.

" A compost manure, which is adapted to furnish all the inorganic matters to wheat, oats, and barley, may be made, by mixing equal parts of bone dust and a solution of silicate of potash (known as *soluble glass* in commerce), allowing this mixture to dry in the air, and then adding 10 or 12 parts of gypsum, with 16 parts of common salt. Such a compost would render unnecessary the animal manures, which act by their inorganic ingredients. According to Berthier, 100 parts of the ashes of wheat straw contain —

Of matter soluble in water	9·0
Of matter insoluble in water	81·0

Now 100 parts of the soluble matter contain—

Carbonic acid	a trace
Sulphuric acid	2·0
Muriatic acid	13·0
Silica	35·0
Potash and Soda	50·0
	100·0

100 parts of the insoluble matter contain—

Carbonic acid	0
Phosphoric acid	1·2
Silica	75·0
Lime	5·8
Oxide of Iron and Charcoal	10·0
Potash	8·0
	100·0

" The silicate of potash employed in the preparation of the compost described above must not deliquesce on exposure to the air, but must give a gelatinous consistence to the water in which it is dissolved, and dry to a white powder by exposure. It is only attractive of moisture when an excess of potash is present, which is apt to exert an injurious influence upon the tender roots of plants. In those cases where silicate of potash cannot be procured, a sufficiency of wood ashes will supply its place.

" All culinary vegetables, but particularly the Cruciferæ, such as mustard (Sinapis alba and nigra), contain sulphur in notable quantity. The same is the case with turnips, the different varieties of rape, cabbage, celery, and red clover. These plants thrive best in soils containing sulphates; hence, if these salts do not form natural constituents of the soil, they must be introduced as manure. Sulphate of ammonia is the best salt for this purpose. It is most easily procured by the addition of gypsum or sulphate of iron (green vitriol) to putrefied urine.

" Horn, wool, and hoofs of cattle, contain sulphur as a constituent, so that they will be found a valuable manure when administered with soluble phosphates (with urine, for example).

" Phosphate of magnesia and ammonia form the principal inorganic constituent of the potato; salts of potash also exist in it, but in very limited quantity. Now the soil is rendered unfitted for its cultivation, even though the herb be returned to it after the removal of the crop, unless some means are adopted to replace the phosphate of magnesia removed in the bulbous roots. This is best effected by mixtures of night-soil with bran, magnesian limestone, or the ashes of certain kinds of coal. I applied to a field of potatoes manure consisting of night-soil and sulphate of magnesia (Epsom salts), and obtained a remarkably large crop. The manure was prepared by adding a

quantity of sulphate of magnesia to a mixture of urine and fæces, and mixing the whole with the ashes of coal or vegetable mould, till it acquired the consistence of a thick paste, which was thus dried by exposure to the sun.

"There are certain plants which contain either no potash, or mere traces of it. Such are the poppy (Papaver somniferum), which generates in its organism a vegetable alkaloid, Indian corn (Zea Mays), and Helianthus tuberosus. For plants such as these the potash in the soil is of no use, and farmers are well aware that they can be cultivated without rotation on the same soil, particularly when the herbs and straw, or their ashes, are returned to the soil after the reaping of the crop.

"One cause of the favourable action of the nitrates of soda and potash must doubtless be, that through their agency the alkalies which are deficient in a soil are furnished to it. Thus it has been found that in soils deficient in potash, the nitrates of soda or potash have been very advantageous; whilst those, on the other hand, which contain a sufficiency of alkalies, have experienced no beneficial effects through their means. In the application of manures to soils we should be guided by the general composition of the ashes of plants, whilst the manure applied to a particular plant ought to be selected with reference to the substances which it demands for its nourishment. In general, a manure should contain a large quantity of alkaline salts, a considerable proportion of phosphate of magnesia, and a smaller proportion of phosphate of lime; azotised manure and ammoniacal salts cannot be too frequently employed."

After giving the chemical composition, in great detail, of thirty-eight different soils, chiefly in Germany, the analysis of several English soils, by Davy, is given, and after each are remarks, pointing out its imperfection.

"Davy," says the author, "has made several analyses of various fertile soils, and since his time numerous other analyses have been published; but they are all so superficial, and in most cases so inaccurate, that we possess no means of ascertaining the composition or nature of English arable land." (p. 240.)

Next follow analyses of soils in Sweden, Java, the West Indies, and North America. On an analysis, by Berzelius, of a soil in Sweden which produced the most abundant crops, and had never been manured, it is observed of the operator—

"This great chemist has strangely omitted to detect in the soil potash, soda, chlorine, sulphuric acid, and manganese. As this soil is eminent for its fertility, there cannot be the slightest doubt that all these ingredients must have existed in it in notable quantity." (p. 241.)

These quotations will show the immense importance of the additions which are made to this edition, which cannot fail to add to its already deserved celebrity.

The Civil Engineer and Architect's Journal for 1841. 4to.

The Surveyor, Engineer, and Architect, for 1841. 4to.

We have recommended both these works in preceding volumes; not, indeed, to be purchased by the gardener, who has already too many calls on him for books relating directly to his profession, but to the country gentleman and the amateur of architecture and mechanical invention. The gardener also, where he can have an opportunity of reading these works, will find a variety of matters that can be brought to bear on his art; such as modes of heating and ventilating, glazing, painting, measuring, draining, road-making, &c.

Taste: a Lecture. By the Rev. R. Jones, D.D., M.R.S.L., &c. Pamph. 8vo, pp. 44. London.

The author treats, in a discursive and agreeable manner, of mental taste; without losing sight of that moral taste, the truest purifier and preserver of all other taste; a taste which regulates the heart, the principles, and the life.

Art. III. *Literary Notices.*

The Cowthorpe Oak.—An engraving and description of this celebrated tree will shortly be published; the engraving by W. Monkhouse, and the description by C. Empson, author of *Sketches of Scenery on the Andes*, and several other works.

Contributions to the Botany of India, by William Griffith, is preparing for publication by subscription.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Single Trees in Park Scenery. — The great use of single trees in breaking the formality of unsightly lines; in varying an uninteresting surface; in connecting together scattered objects; in forming pleasing groups, or handsome, curious, or singular individual objects, of themselves; and as substitutes for clumps, is well known. By the liberal use of single trees, not only numerous plantations of small plants, surrounded by hedges or other fences, the true meaning or final effect of which cannot be readily foreseen by a spectator, are avoided; but a foundation is laid for forming a better idea of the future appearance of the scene, than by any other mode of planting whatever.

Supposing each single tree to be nothing more than a straight stem or pole, it is only necessary for the "prophetic eye" to imagine each of these stems crowned with a head of branches, say three or four times the height, and two or three times the width, of the length of the stem, and the effect of the scenery will be conceived with such a degree of accuracy, that an artist might represent it in a drawing. The stems being all of the same height, will diminish to the eye according to their distance from it, and by imagining the height and width of each tree to diminish in proportion, all the masses of woodiness that will eventually be formed, all the objects that will be concealed, all the open spaces and glades that will be displayed, and all the foreground groups that will be produced, will be present in the mind's eye of the artist, and to the proprietor who has a taste for landscape, as effectively as words on paper convey ideas to a person who can read.

There are only two objections that we have ever heard made to the substitution of single or scattered trees for enclosed masses of young plantations, viz., that the trees will not grow for want of shelter, and that the expense is too great to be incurred.

With respect to the first objection, we consider it in a great measure nugatory; so much so, that we have never yet, in the course of upwards of thirty years' experience, met with a situation or a soil in which single trees would not grow and thrive. Opinions of a contrary nature have arisen, as we think, from improper kinds of trees having been planted; from improper modes of planting them; and from an idea that a great deal is gained in point of growth by drawing up in clumps trees intended to stand singly, and afterwards thinning out those which have served to protect them. We are convinced from experience that in no soil or situation whatever is anything gained by growing trees in clumps which are intended ultimately to stand single; at least as such clumps are commonly managed, viz., left for many years without thinning, or thinned too late and too sparingly. The consequence is, that when all the superfluous trees are taken away, those left as single objects, from being exposed to a much greater degree of cold and of evaporation than they have been accustomed to, become stunted even in

the best situations and soils, and remain in that state for many years. The reason, we repeat, is, that by the removal of the sheltering trees, they have been, in effect, removed from a warm climate to one a great deal colder, against which their thin bark is altogether insufficient to protect them.

The improper kinds of trees for planting singly, to which we refer as the second reason why so much has been said about shelter, are such as will not thrive in the given situation and soil; the improper mode of planting, alluded to as the third reason, is the neglect of stirring the soil and enriching it with manure or surface soil; and the fourth reason is, the planting of single trees with all their branches on. There is no situation in Britain, except a few on the sea-coast, in which the common sycamore will not grow up singly into a very handsome tree, and the same may be said of the Norway maple and the white poplar. For smaller trees, we have the white-beam tree, the mountain ash, and the elder. The last also thrives exposed to the sea breeze; and, with the sea buckthorn, may be observed in great vigour on the east coast of Scotland, in the grounds of Gosford. Say that we have only two large trees and three small ones fit for planting as single objects, without shelter, in the most exposed situations in the island; are not these sufficient to vary a park, and break the lines of masses?

Planting trees with all their branches on may succeed very well in certain circumstances; but to inure a tree to a situation where it is to stand singly, it should either be planted when not above 1 or 2 feet in height; or supposing it to be 15 or 20 feet high, it should be taken up without any previous preparation of the roots, headed down to 10 or 12 feet, and all the side branches cut close off: and in addition to this, if it should have been taken from the interior of a plantation, or the outside of one in a sheltered situation, the stem should be wound round with a straw rope, or branches and spray should be tied round it from the root to the top. A tree so treated, having its fibrous roots to form, will produce only a few short branches the first season, and these will ripen and accommodate themselves to the climate. The second year these branches will increase in length, and the third year they may be thinned out, leaving a leader and three or four side shoots to form the head.

In more favourable situations, where twenty or thirty different sorts of trees might be planted singly, we would follow much the same plan. We have seen its success in France, Germany, and Belgium; even in England, with common English elms and limes, and with several kinds of trees at Smallbury Green twenty years ago, when, the common being divided, an allotment was made to Sir Joseph Banks. The trees, then naked stumps, are now handsome objects. But, in fact, the practice is as old as Evelyn. All we wish is to revive it, and we hope soon to give a practical exhibition of the plan on a park of nearly 5000 acres in the West of Scotland, and another of 500 acres in Kent. We have now given our answer to the first objection to single trees.

With respect to the second objection, the expense, we allow that it is very great when large trees are transplanted with their branches on; but when the practice we have just recommended is adopted, it must necessarily be comparatively moderate. A principal part of the expense will be incurred in fencing, and this will depend on whether the trees are to be protected against cattle and horses, or against sheep only. In the latter case, the stems may be protected to the height of 3 ft., with branches tied closely round them with tarred twine or wire; and in the former case, we would merely clothe them 3 or 4 feet higher. There are a great many ways of protecting single trees, but we know of none so easy of execution, so cheap at first, and so easily repaired afterwards, as that which we have described. Of course it is not applicable to the pine and fir tribe when young, and to young trees which have not a stem of at least 1 in. in thickness at 10 ft. from the ground; these must be protected by more expensive fences, placed at such a distance from the tree as that cattle, when reaching over them, may not touch the branches.

The greater the number of single trees in a given space, the less will be the injury done to each by animals pasturing among them.

Trees suitable for our mode of planting singly may be obtained from almost every plantation of twenty or thirty years' standing, and from many nurseries. The price of the tree in the latter case will vary with the kind; but, in the former, we have ascertained that in Kent the trees may be taken up from plantations not exceeding two miles distant, pruned, brought to the spot, planted, and fenced, at 2*s.* 6*d.* per tree. This includes trenching a circle of ground in which to plant the tree, 6 ft. in diameter, and raising the soil within the circle 1 ft. high in the centre where the tree is to stand, by soil from the adjoining surface.

When the saving of ground for pasturage made by this mode of planting, as compared with planting in masses, is taken into consideration, we think it will be found not less desirable, in a pecuniary point of view, than it is in point of effect.

Forming clumps or masses, for the sake of ultimately producing trees, may have been very well adapted for the state of the country about the middle of the last century, when few or no trees large enough for transplanting singly could be procured from the nurseries, or from young plantations; but in the present day, when they can be obtained in abundance from both sources, we consider the practice as altogether unsuitable, and, in short, quite behind our present state of knowledge and resources. By planting single trees, the ultimate effect, as we have already observed, is foreseen at once; it is realised more and more every year as the trees advance in growth; and, instead of the enjoyment of a place being deferred for a lifetimé, it is, by the proprietor who has an eye for landscape, entered on immediately.

To guard against misconstruction, it may be necessary to state that, when we use the words single tree, we never intend to mean a tree standing by itself, and unconnected with every other object, but a tree which, though standing singly, yet is never so far distant from another tree, or from trees, as not to belong to the same group or mass. It is also to be observed, that we do not propose to head down or cut in trees of the pine and fir tribes. (*Gard. Gaz.*, October 23. 1841.)

Poittevin's disinfected Manure has been applied for the growth of turnips, at the rate of 64 bushels per acre. There has been abundance of rain to dilute it, yet between the rows so manured, and others contiguous which had no manure, the difference in growth, as may be now seen, is not such as is likely to balance the expense; nor does it seem probable that a beneficial result will be obtained. It seems to answer best in the form of manure water; but in this way it is not equal to that obtained from farm-yard manure. Poittevin's manure has been tried with pelargoniums and calceolarias in pots, and also in the open ground with various other plants; its effects in all cases have not proved it of more striking utility than common night-soil or any other good manure. In the open ground, where it was tried upon 9 square yards, the 9 adjoining yards were planted with the same kinds, and scarcely any difference of growth could be detected. For annuals the manure was mixed with the soil in which they were potted in the following proportions, $\frac{1}{16}$, $\frac{1}{12}$, $\frac{1}{6}$, $\frac{1}{2}$, and it was used without mixture. The kinds selected were, Nemóphila insígnis, Impàtiens glandulífera and other sorts of balsams, and sweet peas. The plants of Nemóphila and sweet peas all became sickly for the first ten days, but began to recover in proportion to the weakness of the mixture, those recovering first which were in soil with the smallest portion of manure; some of those planted in manure alone, after becoming very sickly, upon being several times watered, recovered, and finally became more vigorous than any of the others, and of a much darker green The pots were found to be free from worms for a long time. Impàtiens glandulífera and others were potted in the proportions $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{2}$, and in manure alone. The plants (there were two of each) potted in $\frac{1}{16}$ became perceptibly languid; those in $\frac{1}{2}$ very sickly, and were evidently much affected by the over-dose, but they began to recover in

about ten days, and finally grew vigorously. Those in disinfected manure alone, after lingering for about two months, eventually died, or rather rotted off above the pot. The following perennials were also tried as above stated, viz., *V*erbèna soròria, *V*erbèna *t*eucri*ïòïdes*, hybrid petunia, and *S*tátice tatárica. The manure had, as nearly as possible, the same effects as on the annuals, with this difference, that its action was much slower, and not so likely to kill the plants. With respect to shrubs, hardly any effect on their growth was observed, except when they were planted in manure alone, when in most cases they were killed, particularly species of the *P*ìnus ; probably trees and hard-wooded shrubs require one or even two years before the effects of the manure are conspicuous. Nemóphila insígnis, Impàtiens glandulífera, and sweet peas were also potted in the same soil as before, but they were top-dressed with half an inch of disinfected manure. They were also potted with half an inch of manure at the bottom of the pots ; in all cases the growth was in favour of those with the manure on the surface. The perennials, *V*erbèna sorória, *V*erbèna *t*eucri*ïòïdes*, and hybrid petunia, with half an inch of disinfected manure at the top of the pot, grew remarkably well, without any symptoms of injury ; with half an inch of the manure at the bottom of the pot, they also grew very well, but it was evident that those top-dressed were more vigorous and robust than either those with the manure at the bottom, or those in the soil without any disinfected manure. The following were tried with the manure in a liquid state, viz., Impàtiens tricórnis, glandulífera, and cándida, all very strong-growing plants, and well adapted for trying the strength of the substance. Various other plants have also been watered with the liquid, and in all cases with much benefit, more particularly those kinds which naturally grow with great vigour. After various trials, it was found that only 1 part in 60, or about one pint of disinfected manure to eight gallons of water, should be employed, and then the plants should only be watered with it once a week, or, if very slow-growing sorts, once in two weeks. The manure is very powerful ; and taking the small portion required and the price (about 1*s.* 8*d.* per bushel) into consideration, it has merit, and deserves trying in the open ground on a much larger scale. The principal objection to its general introduction is, that it may be used too strong, and so destroy vegetation for the first season, or make plants sickly. If used in a dry state, it seems, in any quantity, almost sudden death to some plants, acting in the same way as dry salt ; it therefore should only be used in a liquid state. It may be mixed with the water, and used in ten minutes afterwards, just as well as if it had been mixed ten hours ; it then seems to lose the deleterious effects so destructive to vegetation. (*Proceedings of Hort. Soc.* for 1840, p. 188.)

Strong Bottom-heat for Cácti, and plenty of light, have been found very beneficial in the growth of these plants, but the experiments are discontinued for the present season, as frame moisture without bright light would prove injurious to them. (*Ibid.*, p. 187.)

Cultivation of the Nelúmbium *speciòsum.*—This season our plants have been treated as follows :—They were kept dry during the winter in a cool part of the plant stove at about 50° Fah. In February the roots were divided, and potted separately in turfy loam; the pots were set in pans of water, the temperature of the house being 65° to 80°. As they began to grow they were set in the water, just deep enough to allow their leaves to float. In April they were removed to a small stove devoted to the cultivation of *O*rchidàceæ and other select stove plants, where the temperature varied from 65° to 90°, temperature of the water in the cisterns being about 75°. In May the strongest specimen was planted out in a water-tight box, 3½ ft. long, 1½ ft. wide, and 16 in. deep, filled with loamy soil, having a little gravel on the top to give it solidity, and allowing room for about 2 in. of water over the surface of the soil. The box was plunged into the bark bed, which raised the temperature of the soil and water in the box to 80°. This bottom-heat was maintained during the summer, the temperature of the house varying from 65° to 95°.

The plant continued to grow rapidly, sending up leaves 3 ft. out of the

water, the largest of them being 16 in. in diameter; and on the return of fine clear weather in August the first flower-bud appeared. The plant proved to be the red variety; its flowers, when fully expanded, increased $10\frac{1}{4}$ in. in diameter, and remained several days in perfection. It is much larger and more beautiful than the flower of *Nelúmbium* lùteum, the only other variety I have seen in flower. Another season I intend trying the effects of a higher temperature at the roots. The plant which flowered now occupies a space of more than 12 ft. in circumference. (*J. Scott*, in *Proceedings of Hort. Soc.* for 1840, p. 192.)

Effect of Age in Trees on the Quality of the Fruit.—The following extract from Dr. Bullar's account of the Azores relates to an interesting subject, which has not, I believe, hitherto received much consideration. Dr. Bullar does not state whether grafts from the old trees continue to produce the same fruit as the parent, or whether the produce is the same as that from young trees. I think Sir W. Temple has some observations on this point.—*K.* "Accompanied Senhor B—— to several of his orange-gardens in the town. Many of the trees in one garden were a hundred years old, still bearing plentifully a highly-prized thin-skinned orange, full of juice, and free from pips. The thinness of the rind of a St. Michael's orange, and its freedom from pips, depend on the age of the tree. The young trees, when in full vigour, bear fruit with a thick pulpy rind, and abundance of seeds; but as the vigour of the plant declines, the peel becomes thinner, and the seeds gradually diminish in number, till they disappear altogether. Thus, the oranges that we esteem the most are the produce of barren trees, and those which we consider the least palatable come from plants in full vigour." (*Gard. Chron.* for 1841, p. 381.)

New Watering-pot.—In one of the early numbers of the *Gardener's Chronicle* there is an article by Mr. Paxton, in which he gives directions for watering plants, and points out the necessity of watering according to the peculiar habits of each. I had a watering-can made twelve months ago, which enables me to do this very effectually, and, at the same time, prevents a great waste of water, as no part of it is distributed except upon the soil in the pot. My watering-can is made of copper, 7 in. diameter by 7 in. high (holding seven imperial pints); in the side, and close to the bottom *inside*, there is a conical brass valve seating (the opening of the valve is $\frac{5}{8}$ in. in diameter), brazed to the side of the can. A small copper pipe, $\frac{3}{8}$ in. bore, is secured to this by a nut; at the end of the pipe there is a small rose, $\frac{3}{4}$ in. in diameter, perforated with holes very similar to a gas-burner. If nicely perforated, the water will spread without uniting in a stream. The valve is opened and shut by means of a rod, $\frac{3}{16}$ in. thick, passing across the can diagonally, and through a collar brazed into the side just above the handle. The rod is lifted by a trigger fixed upon the handle, through which there is a slit groove to receive a steel spring, one end of which is fixed to the side of the can, the other end, pressing upon the under side of the trigger, keeps the valve shut. In using the watering-can, place the left hand under the bottom of it, close to the pipe, the right hand, of course, upon the handle; press down the trigger with the fore-finger, which will open the valve, and when the finger is removed the spring will shut it. The length of the pipe and rose in my can is 14 in., but it may be made any length; and, as the rose is small, it may be introduced amongst all pots of cuttings with great facility. I find the can very handy in watering plants in pots, as any particular plant may be watered, and just in that proportion best suited to its habits. The can is filled through a hole in the top. If any person in this neighbourhood should desire to have a watering-can of this description, they may procure it of Messrs. Shipham and Co., brass-founders, Trinity Lane, Hull, who have the drawings by which it was made. (*H. L., Hull*, in *Gard. Chron.* for 1841, p. 398.)

Rooting of Leaves.—I have never found this circumstance more remarkably displayed than in the case of the Echevèria racemòsa (I believe, the true Mexican "Forget me not"). The very flower-stalks, when laid past for

months, like Aaron's rod, have "blossomed" with young plants. My worthy friend, James Cockburn, Esq., of Elm House, Guernsey, showed me curious examples of the same kind in flower-stalks of the Echevèr*ia* gibbiflòra. Infant plants studded the flower-stalk long after being detached from the parent stem. Leaves and fragments of leaves will strike. The Bryophýllum calycìnum is remarkable for the crenatures of the leaf being fretted with young plants even while yet attached to the parent plant, and still more so in a state of decay. Various plants, I am aware, exhibit a similar viviparous phenomenon; but I must now content myself with alluding to the facility of striking almost fragments of the *Lý*chnis coronària, a favourite of mine. Not only will individual joints strike, but, if each joint be split into two vertically, two distinct plants may be obtained. The echeveria is, however, the most tenacious of life. (*J. Murray*, in *Gard. Chron.* for June 19. 1841, p. 397.)

Want of Moral Courage in Architects and Landscape-Gardeners. — The greater number of these persons being sprung from the people, necessarily have more or less the character of *parvenus*, when introduced into the society of the higher classes. Observing in this class the contempt and disdain with which they look on the mass of the people, they naturally avoid every thing which may remind either themselves or the society into which they have been introduced of their low origin. Hence, to advocate the cause of the class from which they sprang in any way; to be thought to care about their comforts, or to suggest improvements in their dwellings, would remind the employer of their origin, and be thought derogatory to their newly-acquired station. An architect or a landscape-gardener, therefore, who has sprung from the people, is rarely found with the moral courage necessary to propose to the rich who employ them ameliorations of any kind for the poor. In the course of thirty years' observation, we have found this to hold good both in Scotland and England, and in the former country more particularly. How many improved plans of kitchen-gardens, and new ranges of hot-houses, have there not been carried into execution in Scotland since the commencement of the present century, and yet how few improved gardener's houses have been built within the same period! Mr. Repton, having been born a gentleman, was under no such dread as that to which we have alluded, and we accordingly find him continually advocating the improvement of cottages. We also know other honourable exceptions among architects, and among their employers; many whose names might be enumerated, were we not fearful of making omissions, and incurring the charge of partiality. — *Cond.*

Art. II. *Foreign Notices.*

FRANCE.

The Artesian Well of Grenelle. — We have all heard, with the greatest interest, of the complete success which M. Mulot has obtained at Grenelle. After seven years of continued exertion, and after having surmounted difficulties of whose amount it would not have been prudent to speak during the course of the operation, M. Mulot, at length, on the 26th of February, 1841, at half-past two o'clock, had the satisfaction of seeing burst forth, from a depth of 548 metres, the water which he was in search of in the greensand under the gault.

The jet of water springs up with an abundance which surpasses every hope that had been formed; for it yields no less than 4,000,000 of litres in the twenty-four hours. The temperature was not determined by M. Arago and myself till the following day, the 27th; and the state of the basin into which the water flowed not admiting of an accurate direct determination of the temperature of the jet, a bucket was placed in the basin, which was imme-

diately filled with the greensand brought up in abundance by the water. After allowing the thermometer to remain thirty minutes in this basin, it indicated 27° 6′ cent. (81· 68° Fahr.).

We all know that it was owing to the influence of M. Arago that the vote of the Municipal Council of Paris was obtained for the continuation of the boring operations from the depth of 500 metres to that of 600. It was doubted at that time if the water would rise to the surface; and one of the reasons which decided the vote was, the ascent of water in the wells bored at Elbœuf, by which water was obtained from the subterranean sheet of water which was sought for at Paris. M. Arago was sure that the water could rise to a height of from 27 to 30 metres above the surface, which itself is 8 metres above the level of the sea. Now, the surface at Grenelle being 31 metres above the level of the sea, the comparison between these two points gave him reason to hope that the column of water would rise to the surface at Paris. (*M. Walferdin*, in *Edin. Phil. Journ.*, July, 1841, vol. xxxi. p. 140.)

Bore of the Artesian Well at Grenelle. — The bore passes through strata of various kinds, such as, alluvial matter, sands and gravels, clays and lignites, chalk, hard chalk, and chloritic chalk. At the lower part of the bore, the following strata have been found, viz., green and grey clay; a bed of fine sand, containing water, gravel, and rolled stones; and a calcareous and argillaceous bed. The total length of the bore is 1794½ English feet; and the total cost 12,000*l.* The quantity of water thrown up is estimated at nearly 880,000 imperial gallons. It appears, from the analysis of M. Pelouse, member of the Institute, that the water is purer than that of the Seine. The temperature of the water is 82·4° Fahr. (*Sir John Robison*, in *Edin. Phil. Jour.*, July, 1841, p. 141.)

RUSSIA.

Riga, Dec. 20. 1841. — I must now say a few words about a flower-show which we have had this year. It was the first attempt of the sort, and, consequently, could not be compared to the brilliant collections that are displayed so often under your own eyes. Besides, this was not only the first show in Riga, but in Russia in general. The receipts were to be applied to a benevolent purpose, and, consequently, I, who had the arrangement intrusted to me, tried rather to make the whole as imposing as possible, instead, as in true flower-shows, of displaying every specimen separately for the inspection of connoisseurs. However, I managed in this arrangement to satisfy amateurs, by placing tables for cut dahlias in flower, in the cultivation of which the amateurs of our city excel. For this reason, the show was fixed for the end of August, as being the most appropriate. In a public garden here there is a Gothic room, which is used in general by the water-drinkers (it is a hydropathic establishment); and here I had stages erected for plants in pots, and for cut flowers. The colonnade at the entrance was ornamented with a row of orange trees in flower, laurels, and pomegranates; and two enormous plants of Agàve and *A*loe vivípara closed the entrance on the side where the visiters were not to enter. The entrance to the room was arched over by two majestic cypresses, and hung with silk and bronze in a very elegant manner. In the middle of the room a hemispherical stage was placed against the wall, on which was the bust of the emperor, adorned with the finest palm trees and plants of the torrid zone, such as zamias, pandanuses, dracænas, marantas, &c. This centre-piece had an excellent effect, from the singular and completely foreign nature of the foliage. — *Fr. Wagner, fils.*

WEST INDIES.

Residence of Edward Otto at Cuba. (Continued from our preceding Volume, p. 651.) — The immediate suburbs of Havanna no longer presented anything interesting to our eager enquiries; and therefore on Saturday the 12th of

January, eight days after our arrival in Havanna, I set out for Matanzas, where some of my fellow-travellers had gone some days before. Matanzas is a seaport-town on a bay of the same name on the northern coast of the island, about fourteen miles from Havanna. I went in a steam-boat, and reached it in about nine hours. The sea was rough and the wind contrary, so that the greater number of the passengers were sick; but here, as during the whole voyage, I was exempt from it, and it was the more extraordinary as even sailors who had become grey in the service were attacked by sickness during this short excursion, and suffered extremely. The particular object of our first expedition, however, was not Matanzas, as the fortunate acquaintance of Don Carlos Booth Tinto brought us to the plantation of Cafetal el Fundador, where we embarked in a small boat on the river Camina. The banks of this winding stream are ornamented with trees and shrubs of every kind; and on the sides of rocks which would otherwise be naked are seen agaves and yuccas, and the trees are covered with orchidaceous and other parasitical plants; and tillandsias, Guzmánn*ia* trícolor, Epidéndrum elongàtum, Dicrýpta Baúer*i* et crassifòlia, and Epidéndrum cochleàtum, are seen in immense numbers both on the trees and on the ground. There is a spacious avenue of bamboos (*Bambùsa* arundinàcea), from the place of landing to the dwelling-house. Each tree is from 13 ft. to 15 ft. in diameter, and more than 40 ft. in height, and each shoot is 6 in. in diameter, and bends gently towards the ground. The *O*rchidàceæ in the immediate vicinity here (perhaps on account of the season of the year) were nearly all as yellow and unsightly as we see them sometimes, even when cultivated with the greatest care, in our green-houses: I intend to pay the utmost attention to their growth and habits, so as to obtain as much information on the subject as possible for their cultivation at home. We saw no *C*ácti here, except *O*púntia hórrida in hedges and growing wild, and Cèreus grandiflòrus; and all the trunks of the trees were covered with Brome*liàceæ*, *Pòthos*, and other *A*röídeæ.

The plantations of Mùsa have not a very inviting appearance, because the high winds here from time to time tear their leaves to pieces: those of the cocos and oreodoxas are much prettier, and, when not too large, form a beautiful forest. The kitchen-garden presented something quite new to us, as it had its beds bordered by Tradescánt*ia* díscolor. The oranges were within our reach, and had an excellent flavour, and we found that a very frequent enjoyment of them did us no injury, as they are said to do in other regions of the New World. I did not observe any pine-apples. The plantations here are surrounded by high and steep mountains, covered with trees, and our next intention was to penetrate them. We found this extremely difficult; and the forest is quite impassable unless you form a path for yourself, and this is so tedious that you cannot advance more than sixty steps in an hour.

How gladly should we have overcome these difficulties if they had been attended with a more fortunate result! but perhaps that was more than we could expect, as great part of the vegetable kingdom lay in their winter's sleep, and the number of genera of the parasitical *O*rchídeæ which are found in the neighbourhood of Cafetal el Fundador was not very considerable. My attention was particularly attracted to oncidiums, epidendrons, maxillarias, and genera allied to Cyrtopòdium. I found the greater number of oncidiums on the ground in the thickest forests, lying and growing on stones. The last storm had probably thrown them down from the trees, as I saw here and there pieces of the bark adhering to the roots, and many plants of the same kind were seen on the trunks and in the axils of the branches. Besides the *O*rchídeæ, innumerable bromelias grow on the trees, and hang down in long festoons, united with the rhipsalises and cereuses growing near them. Slender trees grow on the stoniest banks of the Camina, particularly Játropha peltàta, the trunk of which is covered with *O*rchídeæ and climbing plants, and actually form a kind of bower over the river itself, thus affording a protection from the burning rays of the sun. I saw both species of Dicrýpta (D.

Baúeri and crassifòlia) on one trunk. The cyrtopodiums, dendrobiums, and other species, were quite as unsightly as we see them in our houses, as the shoots that have flowered cast their leaves and stand bare till they are quite withered up; and I found this to be the case with the epidendrons and maxillarias. I think it is of the greatest importance to observe the different kinds of situations in which the Orchídeæ, &c., are found. Sometimes they grow in the thickest forests, through which the sun's rays can hardly penetrate, and particularly on the ground; sometimes, also, on an open plain and on the banks of rivers, where they are exposed the whole day long to the burning sun. The temperature there varies from 12° R. (59° Fahr.) the heat of the day, to 13°, 9°, and 6° R. (61·25°, 52·25°, and 45·5° Fahr.), before sun-rising; and, besides the rainy season, they only have moisture during the night from very heavy dews, and consequently must obtain their principal nourishment from the air.

In applying these facts to the cultivation of Orchídeæ in our country, it will be observed that, if the houses are heated, the heat should be diminished during the night, and the plants should be but little watered; and not in the evening, but in the morning, and by clear daylight. I observed that the specimens we collected had their tender roots attacked by insects in a similar way as ours are gnawed by woodlice. Unfortunately, I could only find specimens in flower of Epidéndron cochleàtum, and another doubtful species; and an oncidium, very much resembling O. altíssimum in habit, only showed its flower-stalk. I must wait for the flowers and seed of many beautiful plants, apparently unknown to me, before I can decide what they are.

Our excursion from Cafetal towards the sea-coast rewarded us much more richly in a zoological than a botanical point of view. The vegetable kingdom is but sparingly scattered in this neighbourhood, but large spaces are covered with Coccóloba uvífera, and extend even as far as the sea-shore. Under these trees, which are from 2 ft. to 15 ft. in height, grows the amaryllis in great numbers; also the jatropha and plumieria, in the greatest luxuriance. The ferns look exceedingly beautiful on the trees; and I saw a few glycines, with very large leaves and red blossoms, which would be new in our gardens. Large specimens of *Pòthos* crassinérvius, on rocks and old trunks of trees, look extremely majestic; and there were also other species of *Pòthos* climbing up the trees. The hospitable reception we met with from our landlord afforded us every possible convenience for preserving or sending off our collection. Besides our apartments, he gave us possession of a large one which had windows facing the east and west, through which we got a sight of the lofty palms, under which large coffee plantations extend, protected by them.

The large coffee barns are at present empty, because, being about the end of January, the coffee harvest has not yet begun; but my particular attention was directed to the preparation of sugar, and the almost incredible consumption of the fruit of the pisang and the banana, which are prepared as food in very different ways. I have not yet seen plantations of tobacco and cotton. I could not get supplied with this latter necessary article for packing glass, &c., either in Havanna or Matanzas; and when a handful of it was obtained in a shop which sold Nuremburg toys, they asked the sum of two reals!

The great stupidity of the negroes proved a serious obstacle to us, in collecting and sending off what was worth our trouble. They generally broke or injured whatever they set down; and yet I was obliged to get their help, as one individual could not always perform the office: and even when we had our collection apparently secured in the laboratory, the next day we found that the best part of it was either eaten up by the rats, or attacked by small ants, which found their way through the smallest crevices, against which I could take no other revenge than by capturing, and sending them, dead or living, to Berlin for examination. Rather than be annoyed with these little creatures, I should have preferred the all-dreaded mosquitoes, with which I have not yet made acquaintance. Bats are not uncommon here, and even sometimes became our bedfellows; because the style of building is adapted to

the climate, having air-holes instead of windows, and the rooms are open above, with no other covering than the roof. Still we found our social circle in the evenings after sunset extremely agreeable; and we amused ourselves in a somewhat broken Spanish, and a general smoking of cigars, in which even the ladies, without any exception, took a part. (*Garten Zeitung.*)

Art. III. *Domestic Notices.*

ENGLAND.

Building Villas on the Site of the Kitchen-Gardens at Kensington. (From a Correspondent.) — As it appears that the plan of lotting off the ground lately occupied by the kitchen-gardens at Kensington for villa sites is to be carried out, I lose no time in making some observations which I had prepared when the plan was first brought forward, and which were reserved until it should be more matured, as I had some hopes it might be withdrawn by the proposers, whom I suppose to be the same that originated the notable scheme of selling off the plants and breaking up the establishment at Kew, from which the public were only saved by the active vigilance of some members of both houses of parliament. It is certainly singular that almost the only legislative measure to be carried on in this short session should be this; and that the new government, who are to repudiate the plans of their predecessors, should have at once adopted this, to us, most objectionable one. We cannot forget that it is to the same party we owe the demolition of the magnificent trees in Carlton Gardens, and the forming of the embankment at an enormous expense; the wretched architecture which occupies the finest site in London; and, but for the resolute interference of William IV., the exclusion (which was the real object) of the public from access to the Park from Waterloo Place. These plans, in which both parties are concerned, only show the necessity of the utmost vigilance on the part of those who have it in their power to check the proceedings of administrations, and who, I hope, will come forward on this occasion, and arrest the course of this measure.

I do not at all blame the government for carrying out the plan of making a large and proper kitchen establishment at Windsor, and suppressing all the minor and detached branches; quite the contrary. I very much approve of it; and only wish that instead of a number of the most paltry palaces in Europe, we had two or three good ones, and the rest done away. All I object to is the mode of providing for it. The space no longer wanted for the use of the palace should be given to the public, which, under reservations and proper restrictions, has a right and claim to access to these gardens and parks. In the vast increase now taking place in every direction of the metropolis, every inch of ground which can be reserved from the dealers in ground rents and brick and mortar should be so; and the parks are at present by no means too large, but the contrary. The site in question has other claims to be reserved for some better purpose than the paltry one it is destined to. From its distance from the mass of buildings and manufactories, the smoke of which is so destructive to vegetation almost everywhere else, it may be judiciously applied to purposes which cannot be effected in parts nearer to them; and there are many purposes both of use and ornament to which it may be converted.

The paltry and miserable sum of 1000*l.* per annum, to obtain which, it appears, is the object of the plan, is sufficiently characteristic of us; and as no other public ground is brought forward to support it, I hope that the whole metropolis, which is interested in it, will stir and meet in the parishes to protest against it, and call the attention of the members, without distinction of party, for it is no party question, to protest and raise their voices against it before it be too late. — *W. September* 20.

Dartmoor Granite as a building Material.—Dr. Buckland, at the Plymouth meeting, exhibited a series of specimens from Lord Morley's granite quarries,

in Prince Town, Dartmoor. To the depth of 50 or 60 feet the granite is more or less decomposed, and it is *surface granite* which has been employed in almost all cases, because it was obtained cheapest; and the result has been, that in all buildings which have stood for any number of years, such as Dartmoor Prison, each block of granite has become a spongy mass, absorbing moisture continually, rusting the iron bars employed in combination with it, and rendering the cells so damp that they can only be used by covering the walls within and without with Roman cement or tiles. This defect is inseparable from all the granite which is not quarried from a depth beyond the influence of decomposition. At the bottom of the Morley works, a mass of granite is exposed to a great extent, which is entirely free from this influence: it is from this the granite is obtained now being used for Lord Nelson's monument in Trafalgar Square. (*Edin. Phil. Journ.* vol. xxxi., Oct. 1841, p. 429.)

Clay Floors. — With respect to the clay floors in the neighbourhood of Houghton, I do not know precisely their composition; but we have, near Norwich, many clay floors in barns, malt-houses, hay-lofts, &c.; they are merely a mixture of clay and marl (in what proportion, I know not), well compounded, and trodden by horses, and sometimes mixed with chopped straw; and, for malt-house floors, bullock's blood is added. There are certain men here who do these works well, and keep the proportions a secret; and I apprehend a deal depends on the quality of the clay and marl, so that directions would not apply to every locality. I built some time ago a workhouse for 300 paupers entirely of clay walls, and it is now as good as any building needs to be. — *W. T. Norwich, Dec.* 22. 1841.

The Wire-Worm. — The ravages of this worm, one of the greatest enemies of agriculture, have, during the present season, been so great, that we avail ourselves with avidity of the result of any practical experiments which may have been made for the extirpation of the insect. The subjoined is extracted from the *Report* of the South Wilts and Warminster Farmers' Club, recently published: —

"In October, 1836, finding that the wire-worm was fast destroying the wheat plant, and, it being drilled, I had it trodden by men, one man treading two ranks at a time firmly into the ground; the expense was 2*s.* 4*d.* per acre, and it was quite effectual in stopping the ravages of the wire-worm. A week or two after, the wheat in an adjoining field began to show the ravages of the wire-worm, and I pursued the same plan with similar success. In February, 1839, the wheat in a piece of down land, which had been sown late in October, was becoming thinner very fast; the ground being in a hollow state after the frost, the young backward plant appeared to be losing its hold and dying away. I then sent a number of women to tread it, and I never saw a piece of wheat improve faster than it did after the treading; I had not only a good crop of corn, but also more straw, than from any other piece of land in my occupation. In the spring of 1840, finding the wheat in the down land losing plant again, in consequence of the cold weather, I tried the same plan, and there was a speedy change for the better in the appearance of the wheat afterwards. The plant continued to flourish; and, at present, I have a good crop of wheat on land on which I never saw a good crop before. The remarks I have made apply to hill land, although I have no doubt that the spring treading would be found highly beneficial on all soils, when, in consequence of frost or long-continued dry weather, the land is in a light pulverised state." (From the *Cambridge Chronicle and Journal*, Dec. 4. 1841.)

SCOTLAND.

Caledonian Horticultural Society.—We are happy to learn that this Society is about to erect an exhibition hall in its gardens at Inverleith. The following are extracts from the proposals put in circulation: —

"The erection of a building for the exhibition of plants sent for competition has been long a desideratum. Plants so sent have hitherto been placed in the shed at the back of the hothouses, to be inspected and judged by the Committee of Prizes; and they have, from the exposed situation of the place, not unfrequently sustained considerable injury; while, from the want of a sufficiency of light, their qualities cannot be properly ascertained.

"A hall or large room would be extremely useful during the quarterly meetings of March and December, when no regular exhibition can take place out of doors. At these meetings, the judges are unavoidably confined in small apartments while considering the merits of the competition articles; and it has been found utterly impossible to point out to the members assembled in the Council Room, as should be done, the prize articles, while the report of the Prize Committee is submitted.

"It may also be stated, that very great anxiety prevails amongst the assembled practical gardeners forthwith to learn who are the successful competitors: and it not unfrequently happens that erroneous impressions arise from mistakes regarding the awards of the judges; and these are never properly cleared up, until the official notice from the secretary is received, or the report be published in the newspapers. This would be avoided, if a hall could be erected where gardeners and others interested would be present while the report of the Committee of Prizes is read to the Society. All would thus obtain accurate information as to the competition and as to the successful candidates, to be communicated among themselves, and to their employers. In consequence of the present want of means of obtaining satisfactory information, much of that interest which such competition meetings are calculated to produce in stimulating gardeners to renewed exertions is lost.

"The probability of the Society being enabled hereafter to offer increased prizes makes the proposition for a hall still more urgent. The enlarged prizes to be offered by the Society for the ensuing year will undoubtedly create greater anxiety amongst competitors to know the result of the Prize Committee's deliberations before they leave the garden; a result which certainly ought to be promulgated as speedily as practicable.

"At present the largest public apartment in the garden is the Council-Room, which is only 14 ft. by 16 ft. Although well adapted for council and committee meetings, it is much too confined for general meetings. Indeed, it is well known that many members absent themselves, in consequence of the limited accommodation; and practical gardeners are wholly excluded.

"Now that horticulture in all its branches is making such rapid strides all over the country, it would certainly be desirable that this, the leading horticultural society in Scotland, should extend its usefulness, and keep pace with the demands of the times.

"The Highland and Agricultural Society has commenced a new era, by holding monthly meetings for the reading of papers, and discussing points connected with agriculture; why should not this Society follow the example, when there is a mass of useful materials easily attainable? For some time past, it has been strongly urged by many members of the Society, that a horticultural periodical should be set on foot. Such a publication would certainly be desirable; but unless some method were adopted for having it supplied with useful matter, it would be almost useless to commence it. One of the chief sources for such a supply would be afforded by monthly meetings, at which papers could be read, new plants, fruits, and vegetables exhibited, and notices regarding their method of culture brought before the members; easy admission being afforded to all practical gardeners by means of visiters' tickets. Horticultural implements and designs of various descriptions might also be brought forward. At such meetings, members (ladies and gentlemen) should have free admission for themselves and for one friend. This would be one of the greatest advantages held out by the Society, and would be the means of inducing many to become members. If such an object were accom-

plished, the Royal Caledonian Horticultural Society would unquestionably attain a status superior to what it now holds, and be the means of conferring inestimable benefit on the country. At such meetings, useful and instructive lessons might occasionally be given to members; for instance, the various methods of grafting, inarching, budding, &c., might be explained and illustrated by practical operations, Besides, gardeners and amateurs could there meet familiarly together, and discuss different matters of interest, which might afterwards be committed to writing, and read to the Society; and thus a friendly intercourse between the members and practical gardeners would be promoted, a measure which Dr. Duncan, the father and founder of the Society, had in view at its commencement.

"The proposed building could also be advantageously used as an exhibition room for select plants in flower from the hothouses in the garden, and for others sent by gardeners and amateurs from the neighbourhood, at various seasons of the year; for a museum for plants, model-tools, &c., connected with horticulture; for exhibiting in glass cases, collections of named fruits, preservations of tropical fruits, casts of fruits, &c.; and also for a botanical and horticultural library, where the periodical and other works belonging to the Society might be arranged for the use of the members and others.

"It is scarcely necessary to add, that such a hall would be of great general advantage as a place of resort for members and their friends at all times, and would afford convenient shelter on promenade days, in case of bad weather coming on."—*Dec.* 9. 1841.

The Highland and Agricultural Society of Scotland, as noticed in the preceding article, have lately begun to hold monthly meetings for reading papers and for verbal discussion, a practice which cannot fail to be attended with the best results.

The first paper read, and which was by Mr. Oliver, Lochend, was on the importance to agriculture of discovering new fertilising substances. He commenced by stating his conviction that, by the discovery of new fertilising substances, in connexion with thorough draining, a great and fresh impulse might be given to agriculture; and, after adverting to the importance of providing an increase of food for the rapidly increasing population of this country, he stated that the great desideratum for effecting this object was the means of keeping up and increasing the fertility of the soil under a continued system of culture, by restoring to it more food for plants than had been carried off by their production; and by a reference to the past history and progress of the art, showed that the latter had been nearly in proportion to our means of supplying the food of plants. In illustration of this view, he contrasted the weight of materials afforded for manure, under the old system of successive white crops, with those obtained after the introduction of turnips and other green crops, which he distinguished by the name of manure-making crops; showing, on the authority of writers on rural affairs of the period, that a farm of 100 acres, under the former, yielded only about 45 tons of straw, while under the system which followed the introduction of green crops, it yields upwards of 600 tons of straw, hay, and turnip, to be applied to that purpose: thus demonstrating, that to this circumstance, more than all others, the progress made in agriculture, which enables us to supply food for our present population of nearly 20,000,000, with little more reliance on foreign countries than at the former period, when it was under 9,000,000, is mainly to be ascribed to the increased means of furnishing the food of plants to the soil.

He next pointed out the system of management which followed the introduction of manure-making crops on lands of the first, second, and third degrees of fertility, and explained by what changes on these systems, with the aid of new and additional fertilising substances, the quantity of grain produced might be greatly increased, as well as a large addition made to the means of fattening live stock. It appeared, for instance, that farms situated near large towns, from which an abundance of manure could be procured, should adopt the four-course shift, which allows one half of the land to be under grain crops;

whereas those at greater distances, and especially of inferior soil, must follow a five, a six, or a seven course, which only allows two fifths, two sixths, and two sevenths, respectively, to be under corn crops, thereby limiting the amount of food derived from farinaceous substances, while it does not increase but diminish the means of fattening live stock, as compared with what would be afforded under the change contemplated by Mr. Oliver. This was explained and illustrated by details which we cannot enter into.

Mr. Oliver next adverted to the probability of succeeding in the discovery of fertilising substances, by referring to the recent progress made in chemistry and vegetable physiology since the publication of Sir Humphry Davy's *Lectures;* to the interest taken in the subject recently by such distinguished scientific individuals as DeCandolle, Macaire, Liebig, Professor Johnston, and others; to the interest also beginning to be felt by practical agriculturists in the subject; and, above all, to the successful results obtained by those who had instituted and conducted experiments with new specific substances adapted to specific crops. The results of several were stated; but our limits prevent us entering into it further than to give the import of one or two very shortly. In adverting to the experiments on ammoniacal water and other substances by Mr. Bishop, overseer at Methven Castle, and read at the last meeting, it appeared that an application of ammoniacal water, which cost about 1*l.* 15*s.*, gave an increase of 274 stones of hay per Scotch acre, leaving a profit (if taken at 6*d.* per stone) of upwards of 5*l.* In consequence of suggestions circulated last spring by Professor Johnston of Durham, to whose intelligence and zeal Mr. Oliver adverted in strong terms, experiments were instituted partly in England and partly in Scotland.

Near Aske Hall, in Yorkshire, on the property of the Earl of Zetland, six bushels of common salt, which cost 13*s.*, gave 1 ton of additional hay per imperial acre; 20 bushels of soot, which also cost 13*s.*, gave 18 cwt., or 90 stones; 112 lb. nitrate of soda, which cost 22*s.*, gave 12 cwt., or 60 stones.

At Erskine, the property of Lord Blantyre, near Glasgow, 120 lb. of nitrate of soda gave one ton of additional hay per imperial acre; and the same weight of saltpetre gave 16¾ cwt.; but on heavy soils the effect was about one half only.

Results equally favourable were obtained by Mr. Fleming of Barrochan, on grass and almost every other description of farm produce; but we have not space to follow Mr. Oliver in all the details which he gave of these experiments, which is the less necessary as the directors were recommended, on the motion of Mr. Finnie, Swanston, to publish the paper in their *Transactions.* We shall, therefore, only, in taking leave of this highly interesting paper, give the result of a single experiment with a mixture of the sulphate and nitrate of soda, on potatoes: —

	s.	*d.*
Sulphate of soda, 75 lb., dry, at 10*s.* per cwt., or 150 lb. in crystals at 5*s.* - -	6	9
Nitrate of soda, 75 lb. at 22*s.* - -	14	9
	21	6

The return for this 21*s.* 6*d.* was upwards of eight tons of potatoes. The results of these experiments are, no doubt, too limited for the introduction of general principles; but we agree with Mr. Oliver, that they hold out sufficient encouragement for further enquiry on the subject of specific manures.

Sir John Robison described a new form of roofing-tile, of French invention, which appears to combine several advantages over those used in this country; being lighter than Scotch tiles, in the proportion of 68 lb. per square yard to 110 lb. per yard, which is the usual weight. The joints of the French tiles fit into one another in such a way as to render them easily made absolutely weather-tight, and so as to afford no lodgement for water to be blown inwards by the wind, or to be affected by frost. The general aspect of roofs formed

of them was described as being agreeable. Specimens of the tiles and the model of a cottage roofed with them were exhibited, and have been lodged in the museum. As in some parts of the country the appearance and cost of tiles affect both the economy and beauty of our cottages, this new contrivance appears to be deserving of attention both by tile-makers and builders.

[Of these tiles which are as beautiful as they are economical, engravings will be found in the *Supplement* to our *Encyclopædia of Cottage Architecture*, and we hope soon to be able to name some places in England where they are manufactured.]

Sir John Robison described a box-bedstead suited to cottages, proposed by Dr. Charles Wilson, Kelso ; the peculiarities of which consist in having openings which can be made at pleasure in the top, back, and one end, whereby not only a perfect ventilation can be effected through it in case of sickness, but easy access afforded for the medical man to his patient. By a contrivance for advancing the rod from the front of the bed, a screened space is obtained, which answers the purpose of a dressing-room. If the box form of bed is to be retained in cottages at all, the arrangement of the curtain is worthy of general adoption. (*Scotsman*, Jan. 12. 1842.) [This, also, will be figured in the *Supplement* referred to.]

Art. IV. *Retrospective Criticism.*

Erratum.—In the Vol. for 1841, p. 603., line 14. from the top, for "Blue Clay from a tilled field," read "Blue clay from a tile-field."

Mode of preserving Seeds for a Number of Years. (p. 47.)—Since I sent the paragraph (p. 47.), respecting the preservation of seeds for experiments on their vitality, there has been a meeting of the Committee in London to consider the same (on Friday last, Dec. 10th), when it was resolved that the seeds should be kept in jars made of coarse pottery, and with one aperture ; not in a mass, as indicated in that paragraph, but in papers, each paper to contain only a sufficient quantity of seed, mixed with a proportion of dried sand, for one experiment : they are then to be placed one species in a jar, and covered to the depth of 1 in. with dried sand; the mouths of the jars being covered with strong paper dipped in corrosive sublimate. Other modes are to be tried, but this is to be the most general one. — *W. H. Baxter. Botanic Gardens, Oxford, Dec.* 6. 1841.

Art. V. *Queries and Answers.*

The Weather of 1841. — Now that we have left 1841 behind us, will your correspondent N. condescend to inform me, from his own observation, what has been the average temperature of every day during the past year ? — *N. M. T. Folkstone, Jan.* 1842.

Art. VI. *Obituary.*

Died, Jan. 10., *Aylmer Bourke Lambert*, Esq., F.R.S., G.S., &c., for many years Vice-President of the Linnean Society ; and universally respected by botanists, for the kindness and liberality with which he allowed the use of his valuable library and extensive herbarium. Mr. Lambert is also advantageously known to the botanical world by his splendid work on the *Genus Pinus*, which doubtless laid the foundation of the present very general taste for planting pinetums.

THE

GARDENER'S MAGAZINE,

MARCH, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the Conductor.

(*Continued from* p. 55.)

Garscube, Sir Archibald Campbell, Bart. — Imagine a broad extensive basin of park scenery, bounded on two sides by irregular banks finely wooded, and the two ends lost by the banks apparently closing on a noble river with a rocky bottom and sides. Such is the idea that we formed of Garscube, when first we emerged from the fine old wood which covers an approach conducted down one of the steep banks. The effect is striking, from the surface of the ground, and the manner in which it is entered from the public road. In most places the entrance is at right angles to the road, and the approach road within proceeds on a level surface, and for some distance, at least, in a line deviating very little from a perpendicular to the public road; but here the entrance is oblique to the public road, and turns close to the right, the surface rapidly descending through an umbrageous and scattered wood, with beautiful glades of turf, which at once gives rise to a train of ideas as to the cause of so remarkable a deviation from the normal arrangement in such matters. After turning to the right, and while the imagination is still at work, we are whirled down for a considerable distance, till, at the base of the slope, we emerge into a beautifully undulated park, containing a splendid river, close to which we see the house, in the domestic Gothic style of Mr. Burns. Having crossed a handsome and well placed bridge, we arrive at the porch, and soon enter the house by one step; but it struck us at the time that three steps would have given more dignity to the views from the apartments within, as well as the idea of a greater degree of security from damp to the stranger entering from without. The apartments seemed well arranged; and the conservatory

had a noble effect, from the splendid irregularity of the masses of leaves and flowers which over-arched the paths, and clothed the back wall with a surface of vegetation, from which many branches protruded. It will require some management to preserve this character of luxuriance, and prevent the plants from choking one another and getting naked below. Cutting down will not always do, unless the plants happen to be of nearly the same degree of hardiness and vigour of growth, and grow and thrive in the same kind of soil. The cutting down and the cutting in systems, are generally the most economical, and may, at all events, be pursued for a few years; but ultimately the entire mass of soil, and all the plants, will require to be renewed. We could refer to many conservatories in England, where, from allowing every plant to assume its native vigour, and occupy whatever bulk it can in the house, the whole surface of the glass comes at last to be covered with, perhaps, a passiflora, and one or two acacias: and this takes place so gradually, that the proprietors of such conservatories are often not aware of the result; just as in some pleasure-grounds a few strong shrubs are allowed to take the lead, and choke all the rest. We have generally found that the best kept conservatories are those where the master or mistress is without the cares of a family. A good beginning is made at first when the party is perhaps newly married, but with the increase of children there is a necessity for greater economy, and the conservatory is one of the first gardening scenes connected with the house that is neglected, or on which no expense for new plants and soil is bestowed. This is far from being the case at Garscube; but we make this and similar remarks as being the only means of giving any value to this notice, since, being at the time in bad health, and having taken no memorandums, we cannot pretend to give accurate descriptions. Neither will it be supposed, we hope, that we intend to recommend a rigid and formal system of pruning and training in conservatories, like what we should wish to see in a peach-house or a vinery. Our beau-ideal of what ought to be is this. Every plant planted in the bed of soil taking its natural shape, and only gently cut in when it began to interfere with the others, or to occupy a greater horizontal space at the top than it does at its base, because this would deprive the sides of the plant of sufficient vertical light. The climbers trained up the rafters; and the evergreens such as camellias, and other winter-flowering plants such as acacias, trained against the back wall. The former we would allow to hang down in festoons, and the latter we would at first train in till they covered the wall, and afterwards allow the laterals produced by the secondary branches to protrude themselves in a natural manner, as they do in the conservatory at Redleaf, and at various other places. This picture refers to conservatories

where all the plants are grown in the free soil. Where only the climbers are grown in the free soil, and all the other plants in pots or boxes, as at Ashridge and Bromley Hill, we would endeavour, unless it could not be done without offering great violence to the plant, to give each individual plant a regular form.

The terrace garden, between the house and the river, is the only part of design connected with Garscube House that appeared to us open to objections. The space is too small, and what makes it appear ridiculous is, that a broad gravel walk carried from the steps of the upper terrace terminates abruptly at the river in a triangular point; that is to say, the walk is some feet longer on one of its sides than on the other. It has no artificial termination, and a stranger is puzzled to know what it can possibly mean. The truth is, that when a house is set down on the margin of a river, it ought either to be placed close to it, as Culzean Castle is placed close to the sea, or placed at such a distance from it as to afford room for a system of terraces which shall not give an idea of incompleteness; technically speaking, the main walk here is imperfectly developed. In the case of Garscube, the outer wall of a terrace might have been founded on the rock which forms the bed of the river, and this would have given a degree of grandeur, originality, and dignity to the situation of the house, which would have corresponded admirably with the house itself from its architecture, and the romantic character of the sloping declivities which form the boundaries of the park.

From the house we proceeded to the farm-yard and the kitchen-garden. The former exhibits a very ample and complete arrangement, Sir Archibald being a great agriculturist, and having, by the frequent-drain system and subsoil-ploughing, greatly increased the value of lands not before worth more than a shilling or two per acre. The substantial manner in which the stable and farm-offices are built, and the order and regularity which appeared to reign through them, gave us the highest satisfaction.

The kitchen-garden is large, and surrounded by substantial brick walls; but, like almost all the Scotch gardens, even the magnificent one lately formed for the Duke of Buccleugh at Dalkeith, there is a want of architectural design, which, in a grand place like Garscube, where every thing else is architectural, is to us a great defect. The doors and gateways are mere holes in the walls, without architraves or architectural piers to give consequence to them; and where so much architectural design is very properly shown on the offices, we know no reason why a proportionate care should not be exhibited in the details of the walls and buildings of the kitchen-garden.

The garden is cultivated in the Scotch manner, with flowers in the borders to the walks, and crops on the wall borders; two things ruinous to all expectations of abundant crops of fruit. Whenever we have represented this practice as no longer followed in the best gardens in England, and in many in Scotland, the question has been put to us, How shall we get our early crops of peas, potatoes, cauliflowers, &c.? The usual answer which we make to this question is that supplied by Mr. Errington, one of the most scientific and experienced practical gardeners in England, viz. that there is not an early crop of vegetables which could not be obtained within one week of those on a wall border, by making in the compartments artificial slopes to the south, and by careful protection. (See our volume for 1836, p. 129.) We believe, however, that the mode of cropping at Garscube and many other places is followed, because, being that of the country generally, if another mode were to be adopted, and a failure to be the result, the gardener would probably lose his situation. The masters and mistresses, therefore, must be enlightened on this subject, before much can be expected from their gardeners. We should like much to stimulate masters to enquiries of this kind.

We could wish that some dozen or two of Scotch gardeners, who manage gardens that have been made and planted within seven or ten years, would send us the statistics of their wall-fruit, and the surface of walling which is or ought to be covered with trees. We care little for the produce of one wall or of one tree. What we want is, the number of square feet of walling with a south aspect, and the kinds of trees that have been planted against it; the number of square feet covered by these trees, and the number of fruit which has been produced by them for the last three or four years. The same of all the other aspects. What a difference would be found between the produce of such gardens as Erskine House, Kilkeran, Airthrie House, and a dozen others that we could name, and walled gardens in general! not so much from ignorance or want of industry on the part of the gardener, but merely from a want of courage to depart from the customary system. In the days of London and Wise, and from that time to the middle of the last century, it was customary for gentlemen who had first-rate kitchen-gardens, to have them visited and reported on once a year, by the royal gardener of the time, or by some other eminent practical horticulturist. We have often thought, and more than once expressed our opinion in this Magazine, that the revival of such a practice might do good. At all events, it would justify gardeners in deviating from the usual routine. At the same time, we would by no means have gardeners so far interfered with as to render them mere machines, and lessen too much their responsibility.

We departed by another and most delightful approach through an irregular grove of oaks, elms, pines, firs, cedars, Portugal laurels, and hollies. This approach, as far as we can recollect, was on a comparatively level surface, constituting the top of a bank, which formed one of the boundaries of what doubtless was at one time a broad lake, with a river running through it, but which is now low irregular ground with eminences which at one time had been islands. The place was moderately well kept, particularly the kitchen-garden, and though it rained the whole time that we were viewing it, we left it very much delighted.

Glasgow New Botanic Garden.—We returned by the New Botanic Garden, and walked round it with Mr. Murray. When finished, it will combine a pleasure-ground with a scientific garden. The situation of the hothouses, and of the curator's house, is commanding; and between the terraces on which the hothouses stand and the main entrance, on a lower level, there will be at the bottom a large basin and fountain, and, next, a series of horizontal terraces, with steps, forming part of a broad walk up the middle, somewhat in the manner of the terraces and central straight walk at Sans Souci, but with this difference, that instead of training fruit trees on the low terrace walls, they will be devoted to half-hardy things. Perhaps we are mistaken in thinking that this is the plan. At all events, the work of forming the garden seemed going on with spirit.

Glasgow.—Through the kindness of the Secretary of the Horticultural Society, we drove to the different public buildings and squares, and though we have nothing to say in the way of detail, we cannot help expressing our admiration of the many handsome street elevations, executed from the designs of Mr. Hamilton and his sons; and more particularly the new Banking House and the new Club House. We cannot leave Glasgow without mentioning the Eagle Inn, and its most obliging landlord, Mr. Fraser; for his accommodations and attention we found to be far beyond what are usually met with at such places. We were forcibly struck with the difference, when, about a month afterwards, we were obliged to pass through Glasgow, and stop at the Black Bull.

The Climate.—We have complained much of the rain, which we can truly say fell more or less every day during the month that we were at Crosslee Cottage, and the two or three days that we remained in Glasgow; but it appears from the following communication, received from a gentleman on whom we can depend, that the climate is by no means so moist as is commonly thought.

"You say that the 'trees, &c., are rarely seen in a thriving state,' which you attribute to some other cause than the lodgement 'of the earthy part of the smoke on the leaves,' because,

&c., and here you cannot resist the old answer to the question, Does it always rain? 'No, it sometimes snaws (snows).' Now, in 1841, we had 143 fair days, 66 cloudy, 41 stormy, 76 rainy, 41 showery, and 12 snowy. But, in as far as the fuliginous particles are concerned in not injuring the trees, you are quite correct, even without their being washed off, thus evidencing in some degree their innocuous quality; because upon the south side of the river even the *P*ìnus sylvéstris thrives amidst a perfect Pandemonium of smoke, arising from the coal and iron-works in that neighbourhood: but there exist no chemical factories on the south, unlike in that respect the north bank of the Clyde, where these exist in great number; the acidulous emanations from which, even at the distance you mention, wither up the leaves in the course of a few hours; thus, during summer, the leaves of the common lilac, in front of my house, fell off and were renewed two or three times, or, in other words, as often as the wind blew from that quarter; eventually the twigs became dried up, then the branches, and finally the trunk itself.

"Whilst on this subject, I may mention a fact which I cannot sufficiently explain upon physiological principles, and I shall be glad to be gratified in your continuation in March next, viz. that those plants and trees whose habitat is either alpine or maritime, such as the thrift, Armèria, the saxifrages, particularly the *S.* umbròsa (London pride), the birch, &c., flourish most luxuriantly even in the midst of those chemical emanations.—*S. Jan.* 27. 1842."

Probably the leaves of alpine plants may have fewer stomata than those of plants which grow on plains, and hence may be less affected by changes of air than those which have numerous stomata. They may thus thrive in an atmosphere impregnated with salt, and also in one impregnated with soot. This, however, is mere conjecture.

(*To be continued.*)

Art. II. *A Description of the Garden and Collection of Plants of Baron Hügel, at Hietzing, near Vienna.* By M. Maximilian Peintner, Secretary to the Imperial Horticultural Society.

(Translated from the *Garten Zeitung*, August 21st, 1841.)

The zeal which the celebrated traveller and botanist, Baron Karl von Hügel, has shown for several years past in increasing his collection of plants, is truly astonishing. He spared no expense in obtaining whatever was new, both near and at a distance, to enrich his garden, and obtain a complete collection. His efforts are now crowned with success, as he possesses at present one of

the largest collections of plants on the Continent; one which, in number and value, may vie with the collections of any country.

While the plants in the garden continued to increase, greenhouses also sprang up from the designs of the baron, most tastefully arranged and extremely well adapted for the purpose. It is indeed a most delightful treat for the lovers of plants and flowers to behold this beautiful collection. When nature is sunk in the sleep of winter in the open air, here the camellia, azalea, acacia, most of the Papilionàceæ, and many other families of plants, appear in their richest garb. This garden is not only interesting when the severe cold limits our visit to the greenhouse; it is even much more so to the botanist and amateur during spring and the summer months. Imposing groups of beautiful plants, splendid collections of different families in bewildering variety of colour, and all so tastefully arranged that it gives a good idea of the knowledge and taste of the proprietor.

For a full account of this rich collection I must refer to the systematic catalogue published in 1840, and shall here confine my remarks to plants at present in flower, and particularly remarkable for their beauty, rarity, or size.

The view, immediately on entering the garden, is one very rarely seen, and displays knowledge, taste, and propriety, often looked for elsewhere in vain. I particularly allude to the beautiful terrace in front of the living-rooms, where the pillars, surrounded by climbing plants, seem composed of masses of flowers; where in the beds of flowers between the pedestals, revel, in all the richness of colouring, *L*ílium longiflòrum, *G*ladìolus psittacìnus and floribúndus, Tigrídia Pavòn*ia* Juss. (Ferràr*ia* L.), Ferràr*ia* undulàta, and numerous petunias; and where the wire plant-boxes are overgrown with different species of *L*áthyrus, with a gigantic specimen of Fúchs*ia* fúlgens and Lebretòn*ia* coccínea in the centre, by the sides of which are rare specimens of Scótt*ia* trapezòìdes and dentàta, and new species of *A*càcia and *G*nídia. The terrace floor is tessellated, and on it are judiciously distributed stages covered with beautiful flowering plants. Single plants, remarkable for their variety or beauty, stand alone on the terrace before the pillars; and among these some Prote*àceæ* may be particularly mentioned, and a Burchéll*ia* capénsis, 10 ft. high, and covered with innumerable flowers. Along the terrace stand large plants, such as aloes and *P*hórmium tènax, in beautiful vases, different species of *P*hœ'nix, large cordylines, *C*hamæ'rops hùmilis (var. excélsa), and boxes of painted china, consisting of square pieces put together, and filled with petunias and verbenas, thus even increasing the richness of the flowers in a manner peculiarly beautiful. From the splendid and most tastefully fitted up apartments of the proprietor, which recall the time when he lived among the princes of India, a view is obtained of great part of the garden, and the eye gets a glimpse of the romantic village of Upper St. Beit near St. Beiter's Berg, with the beautiful scenery in the distance. The real Chinese furniture on the terrace, the flags hung out above it, consisting of a white middle and red border, and the circular lamps brought by the baron from China, hanging between the pillars, give the whole the appearance of an Oriental dwelling.

On the terrace before the sitting-room of the proprietor stands a colossal group of plants, consisting chiefly of the families Prote*àceæ*, Mimòsæ, *M*yrtàceæ, and several others. Near this group is situated a grove-like collection of Coníferæ. The connoisseur will here find beautiful specimens of Araucària brasiliénsis, 18 ft. high, Cunninghàm*ia* excélsa and imbricàta; *P*ìnus altíssima *Hort.*, Banks*iàna* Lamb., Gerard*iàna* Wall., halepénsis *Ait.* (marítima *Lamb.*), Lambert*iàna* Dougl., Coúlter*i* D. Don (macrocárpa *Lindl.*), montícola *Dougl.*; *A*'bies cephalónica *Loud.* (*A.* Luscombe*àna* Hort., *t*axifòlia *Hort.*), Menziès*ii* Dougl., Smith*iàna* Wall. (*Morínda* Hort.); *P*ícea Webb*iàna* Wall. (*P*ìnus spectábilis *Lamb.*); *C*èdrus *Deodàra* Roxb., and *Deodòra* var. péndula, intermèdia, Podocárpus longifòlius *Hort.*, latifòlius *Wall.*, nùcifer *Loud.* (*T*áxus nucífera *L.*); a remarkable specimen of Cunninghàm*ia* sinénsis *Rich.* (Bèlis jaculifòlia *Salisb.*), also the rare *Dámmara* austràlis and orientàlis *Lamb.* (A'gathis

Salisb.), Dacrýdium elàtum *Wall.* (*J*uníperus *Roxb.*), and many others of the most beautiful kinds of Coníferæ; while different species of Cállitris and Casuarìna stand in the centre of the group on a small stage of ornamental ironwork, down the sides of which small varieties of plants are seen gracefully bending. The charm of the whole picture is enhanced by the splendour of *Catálpa syringæfòlia Sims* (Bignòn*ia Catálpa* L.) in full flower, and by the delightful perfume of the blossoms of the shady lime tree, which lends its peculiar charm to the atmosphere.

A complete collection of Indian varieties of rhododendrons is situated on the further side of this group, and the whole is remarkable for beauty and luxuriance. More to the right are seen the most beautiful erythrinas, near which are groups of Azàlea póntica and *P*æòn*ia Moútan* Sw. (many species) in splendid flower.

The more the beholder advances, the more he fancies himself transported to Japan, as a forest of camellias in which gigantic specimens stand that once ornamented the gardens of Saxony, and the largest of which is 22 ft. high, affords abundant shade. The many hundred lofty stems of camellias, mixed with those of a lower growth, astonish the connoisseur, and especially when he is informed that this collection consists of more than 1000 varieties.

On the lawn on the right stand beautiful exotic trees and shrubs, which have attained a tolerable height; and of these I need only mention Diospỳros *L*ôtus, Virgíl*ia* lùtea; Magnòl*ia* acuminàta, tripétala, Soulange*àna*; Arà*l*ia spinòsa, *B*étula laciniàta var. péndula, *F*àgus sylvática var. purpùrea, *Aúcuba* japónica, and several species of Mahòn*ia*. A group of Clerodéndrum flòr. rùb. símpl., in the parterre, is worthy also of particular consideration.

You now enter the houses, and come first to the division filled with *C*ácti. The collection is rich, and part of it was purchased some years ago at Dresden by the baron, where it was under the care of the court gardener, M. Terscheck, and was universally admired. The next compartment contains hothouse plants remarkable for their outward habit, their size, and beauty, such as *Pandànus* hùmilis, Dracæ'na Dràco, *L*aûrus *C*innamòmum, and some species of Tillándsi*a*, &c. The other division of this house is separated into two beds, in which the specimens are planted; these are mostly of the families of Mimòsa and Papilionàceæ. I must not omit to mention the beautiful specimens of *A*càcia Cunninghàm*ia* Hook., *Juawàra*, decòra, homomálla, polymórpha, obovàta, pentadènia, pubéscens, and vestìta, which are in the middle part of the house, and form an avenue of overhanging trees; also, Gompholòbium polymórphum elàtum, Oxylòbium ellípticum, Indigófera austràlis, Corræ'*a* speciòsa, *P*olýgala attenuàta, Eriostèmon cuspidàtus and *b*uxifòlius, Lissánthe sápida, Conóstylis *j*úncea, &c., which stand in a bed like a thick forest; among which are seen Kennèdy*a* rubicúnda and longeracemòsa, beautifully winding round the supports of the house. The second bed is principally filled with the rarest camellias, in the most luxuriant condition. There are also other plants among them, particularly many Prote*àceæ*; and a plant of Grevílle*a* robústa is 18 ft. high, which, unfortunately, must be taken out, as it has already reached the height of the house. All lovers of plants must wish that this somewhat dangerous operation may be carefully performed. In the front part of the first bed in this division, close by the lights, are two Prote*àceæ* planted in the ground, and in front of the other bed there are small plants in the open ground. The whole house is divided by a passage up the middle, the supports of which are decorated with twining plants, and the two side passages have wire arches over them, covered with kennedyas and climbing plants.

From this house you enter a small, but, as may be expected, tastefully decorated saloon. The floor, like the former, is of mosaic; the painting on the ceiling and walls in the Indian style, and the looking-glasses, drapery, and furniture are of the very newest taste.

Adjoining to this saloon is a conservatory, in which are camellias of all the varieties planted in the soil. Behind them are Camél*lia* japónica fl.

álbo plèno, *a*nemoniflòra, *a*lthæiflòra, *r*òseo-plèna, *Sasánqua*, Gussòn*i*, &c., grown as espaliers, which have already covered the whole wall. A narrow path separates this from beds filled with high camellias and Indian azaleas. Among the camellias, the one most worthy of notice is *C.* reticulàta, 14 ft. high, with a head 5 ft. in circumference. Near the front lights, separated by the principal passage, are small beds, likewise filled with camellias planted in the soil; and by the sides of the pillars, which extend to the back part of the house, are the most beautiful acacias.

You then pass under arches formed of wire, on which kennedyas and other climbing plants grow, also Diòclea glycinöïdes, which had already unfolded its splendid deep red flowers, mixed with camellias and acacias fastened to the wire; and on descending a few steps you enter a small house in which the baron has wisely placed the whole collection of plants in small specimens, so that not one may escape notice, and so be perhaps entirely lost, a frequent occurrence in large assemblages. This collection resembles a living index.

You next enter another house, constructed exactly like the preceding, in which small plants are most tastefully grouped among tufa; and as you passed through an ornamental arch, and descended a few steps to this house, in like manner you now ascend a few steps to the camellia-house already described, to which adjoins a long row of houses intended to contain at another season of the year those plants at present grouped in the open air.

On the left is the orchideous house, in which is a collection of 83 genera and nearly 200 species, most of them grown on the trunks of trees, or planted in little baskets, from which they hang down. As this was only used as an orchideous house last year, it cannot be expected to be very rich in flowers. Some very fine forms and colours begin to unfold. Among these may be mentioned: Catasètum lùridum, bicornùtum, trícolor; Epidéndrum crassifòlium, Oncídium Baúer*i* Cycnòches Loddigès*ii*, Calánthe fuscàta, Acropèra Loddigès*ii*, and many other species; some dendrobiums, maxillarias, oncidiums, &c. *N*epénthes distillatòria also unfolds its blossoms. This house is heated by steam.

You next find yourself in a large conservatory with upright lights, in winter chiefly filled with camellias; the next has slanting lights, and leads to a large saloon, through which you pass to the living-rooms, and, on again reaching the open air, you pass by the terrace already described.

But another most delightful scene is still reserved, and that is a mosaic picture of flowers, a so-called Roccoco-garden*; and we have to thank the Baron von Hügel for setting the first example of a style, since generally imitated, both here and in the vicinity. A garden laid out in this manner requires much skill and ability on the part of the gardener, as well in the arrangement as in the choice of the flowers; and he must also be careful

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* Roccoco.—We have hitherto been in the habit of considering this term as synonymous with what may be called the shellwork arabesque; but on asking a critical friend for the true meaning of the term, he sent us what follows: —

"Roccoco is one of those words which, although they are in vogue both in conversation and writing, are not to be met with in dictionaries, any more than are the thousand and one terms employed either in millinery or in cookery. All, therefore, that I can say of it is, that it is one which seems to have been lately invented by the French, and was first applied to the antiquated frivolous taste of the period of Louis XV. It is now used as a general term of reproach to what is old-fashioned and tasteless in literature and art, and appears to correspond in some degree with our English 'crinkum-crankum.' Instead of being *au courant du jour*, dictionary-makers are always half a century behind the rest of the world, and seldom explain the very words one is most at loss to understand. — *W. H. L.*"

that, throughout the whole summer, there be no lack of flowering plants. It is but justice to the baron's head gardener (M. Abel), to say that he not only has fully accomplished this task, but has also been successful in all the requisites of this garden. The connoisseur, however, does not see the usual ornamental plants in this sea of flowers, but a great many rarities; and, in short, here, as in every part of the grounds, the æsthetic taste of the baron is paramount. Beautiful is this garden within a garden, and hence it has become the model garden of Austria. Here the most beautiful landscape opens on the view; the gently swelling hills appear in the most romantic forms, and on one of these is seen the pretty little garden-dwelling of Dr. von Malfatti. At a short distance behind you stands one of the tasteful edifices of the proprietor, which are one story high, viz. a summer-house. The painting of the saloon is in the Indian style, from a design by the baron, the ceiling consisting of various-coloured ornaments, and the walls of paintings on a red ground. Small brackets are fixed on it here and there, on which statues are placed. The chairs and sofas are covered with silk, which the baron brought from India and China, and the whole is arranged and kept up in the Oriental style. On the right is a smaller saloon, and on leaving this you enter the open air, where the eye is delighted with the beautiful flowering climbers, and the tastefully arranged flower-beds which surround the building. Some of the climbers grow on yellow and red rods, which support a projection of the summer-house, and thus form a kind of covered terrace. Farther on is a beautiful *Catálpa syringæ*fòlia; and on leaving the building, which is girded, as it were, with a band of flowers, the eye glides over a carpet of turf to a green hillock, where the prospect becomes more extensive. On the left, towards the west, are the villages of Upper and Lower St. Beit; and on the right, and somewhat more to the north-west, on the side of a gently swelling hill, are the villages of Baumgarten and Hütteldorf.

We now leave this part of the garden to enter the propagating department. This house is 125 ft. long, with slanting lights facing the east and west. It is heated by hot water under the direction of M. Daniel Hooibrenk, Baron Hügel's garden director, and is most admirably suited for the purpose. We have to thank M. Hooibrenk for having introduced this method of heating in Austria. He erected the first apparatus in 1837, and it has not only been imitated here, but in Hungary, and also in other countries. The utility of this method of heating in propagating plants may be easily seen when compared with the old manner, still to be met with here and there, of heating by means of tan and horse-dung, which is always dirty, and very uncertain.

What M. Hooibrenk has effected by this means in propagation may be witnessed in the propagating garden here, where the present extensive collection was obtained by the above method; and of these plants I need only mention the propagation of the Coníferæ from cuttings, and other plants that are difficult to strike, such as Agnóstus sinuàta, Dracophýllum attenuàtum, Magnòl*ia* grandiflòra, *I*lex *A*quifòlium, Quádr*ia* heterophýlla, Stadmánn*ia* austràlis, Dacrýdium elàtum, *S*àpium *berberidi*fòlium, Lomàtia ilicifòlia, *Dámmara* austràlis, *N*epénthes distillatòria, Grevíll*ea* robústa, Araucària, &c.; and the innumerable specimens of these show that success is not accidental. There are whole beds of Pontic rhododendrons, ericas, camellias, Indian and Pontic azaleas, peonies, &c., all of which have been propagated by the above method. The construction of the houses already mentioned, fourteen in number, is likewise adapted for the propagation of plants, and does great credit to the skill and knowledge of M. Hooibrenk. The apparatus for heating those houses for propagation, and for the growth of young and tender plants, is usually flues. The baron, after a complete examination of all kinds of heating, has been fully convinced that a system of smoke flues at a moderate depth in the soil is the best method of heating; but these must have all the joints or seams stopped up by means of a very effective cement, consisting of a proportionate mixture of finely-sifted or beaten clay, ashes, and stone in a powdered state, mixed with salt water; and the covering should be plates of

cast iron, a few lines in thickness, When the cold is very severe, a basin of water should be placed over the place where the fire is, and thus a medium of moisture produced in the air, without which the great dryness would be very injurious.

In conclusion, allow me to add, that, by the kindness of the proprietor, every respectable person is admitted to visit the garden, which no doubt contributes greatly to increase the love for one of the noblest pleasures.

Art. III. *Plans and Description of Annat Lodge, Perth, the Property of Mrs. Stewart.* By Archibald Gorrie.

I forward you the plans of a villa near Perth, the grounds of which I laid out in the year 1814. Annat Lodge stands on the highest part of the lands attached to it, on the east bank of the Tay; it overlooks the houses in Bridgend, the bridge, the Tay, and the city of Perth. Part of the lodge was built, and consequently the site fixed, before it was purchased by the late Lieutenant-General Robert Stewart.

In the plan of the estate (*fig.* 8.), which consists of about three acres, *a a* are the boundary fences; *b*, house; *c*, porter's lodge;

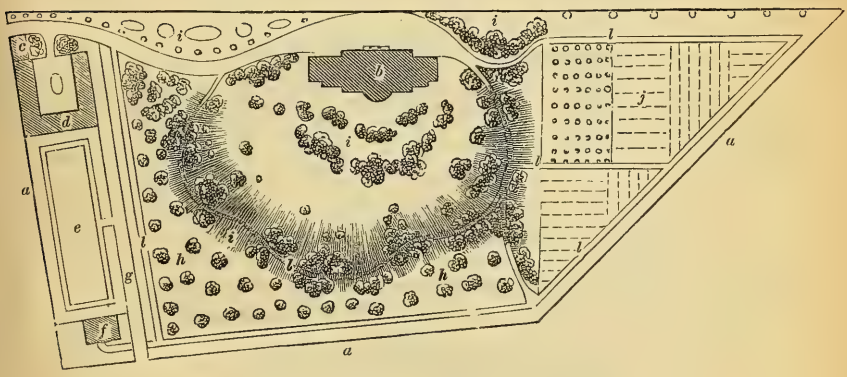

Fig. 8. *Map of the Grounds of Annat Lodge.*

d, offices; *e*, washing-green; *f*, a second porter's lodge; *g*, public service road; *h*, orchard; *i i*, flower-ground and shrubbery; *j*, kitchen-garden; *l*, walks.

Fig. 9. is an isometrical view of the house, showing the garden front, &c.

Fig. 10. represents the ground plan of the villa, in which *a* is the porch; *b*, vestibule; *c*, butler's room; *d*, housekeeper's room; *e*, kitchen; *f*, servants' hall; *g*, kitchen closet; *h*, scullery; *i*, back entrance to kitchen, &c.; *k*, principal stairs; *l*, china closet; *m*, dining-room; *n*, library; *o*, bedroom; *p*, bedroom closet; *q*,

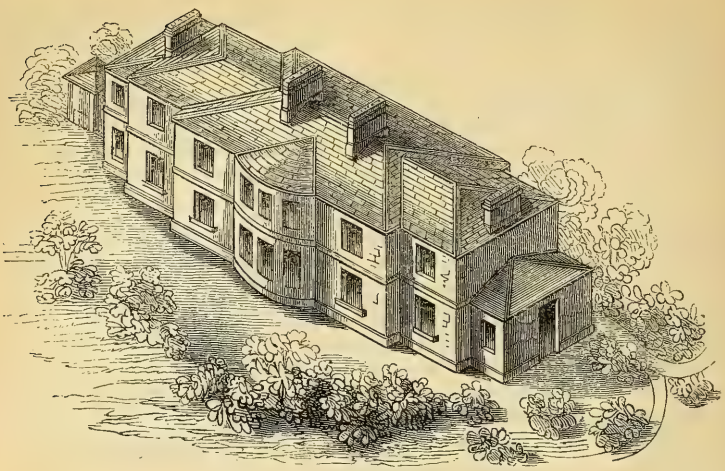

Fig. 9. *Isometrical View of Annat Lodge.*

butler's pantry; *r*, water-closet; *s*, fruit-room over cellars; *t*, well. On the roof of the wing which contains the servants' hall

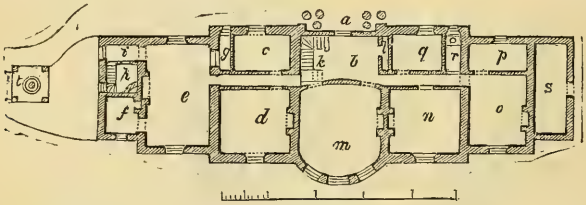

Fig. 10. *Ground Plan of the principal Floor of Annat Lodge.*

and scullery there is a cistern for the supply of water.

Fig. 11. is a plan of the offices, in which *a* is the porter's lodge;

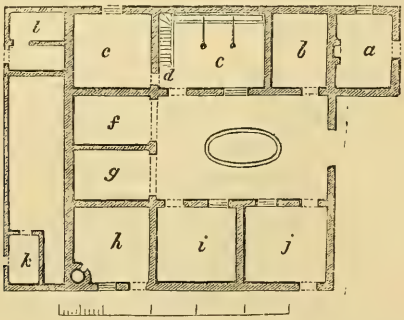

Fig. 11. *Ground Plan of the Stable Offices of Annat Lodge.*

b, byre; *c*, stable; *d*, stairs to loft; *e*, larder over main cellar; *f*, coal-house; *g*, shed; *h*, wash-house; *i*, potato-house; *j*, coal-house; *k*, hen-house; *l*, piggery.

The villas in the neighbourhood of Perth display all sorts of styles, and many of them no style at all. Had your *Suburban Gardener* appeared twenty years sooner, and been read by the proprietors of these finely situated villas, a decided improvement must have been evident, both in the houses and in the grounds adjoining them. Since the publication of that work I have been continually pressing the subject of improvement on the attention of the owners.

Annat Cottage, Dec. 9. 1837.

Art. IV. *The Principles of Gardening physiologically considered.* By G. Regel, Gardener in the Royal Botanic Garden at Berlin.

(Translated from the *Garten Zeitung*, May 2. 1840.)

(*Continued from our preceding Volume*, p. 70.)

I. On the Propagation of Plants — *continued.*

1. Means of preserving the cuttings till they take root.

As the crude sap in the cutting is not raised by endosmose but by the process of evaporation, care must be taken that the surface of the cut does not become dry before being put in the earth, and air get into the lower end of the vessels; for, as soon as this takes place, only very strong shoots are capable of drawing up moisture, as has been proved by the experiments of various philosophers. The cuttings should therefore be stuck in wet sand, if they cannot immediately be put where they are intended to remain, although it were better to avoid this. If, however, they are such as ought to lie a day or two, in order to insure success, as some banksias, acacias, &c., it ought to be in a damp place; and the precaution must be taken, if possible, to cut them again before planting. If cuttings of Dryándr*a*, some banksias (B. integrifòlia, B. Baúer*i*, B. mèdia, B. Calèy*i*, &c.), and most of the long-leaved acacias (*A.* longíssima, *A.* péndula, *A.* brevifòlia, *A.* glaucéscens, *A.* longifòlia, *A.* micracántha, &c.), be stuck in the earth immediately after being taken from the parent plant, the inner bark will become black in from fourteen days to four weeks, and the cutting will perish.

This phenomenon appears to be in close connexion with the form of the leaves of these plants, as those of the acacias have very small stomata, while those of the dryandras have none at all. In their stead, on the under side of the leaves

of the latter plants are small dimples, lined with short hairs, which the diosmas already mentioned also possess. Now, as the crude nourishing matter is drawn up through the open wood in its existing state, and received by the cutting, while the spongioles of the roots only imbibe it in a very thin solution, it appears that the above-named plants, on account of the peculiar formation of their leaves, cannot elaborate in any great quantity this gross nourishing matter; and hence arise stagnation of the juices, and the before-mentioned appearances. The good effect of leaving these cuttings lying, and thus interrupting the growing process, and preventing the superabundant rise of the crude nourishing matter, will be apparent; and this is the more probable, as it is usual, for the same reason, to put a piece of mould round the cut.

Cuttings of succulent, or fleshy, plants must also lie for a time before planting, and on no account in a moist atmosphere, that the surface of the cut may be sufficiently dried. They retain so many watery particles in their cellular tissue, that, when this is neglected, the face of the cut soon rots. The species of the families Melocáctus, Echinocáctus, Mammillària, *O*púntia, Cèreus, &c., have an extremely thick bark, and a firm epidermis with very few stomata; on which account the process of evaporation is so slow, that they remain alive for a long time without receiving external nourishment. The dried cuttings of these plants, therefore, are generally planted in dry earth, and set in a bed or house filled with warm air, and are not watered till they have formed roots from the nourishing matter accumulated in themselves. The roots can scarcely ever penetrate the thick bark, and are produced between the wood and the bark. In some of the *O*púntia and Cèreus species, however, they come out of the bark at the side. The other succulent and fleshy plants which form side roots, such as the *A*loe, Hawórth*ia*, *S*empervìvum, Mesembryánthemum, Crássula, Plumièr*ia*, and its congeners, as well as all the *C*ácti, may be watered as soon as they are planted. Lastly, plants with milky juice also require similar treatment, as they are equally liable to damp off.

As soon as a part of one of these plants is cut off, the milky juice exudes in great quantities, covers the whole surface of the cut, and hardens like caoutchouc, by which the vessels are all stopped up, and the ascension of the moisture prevented. In this garden, cuttings of *F*ìcus, and the dry roots of *E*uphórb*ia*, are stuck in water, where they remain twenty-four hours before they are put in the earth. The same end is also attained when they are put in dry sand immediately after being cut, and afterwards the sand and the milky juice cleared away. Only the succulent and very milky euphorbias must lie for some time.

Although it is proved by the above, that the cutting receives

as much moisture through the face of the cut as it loses in ordinary circumstances by evaporation, yet no sooner is it placed in very dry air or in a draught, or exposed to the sun's rays, than a disproportion takes place between them. When this is the case, more watery particles are lost through evaporation than are raised in the body of the wood, which is very easily perceived in fleshy-leaved plants. On this account, hotbeds and houses prepared on purpose for propagating should be used, in which the outer air can be excluded, a moist temperature maintained, and in very warm sunshine a dense shade can be given. Bell-glasses should be placed over the more difficult-rooting cuttings, to protect them from all external influences which might destroy them before they made roots. The most proper form of bell-glass is that which gradually tapers from the base to the top; as from glasses of this shape the moisture, which adheres to the inside in the form of drops, runs gradually off without the dropping so injurious to cuttings. This disadvantage is found in all other forms more or less, such as those that are round at the top, or cylindrical with the top bluntly truncated, and also in beer-glasses which are often applied to this purpose. The most unsuitable glasses, which are, however, much used, are those small at the base, and swelling out like a globe.

The enclosed air under the glasses will soon lose its oxygen, through the respiring process of the plants within, and also be vitiated by other exhalations; and, if it is not changed, it generates mould, and the cuttings lose their fresh appearance. For this reason, the glasses, if possible, should be daily ventilated and wiped; or what is still better, as it will entirely renew the air, dipped in a vessel of cold water, and well shaken, so that too many drops of water may not remain on the glass, although they are not so injurious to the cuttings. In an extensive establishment, this operation requires too much time, and therefore round holes, of about from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in diameter, should be made at the top of the glasses; and these will prove very serviceable, if the pans stand on a warm platform in the houses or beds prepared for the purpose. In small gardens, where the cuttings are placed with other plants in the houses on the bed or shelf under the windows, glasses without holes would be preferable. When the ground is warmed to about 10° R. (54·5° Fah.) it is better, with some few exceptions, such as the *Laúrus* species, to place the glasses inside of the pans, so that the temperature within may not rise too high. When the warmth is not so great, they may also, without injury, be placed on the outside of the edge of the pot.

The cuttings themselves should not be stuck too close together, and all the leaves should be left on, which are essential for elaborating the absorbed and deposited nourishment; removing

the lower leaves has a particularly bad effect on the rooting. There is an exception, however, in those which have small close-set leaves, such as the genera *Erìca*, Brùn*ia*, &c.; which, when entirely surrounded with earth, soon begin to rot, and infect the branch, and therefore the leaves should be removed from the portion put into the earth. All decayed parts should be taken carefully off; and woolly-haired cuttings should not be sprinkled, for, as the moisture adheres to them for a long time, they are very liable to rot.

With these, and in general all plants liable to decay, the bell is either placed within the edge of the pot, and the water poured between the two rims, by which sufficient moisture is communicated to the pot; or a small unglazed pot, without a hole at the bottom, filled with sand or mould, is plunged to the rim, in the middle of a larger pot; the cuttings are then stuck round the outer edge of this large pot, and the water is only poured in the smaller pot, when as much moisture penetrates through the sides of the pot as the cuttings require.

(*To be continued.*)

Art. V. *On stirring the Soil.* By N. M. T.

There are few operations of culture more beneficial than occasionally stirring the soil to a greater depth than usual, and thereby bringing into action a portion of fresh, or, as it is termed, maiden soil. This being an every-day operation, may be supposed to be so perfectly understood, as to render any remarks upon the subject unnecessary. I question, nevertheless, whether many of our preconceived notions respecting it are not erroneous. It must be admitted that trenching, or turning up a portion of fresh soil, is highly beneficial to many crops upon most soils: this being the case, it may be deemed of secondary importance to enquire how, or by what means, that benefit is conferred? Still, in order to avoid the misapplication of this practice, it is truly desirable the principles be understood, and that (as far as is practicable) things should be called by their proper names, which is far from being the case with regard to the matter before us.

Trenching is said to benefit the succeeding crop, by affording the plants fresh soil to grow in, than which nothing can be more incorrect; as, in nine cases out of ten, the fresh soil so turned up is incapable of growing plants at all; and plants that are capable of penetrating so uncongenial a mass, in doing so avoid all possible contact, and only show an increase of vigour when their roots reach and spread in the exhausted and worn out soil which the operation of trenching has placed beneath, in

what appears to be so advantageous a position; and that soil previously exhausted should be so renovated by mere change of position is not the least inexplicable part of the business. That all the improvement, however (unless manure has been at the same time applied), which takes place proceeds from such a cause, will readily be admitted by those who are aware of the utter worthlessness of most subsoils, and who have remarked their inveterate sterility after the surface has been removed, instances of which, upon a large scale, must be familiar to many interested in the subject; and those who have not such examples may readily satisfy themselves by forming alternate beds of this and top soil, in all other respects equal, when the worthlessness of their favourite will become apparent, often characterised by sterility so stubborn, that an immense expenditure in labour, and in enriching and opening materials, is necessary to render it fit for the purposes of the cultivator. Fertility conferred by trenching is not of long duration, and the necessity for repeating the operation becomes apparent: this would, no doubt, sooner be the case, but for the entire change that has in the mean time been effected in the originally worthless matter brought to the surface, where continued cultivation, the action of the elements, and the introduction of organic substances in the form of manures, have turned it into matter capable of supporting vegetable life.

Perfect pulverisation of the soil is admitted to be essential to good culture; yet, in the face of what passes as undisputed fact, we see vast benefit conferred by placing upon the surface matter that for a time defies all attempts at this; hence, in a great measure, its undeniable barrenness, its unfitness to support vegetation, and possibly the cause, in the first instance, of the benefit conferred by placing it upon well pulverised soil, from its retaining, by its comparatively impervious nature, a greater uniformity, both as regards temperature and moisture, in the strata in which we have seen that the roots delight to luxuriate. Although too compact to be congenial to the tender rootlets, or too destitute of available matter to afford them a supply of food, it nevertheless contributes something to their support, by affording them a secure hold of the ground; a matter of the utmost import, too often neglected, and which the advocates of extreme porosity seem to have entirely overlooked. That pulverisation might often be advantageously carried much farther, I admit; but the extreme ought to be guarded against as decidedly injurious to many crops, as the advantage derived from treading, rolling, or any thing that tends to consolidate the soil, demonstrates. The impolicy of such a practice is also strikingly manifested upon a small scale, when sifted materials are used in the culture of plants in pots, where it becomes so palpably injurious, that it is dis-

continued by every judicious cultivator: the perfect uniformity of the materials (setting aside the loss of the most valuable parts) renders them certain of coalescing, and becomes the surest means of defeating the end in view. Soil for the first time raised to the surface being so unfit for most purposes, turning it up to the depth of 2 or 3 feet at once must be most injudicious; especially as the same end would be easier gained by only turning up a portion that might be ameliorated annually. Such portion should suit the crop intended to follow, which would cause it to vary considerably, and should never be of greater depth than the roots can easily penetrate, as it is impossible the plants should do well until this is accomplished. Much of this precaution would be unnecessary, were the operation properly performed upon materials in a fit condition. The vast importance of this altogether neglected point has often been ably enforced by the editor of this Magazine, and the necessity for having the materials in a state allowing of thorough incorporation clearly pointed out. Nevertheless, an operation upon which everything depends is invariably left to be performed during the most unfitting weather, the worst of which is generally considered good enough to dig or to trench in.

Folkstone, Jan. 21. 1842.

Art. VI. *On the Difference between cultivating and managing a small and a large Garden.* By I. T.

The difference holds equally good between the general management and cultivation of a mansion and its surrounding park and gardens, and the management of a cottage and its ground plot, or a suburban house and its garden and field. The proprietor of a mansion, park, and the other appendages which constitute a country residence on a large scale, employs persons as managers, whose business or profession it is to undertake such charges; he has his land steward, his farm bailiff, his head gardener, his forester, and his gamekeeper. The proprietor of a small residence must unite the knowledge and the duties of all these persons in himself, at least to the extent required for his grounds. In the case of the large proprietor, if the head of any department is found to be neglectful, or to be incompetent to his duty, he can be replaced by another at the shortest notice, and the inconvenience is but of momentary duration; but in the case of a small proprietor who manages every thing himself, he must reconsider the subject in the practical application of which he has failed, and either make himself more completely master of it, or apply his knowledge with more care than he did before. The

large proprietor, in short, has only to give an order; the small one must give his time and his attention.

But it is in the laying out and cultivation of a garden that the greatest difference between the large proprietor and the small one exists. From the ample space possessed by the former, there is room for every description of beauty, and the culture of every desirable crop or plant; but from the limited space of the latter he can only produce a limited quantity of beauty, and cultivate a comparatively small number of crops and plants. If one crop in the large garden fails, its place is readily supplied by the quantity produced of other crops of a similar description; because, from the abundance of room, more is sown or planted of every thing than enough. In the small garden, on the other hand, there is only a very limited space for each particular crop, of which crop enough is sown or planted, and no more; and, consequently, the failure of that crop would not only occasion a want of the particular article, but a want of the requisite quantity of vegetables, fruits, or flowers, as the case might be, for the family. To give a familiar illustration of this, I may observe that in a large kitchen-garden there are grown several sorts of cabbages for winter use, while in a small garden probably only one sort of cabbage is grown. If, in the large garden, any one of the sorts fails, the table can be supplied from the others which have succeeded; but in the small garden, if the sort of cabbage sown has failed, there will be a positive deficiency of that kind of vegetable during the winter. In the article of strawberries, perhaps, the proprietor of a small garden has only space for one kind, and, if that one kind fail, he will be without that description of fruit. In the large garden, on the other hand, several kinds are planted, and, if one fail, another, in all probability, will succeed. Some sorts of strawberries, such as Keen's seedling, seldom fail in producing a crop; others, as the old pine, frequently fail in this result; hence, if the proprietor of the small garden has chosen the latter variety, he will frequently fail of success; whereas in the large garden both sorts would probably be planted, and even the entire failure of any one sort might take place without being noticed by the proprietor, or missed in the dessert. It would be easy to go through all the details of cropping and managing culinary vegetables, fruits, and flowers, to show that in every department of the small garden more knowledge of the crops and plants to be cultivated, and especially more care and attention in cultivating them, are required than in the large one; provided the object be, as it ought to be, to get a maximum of beneficial results. I am certain that every gardener who has fulfilled the duties of a small place will bear me out in this conclusion.

It may be here asked, if I mean to affirm that it requires a more skilful and learned gardener to manage the garden of a cottage than it does to manage that of a mansion? To which I answer, undoubtedly it does, if all the kinds of products are required out of the small garden that are required from the large one: if, for example, forcing in all its departments is to be carried on in both; if there are to be miniature crops in the cottage garden of all those crops which are grown in the mansion garden on a large scale; and if there are to be an arboretum and a flower-garden laid out according to the natural system: if these, and corresponding results obtained on a large scale from the mansion garden, are to be also obtained, in proportion to its extent, from the cottage garden, then I state, without the slightest hesitation, that a more skilful, experienced, and attentive gardener is required for the latter than for the former. More skill is necessary, because more is required with less means; more experience is requisite, because it is only by experience, joined to skill and knowledge, that success can be rendered certain in all cases; and more attention is required to watch the progress of favourable or unfavourable circumstances, because, on a small scale, these circumstances are more immediate and fatal in their operations, and their results, if unfavourable, are more severely felt. But, fortunately, the objects and products of a cottage or suburban garden never include all these objects at the same time; though there are none of them that may not be produced in even the smallest garden, according to the taste or means of the proprietor; and a gardener or a proprietor may succeed perfectly well in one or two of even the most difficult points of gardening on a small scale, who could not attend to all the departments of the art. As a proof of this, I may refer to the gardens of mechanics in the neighbourhood of large towns, who far surpass professed gardeners in the culture of florists' flowers, and certain fruits; and to the gardens of small tradesmen and shopkeepers in the neighbourhood of London, from which some of the earliest and best grapes, melons, &c., are sent to market.

It thus appears that to manage a small garden to the greatest advantage is not quite so easy a matter as it may at first sight be imagined to be by those who judge by mere size; but by limiting the number of objects, by acquiring a thorough knowledge of the nature of these objects, and by constant attention and assiduous care, any person whatever may succeed; and the reward of comfort and enjoyment received will be in proportion to the labour, skill, and care bestowed.

London, Jan. 1842.

ART. VII. *The Landscape-Gardening of F. L. von Sckell of Munich.* Translated from the German for the "Gardener's Magazine."

(*Continued from* p. 102.)

XII. *Of Carriage Roads, Bridle Roads, Walks, and Paths through Defiles and under Rocks.*

1. IN laying out grounds, the roads and paths cannot be accurately staked out in situations where the disposition and form of the ground require to be altered, namely, where hills or valleys are to be formed, till these are completed; as by the raising or lowering of the ground the lines previously marked out must be made to assume different turns, because they no longer follow the line of beauty, and therefore must be altered.

2. Nature makes no roads, they are the work of man and animals. Roads formed by man would almost always be in straight lines, if difficulties of many sorts did not intervene, or if the object of the traveller's destination were not out of sight. From these causes, curved lines and circuitous roads have arisen. In a garden, therefore, when the path is made to wind, merely because modern gardening rejects all straight paths, and when the difficulties, or rather the reasons, which gave occasion for these windings cannot be brought forward, it is faulty; and those paths which are unnecessarily circuitous are usually neglected for a straighter and consequently nearer line. As common roads may be reckoned among the artificial labours of human industry, it is therefore allowable, particularly in gardens, to make the paths of an equal breadth and decided outline, and to make them appear in alternate turns and windings, to correspond with the line of beauty.

3. The windings in carriage roads must not, however, occur so frequently as in walks; this will be avoided, when in the former, to prevent accidents to horsemen and travellers, most of the obstacles are removed, which the too frequent short turns only increase, by causing the traveller to be aware too late of another coming in an opposite direction; carriage roads in grounds should therefore be 15, 20, or 24 feet wide; and walks only 8, 10, or 12 feet, and the paths from 3 ft. to 4 ft. Wavy lines succeeding each other too rapidly are fatiguing, and neither beautiful nor agreeable, and can only be allowable in very narrow paths of from 3 ft. to 5 ft.

A gentle curve line which proceeds uninterruptedly for a distance of from 1000 ft. to 2000 or 3000 feet and more, assuming the form of a majestic bow, and then changes its direction, and imperceptibly assumes an opposite bend, possesses much greater beauty and effect, and is also much more rational than when turns are too frequent. If, therefore, for example, over the line

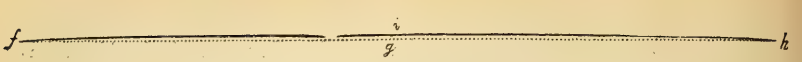

Fig. 12. *M. Sckell's Curve for a Walk.*

f h, 300 ft. long, a noble and graceful curve be drawn, which does not recede from view till after a length of 800 ft., it ought not to be further distant from the middle of the straight line *f h* at *g* than 4 or at most 5 feet, and it will then describe a curve by the points *f*, *i*, *h*, which will undoubtedly be pleasing.

In marking out roads the artist must greatly depend upon his feeling, in the choice of a line which shall at once be inviting and productive of pleasure, as leading to those spots where beautiful natural scenes are presented to view. These road lines may be accurately marked out from the plan, or by means of arrangements in nature; but a line of this sort always betrays a compulsory course, it wants that free and bold sweep, or, in other words, it wants *nature*.

It also frequently happens, that a line which appears particularly beautiful on paper is not pleasing in nature. The paper is a flat surface, this is seldom the case in nature; consequently, the lines must appear different, as we have previously observed. Therefore lines rising from valleys, and ascending over hills, are much more difficult to trace out than those on a level surface. In the first case, their appearance is as varied as the forms of the hills and dales over which they are to wind. To overcome this difficulty, I know of no other rule than that these lines should be carefully tested, and by repeated corrections and improvements be brought nearer to nature as well as to beauty.

Tracing out walks should therefore, 1st, not be considered so trifling, because much more is required from the lines which define them than that they should merely describe curves. They should have a noble, majestic, and graceful curve. 2d, At every new turn, directly opposed to the preceding one, the reason and necessity which occasioned it must be shown. 3d, The objects to which the road leads should account for its existence.

As the walks in gardens, considered as works of art, and which cannot be confounded with the chance-directed paths over meadows, and through woods and fields, should have a sharp outline, the edges may be defined by very small furrows, half an inch deep, in which a mixture of hay and clover seeds may be sown, and by this means the lines be preserved distinct, clear, and beautiful. To prevent these lines, which can only be formed with much labour, from being obliterated by the frequent cutting and renewing of the edges, and by degrees assuming an ungraceful direction, it is requisite that, at the distance of every 20 or 30 feet, blocks of oak, the colour of the earth, should be driven in; by which means the original lines are not only preserved, but can always be refound and easily determined.

4. There are also in nature paths which penetrate through overhanging precipitous rocks, and are called *hohlwege*, or hollow ways; and sometimes through rude arches, which are formed by nature, and sometimes even by art, through the interior of the rocks, where the traveller is led, as if by a miracle, by torch-light, to the opposite side. These scenes are but rarely required to be produced by the imitative art of gardening. But there are other kinds of hollow ways in nature which can be easily imitated, and created in gardens; these paths are cut in the earth, instead of in the rock. The steep banks are covered by many sorts of shining-leaved and other shrubs, particularly honeysuckle, the clematis, the bramble, the raspberry, the hop, the sloe, and different species of whitethorn; with the wild rose, the maple, the berberry, the buckthorn, the wayfaring tree, (*V*ibúrnum Lantàna); with the dogwood, the cornel cherry, the hazel, the spindle tree, the privet, and many others, besides a great number of field and meadow flowers.

From this entangled mass rise here and there almond, plum, and cherry trees; sometimes also the Pseùdo-*P*látanus (gemeine ahorn), the service tree, and others of the sort, grow out of the declivities, which are never perpendicular, but rise steep and boldly from the path.

These sunk walks are particularly beautiful; they possess in general a confidential, contemplative character, which also approaches solitude, by excluding and concealing from the eye all natural scenes except those which lie within their immediate boundary. Sunk walks leading to eminences generally surprise the spectator when they terminate with an extensive prospect, which was previously concealed from view. These charming walks are never quitted without feeling a lively wish of soon returning to enjoy their delightful, unpretending, romantic beauties. Sunk paths, when constructed in gardens, are much more rich in plants than when they are natural, as they unite the climbing and other exotic shrubs and trees, without any particular regard being had to grouping, or keeping; as not this character, but rather one of a disordered, wild, entangled, and confused plantation, is peculiar to them. In planting the slopes, therefore, much more attention should be paid to the health and growth of the plants, and care taken that they do not shade each other too much, so as to cause their death.

This luxuriant mass of plants and trees must partially cease at certain places, and give place to trees, which must interlace high above the path on which the spectator walks, as if in the deep shade of an arbour, and where rays of light, tinging with gold the distant overhanging shrubs, will point out to him the end of his solitary wandering. The slopes of this path must be

formed at an angle of at least 45°, to prevent their falling in. But there are other sunk paths, of an entirely opposite character, which are much more adapted to gardens than those I have just mentioned. These paths are formed and planted in the following manner. Two approximating declivities, only separated by the path, lying opposite to each other, swelling in a graceful natural form, and which can be ascended without any exertion, covered with a lively green sward, are clothed with large picturesque trees, planted in transparent groups in the manner of a grove. Between these lovely slopes, for which one often leaves the path to wander among the majestic trees, or to repose under their shade, winds a path in the hollow, traced out in gently flowing curves, which, from its lighter colour, betrays its course as it winds, now near, now at a distance, among the trees, and completes the beautiful and picturesque scene.

A sunk path of this description has a decidedly picturesque character, and has a charming effect in garden scenery, while its dreamy romantic character is as inviting as it is capable of yielding enjoyment.

To these sort of hollow ways another may be added, which, in point of form, deserves the preference. These paths are concealed by an impenetrable close wood of tall majestic trees, of which the outer groups, exposed to the light, present beautiful forms to the imitation of the artist. Paths of this sort are characterised by a kind of solemnity, which is only softened by beautiful valleys proceeding from them, which, becoming narrower as they recede, finally escape the eye. There are also hollow ways where wild mountain torrents rush foaming over masses of rocks, and form a number of waterfalls. Hollow ways of this description, when they are deeply cut, and their slopes clothed and shaded with noble trees, under whose branches the grand masses of rock, with the precipitous torrent rushing over and between them, are clearly perceptible, justly deserve the preference. As a general remark with regard to walks, I must mention the following: viz., that too many walks are prejudicial to pleasure-grounds, as they break up plantations too frequently, make them appear meagre, and also require much expense in keeping.

Walks may be so constructed as to make gardens appear much larger than they actually are, by never allowing the boundary, which is often very limited, to be seen, but which must be concealed by thick plantations, and its vicinity never guessed at. Especially, they must not approach too near to those openings, where the outer landscape, by means of ha-has, appears as if it belonged to the garden. A garden may also appear much larger to the spectator when the paths take contrary turns, and by circuitous routes describe a longer line. But this sort of

deception does not always succeed; the deceit is but too soon discovered, even if these sudden windings, which must, besides, be often repeated, do not present obstacles.

Among such repeated turns, and to dissipate the suspicion that they might awaken, the spectator must be surprised, now by a beautiful inscription, a murmuring fountain, which will recal Vaucluse and the complaints to Laura; and now by an urn, a bust, &c.; and thus his mind be occupied with more elevated subjects than the course of the walks.

A neighbouring path should never be perceived from any walk, because this would destroy the illusion of size. The plantations, therefore, which separate these near walks, must be close and impervious. At the narrowest spots these plantations should be at least from 15 to 20 or 30 feet wide. In large extensive grounds, however, where no deception to increase the apparent size is necessary, sometimes, from one walk, others may be seen through transparent plantations; and, from the momentary appearance and disappearance of the passers by, animated and lively pictures may be produced.

A walk winding in a gentle slanting curve up a steep bare hill, on the other side of which a beautiful landscape, half-concealed, is by degrees revealed to view, has a particularly picturesque and beautiful effect. To display this sort of beauty, however, the walk should only have a single long shallow curve, which would also render the ascent easier. For the same reason, those walks which are to be carried over very steep hills can only be properly executed when they are cut first from the right to the left, and then from the left to the right (zigzag), and thus their extent increased. In cases, however, where the zigzag line cannot be sufficiently extended, or cannot be applied, in order to facilitate the ascent, steps, either of stone or of oak, must supply its place. These steps should not be more than 5 in. high, and not more nor less than 2 ft. apart, to be ascended conveniently.

When two walks are to be united, it should never take place at a right or obtuse angle, but rather at an acute angle, by which the lines of both walks will be united in a much more beautiful manner.

5. The marking out of all these lines and forms, if they are to approach their original pattern, nature, is, as we have already said, a matter as important as it is difficult. It is easily understood, therefore, that he who undertakes to lay out a garden in the natural style ought to be a good draughtsman in geometrical plans as well as in landscapes. But there is a great difference between expressing these forms in miniature on paper, and marking them out in their natural size in nature. If the cleverest landscape-painter were to draw such large lines, which often

proceed in connected circles, and in lines several miles in extent, with a tracing-stick which must be 4 or 5 pounds' weight, he would find great difficulties, and his first attempt would not likely be successful.

In order to facilitate this operation, I will here explain my method of drawing in nature, which I have followed since I first began to practise, and which I have communicated to many young artists. The plan on which the improvements are designed, which are now to be staked out, shows the natural objects, under what form they are to appear, and where they are situated. According to this plan, the principal points in nature will be determined; but, as has been already observed, without straining to observe them too minutely, in case nature should thereby be distorted, or fine trees fall under the axe, which, without injuring the landscape, might have been preserved, if the line of the water or walk, or any other line, had been altered a little. There may also be obstacles of another kind contrary to nature, which could not be foreseen in making the plan.

But these difficulties will not be insurmountable to one who is familiar with nature, and her numerous forms and means of remedy; because he will make such alterations as will not affect the beauty of his grounds, but, if it be possible, improve them by those very means. Hence, it is clearly enough seen, that, in executing the plan, it cannot be exactly followed up, because it only gives the principal forms and situations. It can only show the scenes the grounds are to present; and point out where the hills, the valleys, the lakes, the ponds, the waterfalls, the bridges, the temples, &c., are to find their places.

6. The instrument with which large and small outlines in nature are drawn on a large scale is a round stick, or tracing-staff (*fig.* 13.), from 5 ft. to 6 ft. long, and $1\frac{1}{2}$ in. in diameter, pointed with iron at the bottom, to draw the lines in the earth. The artist holds this stick with the right hand above, and the left below, or *vice versâ*, and in such a manner as that the iron point is turned towards the ground backwards. With an erect carriage, and his glance directed

Fig. 13. *Tracing-Staff*

forwards towards the existing localities, the main points being previously determined by the plan, and which his line (if no obstacles intervene) is to arrive at, he pursues, with a steady pace, the beautiful undulating line which his practised imagination presents to his mind, and, as it were, displays before him.

With his tracing-stick turned backwards, and grasped with a firm hand, the point pressing on the earth, the artist imprints the line of beauty on the ground mechanically without any further care or requiring to look behind him; immediately after him follow two labourers, who set in posts, but do not beat them firmly in at first. When he has reached the end of his line, he turns back, examines its course, improves it, and then has the posts firmly driven in, or the line cut out with a sharp hoe, when the line is to remain and requires no change, as in the outlines of the woods and clumps. (p. 56.)

By this method, which requires great practice, and a comprehensive glance, united with the art of justly representing forms and images, I am convinced that nature and the character of the locality will be most successfully imitated; at least, forty years' experience has proved this to me, so that I can vouch for its success.

7. Let this method be compared with the usual one, where, with the tracing-stick under the arm, the face directed towards the ground, the operator draws the line, and, on looking up again, becomes aware of its stiff faulty swerving from the right line, requiring repeated and numerous alterations. This is not the case in the method above described: the artist remains in an upright position; he overlooks as he draws the points determined beforehand which his line is to touch, and advances towards them in a manner as agreeable as it is natural. He has the whole locality which his grounds are to embrace, and the forms which he has already sketched, and which are to be in unison and harmony with the rest, constantly before his eyes; and his perception of the beauty and truth of nature directs his steps, and consequently his tracing-stick, which follows faithfully the motions of its master.

8. The chief artistical value of a good picture lies more in the correctness of the drawing than in the colouring; therefore, the faults of colouring are more pardonable than those of drawing. Thus, also, correct drawings of beautiful picturesque forms and outlines are required in gardens, because they also greatly contribute in giving the grounds their chief merit. For this reason, the manner above described of drawing on a large scale is to be preferred to the usual method, because it is capable of defining more distinctly than the other does. The practised artist is able, also, to draw as quickly as he goes.

His taste for the beautiful forms of nature, his imagination supported by the rules and principles of art, guide him quickly and with a certain hand, and show him where his woods are to project in expressive masses, and where they are again to retreat in shade; where hills are to arise, and valleys be sunk; what lines the brook flowing through flowery meads is to describe; and where the soft wavy lines, or the bolder, sharp, obtuse-angled, and slightly curved outlines, are to describe and determine forms, &c.

It must be observed, that the artist, while drawing the undulating line, should not look backwards, because he is in danger of losing his imaginary line, and of pursuing another which cannot harmonise with the first nor be successfully continued with it.*

Art. VIII. *Observations on Irish Planting.* By T. T.

Extensive planting in Ireland can scarcely be dated more than sixty or seventy years back.

The Elm is certainly an introduced tree, no plants in truly wild situations having been found. The English elm is far more hardy and vigorous in growth than the wych, bearing its leaves fully three weeks longer in autumn. The elm bears transplanting at a more advanced age than any other tree. It grows as vigorously standing exposed, as in the shelter or society of other trees. The dust and smoke of towns do them little injury. At Crookstown, in the county of Tyrone, is a magnificent avenue of elms, planted in 1774; yet the soil, in many parts, was mere turf bog, covered by a road. Silkworms will feed on the leaves when very young. Its vivaciousness is great; pieces turned up accidentally by the plough have grown into trees. There are elms at Dunkerron upwards of 100 years planted, in full vigour, and about 3 ft. in diameter at 8 ft. from the ground. The date of its introduction is unknown; but, as it has a distinct name in the Irish language, it must be very distant.

The Horsechestnut bears the utmost rigour of cold of our winters.

The Lime Tree's leaves are not subject to be devoured by insects, as those of the elm; its increase is rapid; its branches

* Walks should be somewhat curved to carry off the moisture, but without their being so much so as to be inconvenient to the pedestrian or dangerous for carriages. A road 10 ft. wide may be raised in the middle 3 or at most 4 inches, and one of 15 ft. from 5 in. to 6 in. They must not form any ridge in the middle, but must describe a uniform flat segment of a circle, in which the fall is equally divided, and thereby rendered convenient to all.

are tough, and seldom injured by storms; it does not injure the grasses beneath by its shade or drip. Near Killarney is a row 40 ft. in height, and averaging 3 ft. in diameter.

The Holly delights in a moist atmosphere; and is much injured by the smoke of towns. At Killarney, trees 30 ft. in height are not uncommon; one at Innisfallen, at $2\frac{1}{2}$ ft. from the ground, was 39 in. in diameter. Hollies survive the wood in which they were reared. Holly timber stands better than brass for steps [?] in machinery. A variety with yellow berries occurs at Blarney, near Cork.

The Ash raised in rich soils fails remarkably in poorer. It grows well in almost any soil or elevation in Ireland; yet of ash plantations in the same soil, rich or poor, several fail alongside of those that have succeeded. We must suppose some subterraneous enemy or disease attacks them; this conjecture is perhaps supported by the general sweetness of the sap in the genus to which it belongs. At Leix, in the Queen's County, in 1792, the celebrated ash, at 1 ft. from the ground, measured $40\frac{1}{2}$ ft. in circumference; its branches extend 70 ft. The ash injures other plants remarkably by its drip; and yet in moist soils it seems to drain the ground and give it firmness. Its young shoots are greatly injured by late frosts. It finds the readiest market, and at the earliest age, of any tree in the country, in Ireland.

The Oak bears transplanting badly after three years old. The remains of oak woods, kept down for years by the browsing of cattle, have been observed by Mr. Critchley of the county of Wicklow to grow up into fine trees by fencing alone. One oak, in Lord O'Neil's Park, near Lough Neagh, was sold for upwards of 200*l.* Mr. Critchley's oak woods doubled their value between the fifteenth and twentieth year. An oak at Castle Cor, in the county of Cork, is 25 ft. in circumference at 6 ft. from the ground, and has growing on it a stem of ivy 7 ft. in circumference.

The Pines adapt themselves to a variety of climates, and one or other species may be found to thrive in all sorts of soils, from the driest quartzose sand to turf bogs. Their growth is rapid, and duration protracted. They multiply with great facility by seed, but the principal stem once cut down never recovers. Growing closer, they yield more timber on the same space of ground than round-leaved trees.

A species of pine was once indigenous to Ireland; the stems are still found in our turf bogs. It is not the *P.* sylvéstris; the roots bear a much greater proportion in size to the stem. In the county of Kerry, I found the horizontal section of one, where the roots commenced, to be 7 ft. in diameter; while the stem, at 2 ft. in height, was scarcely 4 ft. The stems of the *bog deal*, besides, are often remarkably twisted.

The Scotch Pine prefers a poor sandy soil. The seeds accidentally falling on turf bog have grown into large trees. Its timber is of more value in the remote parts of Ireland than that of alder. It does not grow as thick in the same space of time as the pinaster, but its timber is harder.

The Larch is more injured by the sea breeze than any other timber tree in Ireland; it thrives ill near towns, or on road sides. It should be planted unmixed with any other trees; for, as it outgrows them, its leading shoots are apt to be bent by winds. It easily takes a new leader, if accidentally or otherwise topped.

The Silver Fir is admirably adapted to Ireland, yet its cultivation is much neglected. It thrives in wet cold soils as well as in the rich and dry, at all elevations, and with every exposure; living to 400 years and more, while the

Balm of Gilead Pine, so like it when young, scarcely attains 40 years before decrepitude. It preserves its deep green colour, while the spruce fir turns brownish towards the end of winter. At Ballylickey, near Bantry, it has outtopped a variety of the usual timber trees among which it was planted sixty years ago.

The Sàlix àlba, *Sàlix Russelliàna*, and *Carolina Poplar*, are all well adapted to wet poor turfy soils. They have reached 30 ft. in height, at nine years from the time they were put down as cuttings, at Dunkerron.

I can give no information as to the dates of introduction of different exotic trees and shrubs into Ireland, nor should I know where to look for any information on that head not already in your *Arboretum*.

ART. IX. *Extracts from a Correspondence which took place from* 1817 *to* 1835, *respecting the Preservation of Timber by the Water of a Copper Mine in Anglesea.* Communicated by a CORRESPONDENT.

Extract of a Letter from Joseph Jones to Mr. Sanderson, respecting the Water of Parys Mountain being a Preservative of Timber, dated Amlwch, 20th October, 1817.

" THE piece of timber which I present to you is of oak, and was part of the bucket of a mill-wheel, turned by a stream of *mineral* water. The one side is left rough, as it was taken out, with the ochry sediment of the water adhering to it; the other side planed, in order to show how it colours wood. The whitish spot on the planed side is a deal pin, which was put in to bind the bucket; and it serves to prove that the water preserves deal, or other soft wood, as well as oak.

" The wheel from which the piece was taken had been worked for eighteen years; and it is five years since it was taken out. Mill water-wheels are generally considered to be more subject to decay than any other species of woodwork, in consequence of being exposed, without paint, to all the vicissi-

tudes of the seasons; and being alternately wet and dry, every twenty-four hours.

"The fact of the mineral water being a preservative of timber has been long known to many persons in this neighbourhood, though I never knew of any advantage being taken of it, farther than what chance threw in the way. My attention was more particularly attracted to it by the following circumstance:—A brig, called the Amlwch, more than thirty years old, to which I am ship-husband, required considerable repairs about three years ago; amongst other things, she wanted a keel and some floorings. Her ceilings were in consequence stripped, and, to my great astonishment, the floorings and the timbers in her bottom, wherever mineral water had reached, were found as perfect as the first day they were put in. This vessel had always been a regular trader out of Amlwch port to Liverpool, and loaded with copper ore; and formerly, when the ore was kept in uncovered bins, it often contained a considerable quantity of wet, which, when shipped, passed through the ceilings, and being worked backwards and forwards by the motion of the vessel at sea, it effectually washed the timber below. In some instances pieces were found which had been partially acted upon by the mineral water; the part washed being perfectly sound, and that beyond its reach quite decayed.

"Since then we have opened three other vessels, that had been employed in the same trade for above twenty-five years; and the result has been, in every instance, the same. This led me to take every opportunity of examining the effects of the mineral water upon wood in general, and I have found its effects the same upon every species of timber: it makes it harder, more elastic, and so durable, that it might be said, with propriety, that it renders it imperishable; and, what is very extraordinary, it makes the outer part, or sap-wood, which otherwise so soon decays, as lasting as the inner part, or heart-wood: for instance, the land-ties in Amlwch port, which are pieces of oak timber, roughly squared, to support the quay, have been fixed there for nearly sixty years, and yet they do not exhibit the least symptom of decay.

"The specific gravity of mineral water being less than that of sea water, it floats upon the surface of the docks, and acts as effectually upon the land-ties, through the gradual rise and fall of the tides, as if they had been immersed in mineral water alone. I could mention innumerable other instances, if it were necessary, to illustrate the preservative quality which the mineral water possesses, but I fear I have already trespassed too much on your time,

"I understand that government is now making different experiments for discovering some preservative from the dry rot, which has, of late years in particular, been so destructive to ships of the navy; and that sanguine hopes are entertained that the application of sea water to timber will answer that purpose. Perhaps the marine acid which sea water contains may have a similar effect, in the same proportion it bears to the quantity of vitriolic acid with which our mineral waters are so strongly impregnated. JOS. JONES."

The above letter, with the pieces of timber to which it alludes, were taken by Mr. Sanderson to the Admiralty Office, and delivered to Mr. Croker; when it was understood that enquiry would be made into the fact of the statement. For more than two years there was nothing heard about it, when a pamphlet, "by a Lieutenant in the Navy," *On the Preservation of Timber from Dry Rot*, made its appearance, recommending the mineral waters of Parys Mountains for the purpose, in words so much like the letter which had been delivered at the Admiralty, that it naturally led to a suspicion that the author had, by some means, seen or heard of it, which induced Mr. Sanderson to write a letter to the Admiralty, to which he received the following answer from Mr. Barrow:—

"Sir,—Having laid before the Lords Commissioners of the Admiralty your letter of the 20th instant, on the subject of a work lately published by "an Officer of the Royal Navy," *On the Preservation of Ship Timber*, which you have understood to contain some information drawn from a communication

made about two years ago to this department, by Mr. Jos. Jones of Amlwch, I have their Lordships' commands to acquaint you that they have no knowledge of the publication you allude to. I am, Sir, your humble servant,

JOHN BARROW."

Mr. Sanderson then wrote to Mr. Barrow as follows: —

"Plas Newydd, Sept. 28. 1820.

"Sir,—I beg to acknowledge the receipt of your letter of the 22d instant, in which you are pleased to acquaint me, in reply to mine of the 20th, that the Lords Commissioners of the Admiralty have no knowledge of the publication alluded to. I did not for one moment suppose that their Lordships would give their sanction to a publication of matter drawn from private correspondence of Mr. Croker; indeed, my allusion to that publication was merely incidental. It was the chief object of my letter to ascertain whether Mr. Jones's statement of facts relative to the preservation of timber had received the consideration of the Lords Commissioners of the Admiralty, or of the Commissioners of the Navy; and I hope I may now, without impropriety, enquire whether any and what report has been made upon it? I should also feel much obliged if you would have the goodness to procure for me the return of Mr. Jones's letter, as I did not keep a copy. I have the honour to be, Sir, your most obedient Servant, JOHN SANDERSON.

"To John Barrow, Esq."

To which the following final reply was given by Mr. Barrow: —

"Admiralty Office, 30th Sept., 1820.

"Sir,—Having laid before the Lords Commissioners of the Admiralty your letter of the 28th instant, enquiring whether any report was made on Mr. Jones's letter of the 20th of October, 1817, respecting a plan for the preservation of timber, and requesting that Mr. Jones's letter may be returned to you, I have it in command to acquaint you that the letter in question cannot be returned to you; and that, from a report made by the Navy Board on the subject, their Lordships did not mean to give Mr. Jones any further trouble on the matter. I am, Sir, your very humble Servant, JOHN BARROW.

"To Mr. John Sanderson, Plas Newydd, Anglesea."

"The following observations and experiments were made by me in January, 1818, on the chemical properties of the mineral water of Parys Mountain, by which timber is preserved: — This water is known to contain copper and iron, held in solution by sulphuric acid. 'Wood, when distilled in a retort, yields an acid liquor of a peculiar taste and smell and distinguished by the name of pyroligneous, and formerly considered as a distinct acid, but it is now ascertained that it is merely the acetic acid, combined with an empyreumatic oil.' — *Thompson.*

"I obtained from a manufacturer in Liverpool some pyroligneous acid in its simplest state, for the purpose of making experiments. On adding an equal quantity of sulphuric acid to the pyroligneous, it was speedily decomposed, and a black substance was precipitated, which, when dried, appeared to be carbon. A small quantity of sulphuric acid being applied, changed the colour to a dark, and nearly black. The Parys Mountain water being added to an equal portion of pyroligneous acid, changed its colour precisely the same as in the last experiment, when sulphuric acid was used alone.

"Is the sulphuric acid contained in the water, under any circumstances, sufficiently strong to carbonise the sap within the pores of the wood? I am persuaded it does convert some part of the sap of timber into charcoal; and when it is properly saturated, every pore becomes lined with the substance, which, when once formed, is afterwards insoluble in water; thus making use of the otherwise destructive sap to char the wood; charring the surface of wood having always been considered a preservative of timber from dry rot.

"Caernarvon, Sept. 9. 1835. JOSEPH JONES."

Mr. Jones's Proportions of the Oxides for Saturation.	Price of the Ingredients for Solution.
15 lb. sulphate of iron.	Copperas, 7*s.* 6*d.* per cwt. (i. e. sulphate of iron).
12 lb. sulphate of copper.	Sulphate of copper, 45*s.* per cwt.
24 lb. sulphate of zinc.	Sulphate of zinc, 45*s.* per cwt.
1 qrt. sulphuric acid.	Sulphuric acid, 3*d.* per lb.

The sulphates to be well pounded, and dissolved in hot water; and then the sulphuric acid to be mixed in the solution, and well stirred up with a scrubbing-broom. The above, added to thirty-six gallons of water, is ready for the tank.

Time of Saturation.—1-inch board, 3 days; 3-inch plank, or scantling, 7 days; 5-inch to 6 and 7-inch scantling, all 12 to 14 days; large timber, 12 in. to 14 in. square, will require 21 days.

ART. X. *Botanical, Floricultural, and Arboricultural Notices of the Kinds of Plants newly introduced into British Gardens and Plantations, or which have been originated in them; together with additional Information respecting Plants (whether old or new) already in Cultivation: the whole intended to serve as a perpetual Supplement to the "Encyclopædia of Plants," the "Hortus Britannicus," the "Hortus Lignosus," and the "Arboretum et Fruticetum Britannicum."*

Curtis's Botanical Magazine; in monthly numbers, each containing seven plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Sir William Jackson Hooker, LL.D., &c., Director of the Royal Botanic Garden, Kew.

Edwards's Botanical Register; in monthly numbers, new series, each containing six plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Dr. Lindley, Professor of Botany in the University College, London.

Maund's Botanic Garden, or Magazine of Hardy Flower Plants cultivated in Great Britain; in monthly numbers, each containing four coloured figures in one page; large paper, 1*s.* 6*d.*; small, 1*s.* Edited by B. Maund, Esq., F.L.S.

The Botanist; in monthly numbers, each containing four plates, with two pages of letterpress; 8vo; large paper, 2*s.* 6*d.*; small paper, 1*s.* 6*d.* Conducted by B. Maund, Esq., F.L.S., assisted by the Rev. J. S. Henslow, M.A., F.L.S., &c., Professor of Botany in the University of Cambridge.

Paxton's Magazine of Botany, and Register of Flowering Plants; in monthly numbers; large 8vo; 2*s.* 6*d.* each.

The Ladies' Magazine of Gardening; in monthly numbers; 8vo, with coloured plates; 1*s.* 6*d.* each. Edited by Mrs. Loudon.

CAPPARI'DEÆ.

1904. CLEO'ME
lùtea *Hook.* yellow O or 1 jl. au N. America 1840. s.l Bot. reg. 1841, 67.
Synonymes: C. aúrea *Tor. et Gray;* Perítoma aúrea *Nutt.*

A pretty hardy annual from Fort Vancouver, on the north-west coast of North America. It "requires rather a strong soil and a dry situation. The plants are subject to damping off, and will not seed in a confined situation." (*Bot. Reg.*, Dec.)

Byttneriàceæ.

680. LASIOPE'TALUM macrophýllum *Grah.* large-leaved ⚘ ⌊⌋ or 5 my P.G N. South Wales 1835. C. [mag. 3908. s.p Bot.

A very handsome erect shrub, with large leaves which are woolly beneath The flowers are very pretty, and very abundant. (*Bot. Mag.*, Nov.)

Rutàceæ.

3549. DIPLOLÆ'NA 29842 Dampièri Bot. Reg. 1841, 64.

Onagràceæ.

1188. FU'CHSIA radìcans *Miers* rooting ⚘ ⌊⌋ or 20 s. o S Brazil 1837. C co Bot. reg. 1841, 66.

"A long trailing perennial shrub, the stems of which, much branched, attain a length of 20 ft. and upwards." A very handsome species from the Organ Mountains, where it "clings in long festoons" to the branches of the trees, and "exhibits abundance of its brilliant flowers." Though its native place is within the tropics, yet being at an elevation of 3000 ft., the nights in winter are frequently as low as from 35° to 40° Fahr. "It strikes easily from cuttings." (*Bot. Reg.*, Dec.)

cordifòlia *Benth.* heart-leaved ⚘ ⌊⌋ or 5 au. s S.G Mexico 1840. Bot. reg. 1841, 70.

This species "is remarkable for the rich green which terminates the scarlet flowers, which, if it takes something from their brilliancy, adds much to the novelty of their appearance. It has, moreover, a fine broad foliage, and when out of flower is handsomer than the generality of its race." (*Bot Reg.*, Dec.)

Salicàriæ, or *Lythràceæ.*

1453. HEI'MIA 12200 salicifòlia var. grandiflòra.

Crassulàceæ.

ÆO'NIUM *Webb.* (One of the synonymes adduced by Dioscorides to Sempervìvum arbòreum.)
cruéntum *Webb* bloody ⚘ ⌊⌋ or 2 my Y Canaries 1834. C s.p.l Bot. reg. 1841, 61.

Mr. Webb has remodeled the old genera Sèdum and Sempervìvum, and separated from them three genera, which he has called Æònium, Aichrỳson, and Greenòvia. This species was found on the stones and bare rocks near the base of the pine region of the Isle of Palma. "It requires the same treatment as Mesembryanthemum, and similar plants." (*Bot. Reg.*, Nov.)

Cactàceæ.

3359. ECHINOCA'CTUS corynòdes *H. Berol.* club-shaped ⚘ ▭ or ½ o Y.C S. America 1837. C s.p.l Bot. mag. 3906.

A very curious plant with a cluster of yellow flowers at the top, with crimson centres. (*Bot. Mag.*, Nov.)

1474. OPU'NTIA 12609 monacántha *Bot. Mag.* 3911.

A species was figured under this name in the *Bot. Reg.* t. 1726. with solitary spines; but it is stated in the *Bot. Mag.* that the Opúntia monacántha of Willdenow is quite a different plant, with a little tuft of bristles at the base of each spine. The flower of the plant figured in the *Bot. Mag.* is orange, and that in the *Bot. Reg.* yellow.

decúmbens *Salm* decumbent ⚘ ▭ or ½ jn Pa.Y Mexico 1838. C s.p.l Bot. mag. 3914.
Synonymes : O. rèpens *Karw.*; *O.* irroràta *Mart.*

A handsome species, with large pale yellow flowers. (*Bot. Mag.*, Dec.)

Stylidièæ.

2581. STYLI'DIUM recúrvum *Grah.* recurved ⚘ ⌊⌋ or ½ my Pk Swan River 1840. C s.p Bot. mag. 3913.

A very pretty little greenhouse shrub, with slender suffruticose stems, much branched in tufts, and sending down long wiry roots. The flowers are pink, and very abundant. (*Bot. Mag.*, Dec.)

Gesneriàceæ.

1698. GE'SNER*A*
díscolor *Lindl.* two-coloured or 2 my. jn S Brazil 1839. C. s.l Bot reg. 1841, 63.

The leaves of this plant are "very large and hard, with the lobes of their cordate base overlapping each other; they are somewhat shining and smooth on the upper side, and hairy beneath; the flowers are almost 2 in. long, cylindrical, scarlet, with a flat limb, and dispersed in a large leafless panicle, with branches of a deep purple colour, and perfectly destitute of hairiness. Both they and the flowers were shining, as though they had been varnished." (*Bot. Reg.*, Nov.)

mŏllis *Paxt.* soft or 4 au Caraccas 1839. C r.s Paxt. mag. of bot. vol. viii. p. 243.

A very showy plant, remarkable for its "strong, erect, tall, succulent stems, and large soft leaves;" which, as well as the stems, are clothed with a soft down, "which at once yields to the touch of the fingers, and feels smooth and agreeable. (*Paxt. Mag. of Bot.*, Dec.)

ACHIME'NES *P. Browne.* (From *a* augm. and *cheimainō*, to suffer from cold; tenderness of the plant.)
*r*òsea *Lindl.* rosy or 1 su Pk Guatemala 1840. D co Bot. reg. 1841, 65.

The plant generally called Trevirà*n*a coccínea having been originally called Achimènes by Dr. Patrick Browne, in his *History of Jamaica*, that name has been restored to it by De Candolle in his *Prodromus;* and this species being of the same genus, it is called Achimènes *r*òsea. It is a very pretty plant, producing abundance of its bright rose-coloured blossoms all the summer. "The stems die off after flowering, and the roots must then be kept perfectly dry throughout the winter and spring, till it begins to grow." (*Bot. Reg.*, Dec.)

Ericàceæ.

1346. *A*RCTOSTA'PHYLOS
nitida *Hook.* shining or 4 my W Mexico 1836. C s.p.l Bot. mag. 3904.
Synonymes: A. díscolor *Dec.*; *A'*rbutus díscolor *Hook.*

A very beautiful shrub, a native of the colder part of Mexico. The leaves are long; and dark green and shining on the upper surface, but pale and glaucous below. (*Bot. Mag.*, Nov.)

1339. *R*HODODE'NDRON [of bot. vol. viii. p. 217.
Gibsòn*ii* Paxt. Mr. Gibson's or 5 my. jn W Khoseea Hills 1837. s.l.p Paxt. mag.

A very handsome species of *R*hododéndron, which has the habit and foliage of an azalea; though the flowers are decidedly those of a rhododendron. It is about as hardy as *R.* arbòreum, but a much smaller plant, having only the character of an undershrub, even in Nepal. (*Paxt. Mag. of Bot.*, Nov.)

Gentiàneæ.

PREPU'SA *Mart.* (From *prepousa*, showy; flowers.)
Hooker*iàna* Gord. Hooker's or 1 mr. ap W.C Brazil 1841. D m.s Bot. mag. 3909.

A very showy plant from the dark crimson calyx to its white flowers. It is a native of Brazil, where it is found on the Organ Mountains. (*Bot. Mag.*, Nov.)

Scrophularíneæ.

3387. FRANCI'SC*EA*
latifòlia broad-leaved or 4 au. s P Rio Janeiro 1840. C s.l.p Bot. mag. 3907.

A very splendid plant, with large purple flowers, which, though hitherto kept in the stove, will doubtless flower in a greenhouse. The leaves are broad, and very handsome. (*Bot. Mag.*, Nov.)

1783. *MI'*MULUS 30298 cardinàlis var. insígnis, atro-*r*òseus, and pállidus, *Ladies' Mag. of Gard.* t. 11.

Three very beautiful varieties, or hybrids, which have been raised in the Experimental Garden in Edinburgh by Mr. James M'Nab. (*Ladies' Mag. of Gard.*, Nov.)

Labiàtæ.

1669. *S*TA'CHYS
speciòsa *Maund* showy or 4 jl. au S Mexico 1839. D co Bot. gard. 809.

A very handsome species which appears to be quite hardy, as in the months

of July and August, after standing out during the winter, it had "attained the height of 4 ft., and flowered luxuriantly." (*Bot. Gard.*, Nov.)

Acanthàceæ.

1734. THUNBE'RG*IA* 15538 alàta var. chlorántha *Bot.* 238.

The flowers are small, and greenish on the back. (*Botanist*, Oct.)

Orchidàceæ.

538. CYRTOCHI'LUM [1841, 49.
filipes *Lindl.* thread-stalked ⚥ ⊠ or 1 jn Y.B Guatemala 1840. D p.r.w Bot. reg.

This plant bears some resemblance to an oncidium. (*Bot. Reg.*, Nov.)

2559. E'RIA [Bot. reg. 1841, 62.
convallariòides *Lindl.* Lily of the Valley-like ⚥ ⊠ pr ½ au W E. Indies 1839. D p.r.w
Synonymes : Pinòlia álba *Haw.*; Octomèria spicàta *D. Don ;* O. convallariòides *Wall.*

This species "has small whitish flowers collected in close heads, in the axils of broad striated leaves; they have no smell, and the species proves much less pretty than was expected." (*Bot. Reg.*, Nov.)

[on his mission to Brazil, respecting the culture of tea.)
HOULLE'T*IA* Ad. Brong. (In honour of *M. Houllet*, a gardener who accompanied M. Guillemin
vittàta *Lindl.* striped ⚥ ⊠ cu 1 su B.Y Brazil 1841. D p.r.w Bot. reg. 1841, 69.

Rather a curious plant, with yellow and brown flowers; belonging to the section *Vándeæ* (*Bot. Reg.*, Dec.)

2565. AE'RIDES [Paxt. mag. of bot. vol. viii. p. 241.
quinquevúlnerum *Lindl.* five-wounded ⚥ ⊠ jn ½ Pk. G Philippines 1838. D p.r.w

A very splendid plant, from the long spikes or racemes of flowers, which it produces in great abundance, and which have a delightful fragrance. (*Paxt. Mag. of Bot.*, Dec.)

Iridàceæ.

RIGIDE'LLA [68.
immaculàta *Lindl.* immaculate ☿ ⊠ pr 1 au S Guatemala 1840. D s.l Bot. reg. 1841,

"It differs from the original species in having much smaller flowers, not spotted, and narrower leaves." It is also a much smaller plant. (*Bot. Reg.*, Dec.)

Amaryllidàceæ.

979. ALSTRŒME'R*IA* 29419 Errembaúlt*ii* Bot. 237.

Melanthàceæ.

KREYSI'G*IA*. (Probably in honour of some botanist of the name of *Kreysig.*)
multiflòra *Reich.* many-flowered ♃ △ pr 1 su Ro N. South Wales 1823. D co Bot. mag. 3905.
Synonyme : Tripladènia Cunninghàm*ia* D. Don.

A pretty little plant with pinkish flowers. (*Bot. Mag.* Dec.)

Art. XI. *Design for a Flower-Garden on Gravel.* By the Conductor.

In our Volume for 1836, p. 526., will be found a design for a flower-garden on turf. That garden having been five years executed, the parties began to get tired of it, on account of the expense of mowing among the beds. We were therefore a second time applied to, to furnish a design suitable for being contained within the same low wire fence, the beds to be edged with box, and the walks to be of gravel.

Fig. 13. is a ground plan, in which all the beds are numbered. In the centre will be observed a basin and fountain, and the whole is surrounded by a dotted line, indicating a wire fence, 18 in. high, and gently curving outwards at the top. This fence is not put down on the line of junction between the grass and the gravel, but 2 in. within the gravel, in order that there may

be no difficulty or loss of time incurred in cutting the grass quite short to its junction with the gravel, which is often the case when hare-proof wire fences are set down on turf.

The following list indicates the plants, some of them, it will be seen annuals, and others perennials, with which the garden may be stocked the first year; and the kinds and their disposition may be varied every year afterwards.

1. Limnánthes Douglàs*ii* ○ yellow and white.
2. *L*upìnus nànus ○ blue.
3. Platystèmon califórnicus ○ cream-colour.
4. *M*ímulus Harrisòn*ii* △ yellow and red.
5. Frogmore Scarlet Pelargoniums ⊔ scarlet.
6. *Œ*nothèra speciòsa △ white.
7. Alonsò*a* lineàris ○ scarlet and yellow.
8. Eùtoca viscòsa ○ dark blue.
9. Leptosìphon *a*ndrosàceus ○ French white.
10. *V*erbèna *Melíndris* ⊔ bright scarlet.
11. Clárk*ia* pulchélla álba ○ white.
12. pulchélla ○ pale purple.
13. *Œ*nothèra Drummónd*ii* ○ yellow.
14. *G*èum coccíneum △ scarlet.
15. *Petùnia* supérba ⊔ dark purple.
16. Pentstèmon *genti*an*oìde*s △ morone-colour.
17. *V*erbèna *t*eucri*oìde*s ⊔ white and pink.
18. Tweedie*àna* supérba ⊔ dark crimson.
19. radìcans ⊔ lilac.
20. Arran*iàna* ⊔ purple.
21. Lámbert*i* ⊔ rose.
22. Tweedie*àna* ⊔ crimson.
23. incìsa ⊔ pink.
24. *Melíndris* supérba ⊔ dark scarlet.
25. Bartòn*ia* aúrea ○ golden yellow.
26. Collíns*ia* bícolor ○ purple and white.
27. *P*hlóx multiflòra ⊔ white.
28. *C*atanánche bícolor ○ blue and white.
29. Nolàna *a*triplicifòlia ○ blue and white.
30. *Petùnia* nyctaginiflòra ○ white.
31. Clintòn*ia* pulchélla ○ blue, yellow, and white.
32. Rhodánthe Manglès*ii* ○ rose-colour and white.

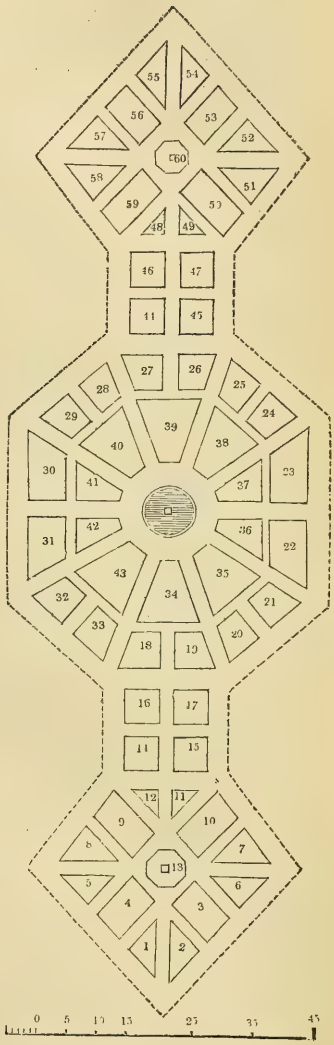

Fig. 14. *Garden on Gravel.*

33. Nemóphila atomària ○ white with black dots.
34. insígnis ○ brilliant ultramarine blue.
35. aurìta ○ dark purplish blue.
36. *Petùnia* erubéscens ⊔ or ○ bluish.
37. Lobèl*ia* ramòsa ○ dark blue.
38. grácilis ○ pale blue.
39. lùtea △ yellow.
40. Calceolarias of sorts △ various shades of red, yellow and white.
41. Gíl*ia* trícolor ○ white, purple, and black.
42. Crucianélla stylòsa △ lilac.
43. Eschschóltz*ia* cròcea ○ orange.
44. Gíl*ia* capitàta ○ blue.
45. *A*ntirrhìnum variegàtum △ dark red and white.
46. Zínn*ia* élegans coccínea ○ dark scarlet.
47. *E*rýsimum Perowski*ànum* ○ dark orange.
48. Eùtoca Menziès*ii* ○ pale blue.
49. *A*nagállis latifòlia ◐ dark blue.
50. grandiflòra ◐ dark scarlet.
51. Calceolària integrifòlia △ yellow.
52. *Petùnia* bícolor ⊔ pink and white striped.
53. *P*hlóx vérna △ white.
54. Pentstèmon glandulòsus △ pale pink.
55. *C*atanánche cærùlea ◐ blue.
56. Gaillárd*ia* bícolor ○ yellow and dark red.
57. *S*enècio élegans ○ purple.
58. Nierembérg*ia* filicaúlis △ pale lilac.
59. Collíns*ia* bícolor ○ purple and white.
60. Stenáctis speciòsa △ purple and yellow.

Bayswater, March, 1841.

Art. XII. *On the Culture of the Tussilàgo fràgrans.* By Archibald Gorrie.

This delightfully fragrant plant has now been an inhabitant of Britain for something more than thirty years; and yet, so far as I know, its culture has not nearly met with that attention which its fragrance merits, flowering too, as it does, at a season when the greenhouse is not overstocked with sweet-smelling plants in flower. It is rather surprising, that nurserymen and commercial florists have not long since directed more attention to its culture; as from its scent, its adaptation to flower in situations where the temperature does not fall below the freezing point, its singular though not beautiful appearance, and from the heliotropean perfume which it diffuses through any apartment where only one plant may be in flower, it must, when known well, become a favourite with amateurs, and its culture a profitable speculation for florists in large towns; but it is a rapidly-spreading plant, and with ordinary culture flowers sparingly, which partly accounts for the small share it has hitherto received of the florist's attention. I know of no plant that is a greater favourite with ladies, either growing in pots or as a cut flower: and, to insure a regular or ample supply of flowering plants, it is only requisite to prepare a steep bank facing the south, and sloping to an angle of about 45 degrees; about the middle of June, fill it with plants 6 in. apart; and cover the surface of the bank with at least 6 in. of ordinary garden mould. No further attention is necessary till the end of October, when it will be observed that almost every flower has formed a bold swelling flower-bud, from which

a sufficient supply, either for the greenhouse or the market, may be potted off. By keeping part in a cold-frame, a succession may be retarded, and thus a supply obtained till the end of March, when the season will furnish an ample stock of other flowering plants to take its place. The plantation made in June will continue to furnish plenty of flowering plants the second year after planting, but should be afterwards renewed, as the flowering plants become weaker and far fewer in number after the soil is exhausted by bearing a succession of the same sort of crop. A few leaves thrown over the bank will protect many of the flowers in ordinary winters, and retard their flowering till the beginning of spring.

Annat Cottage, Jan. 12. 1842.

Art. XIII. *Some Remarks on training and pruning Fruit Trees.* By a Correspondent.

It is well to understand the various methods of training in use in British and Continental gardens; and, knowing them, any mode or modification may be adopted which circumstances may require, provided the general principles are kept in view. Ornamental shrubs are easily managed, because they have not a tendency to rear themselves by forming a strong stem; but with regard to fruit trees the case is otherwise. These, it is well known, if left to nature, form one strong stem, supporting a top which reaches the height of 20, 30, or 40 feet, or more. In order to attain this, the sap rushes, whilst the tree is young and vigorous, towards the leading shoot; and, if lateral branches are occasionally produced, the flow of sap is not strongly directed towards them, compared with that towards the more upright part. At length, however, a ramification does take place, in comparison with which the leading shoot becomes less and less predominant, till it becomes ultimately lost amongst its compeers. A tolerably equal distribution of sap then results, and a conical or spherical top is formed, bearing fruit, not generally in the concavity, where it would be greatly excluded from light, but at the external surface, where the fruit itself, and the leaves immediately connected with the buds producing it, can be fully exposed to light, air, and dews. It was remarked, that lateral branches were occasionally produced on the stem, in the progress of its ascent. When the top is formed, these are placed at great disadvantage, owing to their being overshaded, and they are then apt to decay, the tree assuming the character of a large elevated top, supported on a strong naked stem. This is the natural disposition of trees, and to this it is necessary to attend in order that it may be counteracted where the natural form of

the tree cannot be admitted. It should be borne in mind, that the disposition to form an elevated naked stem is still strongly evinced in dwarf trees; although subdivided, yet each branch possesses its share of the original disposition, and its lower and horizontal shoots are apt to become weak in comparison with the upper and those that are vertical.

A standard tree, from its being least restrained from attaining its natural habit, requires least management in regard to training, as has been already explained. When trained in any dwarf form, attention is in the first place required towards counteracting the disposition to form one large elevated stem, by stopping the leading shoot. In this and other processes in pruning and training, it is necessary to be aware of the nature of the buds on different parts of the shoot, and the effect of cutting near or at a distance from the base. When a shoot is shortened, the remaining buds are stimulated, and those immediately below the section seldom fail to produce shoots, even although they would have otherwise remained dormant. The lowest buds on the base of a shoot do not generally become developed unless the shoot is cut or broken above them. They remain endowed with all their innate vital power, although comparatively in a state of repose: but, should the shoot on the base of which these buds are situated be destroyed or amputated, very soon they are called into vigorous action, producing supplementary shoots much stronger than could be obtained from any other buds more remote from the base. Were these buds as prone to developement as others, a mass of shoots and foliage would be produced in the central parts, where the foliage could not have a due share of light, an arrangement that would prove bad. They must be looked upon as in reserve for furnishing wood-shoots, whenever the pruner chooses to stimulate their developement by amputating the portion of shoot above them.

From this view of the properties belonging to the lowest situated buds, it is evident they are the most unlikely to become fruit-buds. These are formed towards the extremities. In some cases they are terminal; but generally about two thirds from the base is the situation where fruit-buds are first formed, and in some kinds of fruit-trees are developed into blossom the following season, and in others the basis of a spur is established. This spur sometimes continues slowly to elongate for years before it produces fruit. As the strongest shoots are obtained from buds near the bases of shoots, and as all horizontally trained branches grow weak compared with those that have a more vertical position, it follows, that all horizontal branches, and those approaching that direction, should be obtained, as far as circumstances will permit, from buds situated near the base.

Hence, in horizontal training, say 1 ft. apart between the tiers of branches, it is not well to encourage two tiers in the same season; for, in that case, the tier that proceeds from buds 2 ft. from the base of the current year's shoot has a much less substantial origin than those that are produced from buds only 1 ft. from the base. The formation of two tiers should, therefore, never be attempted whilst the lower part of the wall is being furnished, for the lower horizontals have a tendency to become ultimately weak, and on this account it is requisite that their origin should be well established. Towards the top of the tree, where the sap flows with greater force, two tiers are less objectionable. According to the principles of Seymour's training, the originating of the side branches from buds near the base of the vertical central shoot is well provided for, and this ought to be kept in view in every mode of training adopted. In order to furnish well the lower part of a tree, it is necessary to procure strong branches, and these can be best obtained from the lower part of a strong central shoot; and, in order that this shoot may have sufficient strength, it must have a vertical position. If no central shoot is retained, one of three evils must result: the central part must remain open as the tree increases, with half fans on each side; or a shoot to produce others to fill the centre must be encouraged from one side, thus upsetting the balance of the tree; or, to avoid this, two or more vertical or nearly vertical shoots must be allowed, the divarications from which cannot be kept clear of each other, whilst likewise a great proportion of shoots must inevitably be placed nearly or quite perpendicular, relatively with which the horizontal branches below are situated at an infinite disadvantage as regards the distribution of sap.

Trees commenced to be trained in nurseries have often the objectionable form imposed upon them of an open centre, being deprived of an upright shoot and set off like a V; and similarly objectionable are the Montreuil and other modes on the same principle. With skilful management these modes do succeed in France; but, in the rich soil and humid climate of Britain, the flow of sap cannot be equalised by any mode that admits of a competition between vertical and horizontal branches. One upright is necessary for furnishing side branches; but, being annually cut back for this purpose, it does not gain any increasing ascendancy, and forms but a slight exception to the whole flow of sap being directed to the growth of the side branches; and, in consequence of this, these branches will become so well established that they will be capable of receiving a due share of sap to enable them to continue healthy instead of dying off, as is their tendency when the vigour of the tree is wasted in

exuberant wood induced by permitting shoots, either intentionally or through neglect, to follow their natural disposition to grow up into stems whenever they can avail themselves of a favourable, that is an upright, position for appropriating an abundant supply of sap.

Art. XIV. *On a Method of producing Four Pine-apples on the same Plant in Four successive Years.* By George Dale, Gardener at Brancepeth Castle.

[In consequence of an extract from a letter of Mr. Dale's, printed in p. 41., we have been written to on the subject for farther details. We sent the letter to Mr. Dale, and below is an extract from his answer.]

I should have answered yours before this, but I had to send to Newcastle for a copy of the *Horticultural Reports* for 1830. The part I referred to in my last I enclose for your inspection.

"At the meeting at Durham, in July, 1830, some very fine and large artichokes were exhibited by Mr. Frushard, from the garden of the Durham prison. The pine-apple (Black Antigua) exhibited at this meeting for competition, and for which the Society's gold medal was awarded, was from the garden of R. E. D. Shaftoe, Esq., of Whitworth, the fourth fruit produced from the same plant in four successive years; the weight of the fruits being as follows, viz.: In May, 1827, 5 lb.; September, 1828, 5 lb. 7 oz.; August, 1829, 4 lb. 15 oz.; July, 1830, 5 lb. This pine was grown by Mr. John Robson, a pupil of the justly celebrated pine-grower, Mr. George Dale, gardener to William Russel, Esq., of Brancepeth Castle.

"At a district meeting of the Society, held at the Queen's Head Inn, Durham, in July, 1830, the following prize medals were awarded:—

"For the best-flavoured pine-apple (Black Antigua), the gold medal to Mr. John Robson, gardener to R. E. D. Shaftoe, Esq., Whitworth.

"For the best dish of strawberries, the silver medal to Mr. John Avery, gardener to W. T. Salvin, Esq., Croxdale.

"For the best dish of cherries (the Elton), the silver medal to Mr. George Dale, gardener to William Russel, Esq., Brancepeth Castle."

I shall endeavour to inform you of the manner I would treat those plants Mr. Loynes names. Supposing the first fruit cut, and the suckers and the old plant going on in a vigorous growing state, I would reduce the suckers to one or two, according to the appearance of the plant's health. Should the roots of the plant have become much matted, pull off a few of the bottom leaves, to allow the plant to make fresh roots into a top-dressing of rich compost, allowing the plant a moderate moist bark heat and moist atmosphere, and keeping it as near the glass as possible. Give the plants, if free rooters, a fair portion of water; and, should the soil get much exhausted, give liquid manure occasionally, allowing the plant and sucker or suckers to grow on until the sucker or suckers are strong enough to produce a good fruit. Then, the plant being tied up, turn it carefully out of the pot with a sharp-ended prong: take from the bottom and sides

of the ball as much of the old soil as can be done without injuring any fresh roots; trim off any black roots; then place the plant with a part of the ball as low in the pot as you can, placing a small portion of compost at the bottom, and leaving a little room at top, so as to have a command of top-dressing afterwards. By this means the plant will receive a partial check, and in making fresh growth will generally show fruit.

The following year's success much depends upon the health and treatment of the mother plant. Should the suckers have broke from the plant near the pot, I endeavour to give strength by putting a circular case round the rim of the pot, so as I can add compost for the roots of the suckers (previously pulling off a few bottom leaves) to strike into. The plants being potted deep, care must be observed respecting the bark's temperature in plunging, so as not to risk a scald, as much depends on a proper attention to the tan bed.

Brancepeth Castle Gardens, Durham, Jan. 30. 1842.

Art. XV. *On protecting Peas, and other early Crops.* By C. P.

I sent you a description several years ago of the means used in my garden for protecting early crops of peas, potatoes, and other vegetables, but which has never been taken notice of.

Situated as we are on the mountain limestone debris, I direct the sods always to be taken from the millstone grit, which change of soil insures a larger produce. On the removal of the peas into the open air (observe, they are taken up and transported on boards), they are carefully covered over for a time nightly, according to the state of the weather, by the protectors, of which I here describe and send you a sketch. (*fig.* 15.) The cover consists of five long and six short pieces of wood, two long and two short form each side; a top piece is left longer, to form handles at each end, and the sides are attached to the top with hinges, and kept apart by two stretchers. I form them of larch poles, and cover with sugar mats, fastening the mats on with larch laths, as more pliable and cheaper. The stretchers are made removable, to allow of their being shut up when out of use; otherwise they would take up much room. Two men will put off and on an immense quantity in a few minutes; and if during the growth of the peas, &c., they prove too low, they can be raised by four bricks or stones.

Fig. 15. *Cover for Peas and other early Crops.*

F. H., Feb. 1. 1842.

Art. XVI. *On the Excellences of the Ash-leaved Kidney Potato.* By T. Torbron.

This most excellent potato may be planted, as soon as the frost leaves the ground, on south borders, and other warm sites: if the frost returns, cover the ground with fern or litter. Plant the main crop in March, in an open site; but if it be desirable to prolong the season for the supply of that sort, it may be planted at intervals up to July, whereby it may be had in its best state nearly all the year. — *Bayswater, Jan.* 27. 1842.

[Mr. Torbron is an excellent gardener, and we wish we could see him established in a good place.]

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Whittaker's Composition for destroying Worms.—Mr. Fortune reported from the Hothouse department that Whittaker's composition, a substance advertised for the destruction of the insects called scale and green fly, had been tried; but that the results had not been satisfactory. It appears to destroy the plants without affecting the insects which infest them. He did not find that it injures the roots of plants, when used in the proportion which is necessary for the destruction of worms, and therefore it may be employed for that purpose in the same way as lime-water, or any acid. (*Proceedings of the Hort. Soc.* for 1841, p. 199.)

Art. II. *Foreign Notices.*

NORTH AMERICA.

Jussieu'a grandiflora.—I am now enabled to give you the facts of the salutary influence of this plant on the health of the inhabitants, when permitted to grow in the waters of Louisiana, which facts I promised in my communication in your Magazine of February, 1841. Dr. Cartwright informs me, under date of September 24., that "Bayou Terre Bonne, in the parish of Terre Bonne, having been declared a navigable bayou, or natural canal (stream it is not, for it has no current, and is not fed by springs or rivulets), and its surface being thickly set with the plant, which gave it the appearance of a meadow covered with a tall flowering weed, and obstructed the navigation very much, it was cleared of it. The banks of the bayou are now, and have been thickly inhabited for seventy years, with the constant enjoyment of health, until the destruction of the jussieua three years since, when bilious diseases made their appearance, while those on the banks of the two Bayous Caillon (Grand and Petit), Bayous Black and Blue, and some others, on whose waters the plant still remains, continue exempt from them. The waters in those bayous are stagnant, but pure and sweet. The plant feeds on the aqueous impurities. It has no attachment to the soil, but floats on the surface of the water, and only become stationary when it becomes too thick and crowded to float. Put into any stagnant pool of water, it soon purifies it. I have not met with it above the 30th degree of latitude in this country, but I saw it growing in one of the aquariums in the botanic garden of Oxford: when I asked the botanist who accompanied me in the garden why the water was so much clearer and sweeter than in the other aquariums, he assured me he could not tell, and added, that all the aquariums were supplied with water from the same source."—*J. M. Philadelphia, Oct.* 15. 1841.

Large American Red Oak.—A correspondent in the *Natchitoches* (Louisiana)

Herald says it can be seen on the plantation of Wm. Smith, Esq., eighteen miles from Natchitoches, on the road leading to Opelousas. This majestic oak stands in the midst of a rich and heavy bottom, on the Bayou St. Barb. At 2 ft. from the ground, it measures 44 ft. in circumference; and at 6 ft., 32 ft. The trunk appears sound and healthy, and its height to the branches is from 50 ft. to 60 ft.—*J. M. Philadelphia, Oct.* 15. 1841.

Maclùra aurantìaca Apple.— In my notice of this production (*Gard. Mag.*, vol. vii. p. 508.), I stated, on good authority, that of the representative in congress from Arkansaw, that it was not eaten there, but I have since been told that in Texas it is eaten, at least by the Indians; their taste, however, is not very refined. I will enquire further on this point. In the page quoted above the beauty of the wood is mentioned, and this I can testify to from what I have lately seen in Philadelphia. The original trees brought by Lewis and Clarke were planted in the garden of the late Mr. M'Mahon, near Philadelphia; and either from one of them, or one of their successors, a limb was cut off and sawed into veneers by the present occupant, from which a small table was made. The wood is of a bright lemon colour, and has a fine grain. I can send you a specimen to Liverpool, in the form of a tea-caddy, if you will point out the person to whom I can consign it. A vessel direct to London is a rare occurrence in this city. To this day, the navigation has not been obstructed by ice. I send this letter by Liverpool, because I learn that the postage is reduced to a mere trifle in England.—*Idem.*

Art. III. *Domestic Notices.*

ENGLAND.

Royal Botanic Garden, Kew.—We are happy to learn that our friend Mr. Smith, for many years foreman of the Kew Botanic Garden, in consequence of a memorial submitted by him in October last to the Commissioners of Woods and Forests, praying to be allowed to assume the title of Curator, has been authorised to do so. His salary is 130*l.* a year, with house, coal, &c., commencing from the 31st of December last.—*Cond.*

A Botanic Garden in the Isle of Wight has been projected for several years, and ample plans and prospectuses are now in circulation, and may be had of Mr. Brooks, Old Bond Street, London.—*Cond.*

Singular Instance of Vegetation.— On the 20th of September, 1813, a grave was opened in Tockholes churchyard, from which a coffin was taken up which had been buried twenty-two years. The coffin was opened, and in it were discovered some sprigs of box, which appeared quite fresh. One of these was planted in a garden belonging to Peter Catteral, Tockholes, and it now forms a tree about 3 yards in circumference, after yielding successive supplies of sprigs for the decoration of other corpses. (*Newsp.*)

IRELAND.

Designs for Cottages and Suburban Villas. — I can send you a complete set of the plans, sections, &c., of Ballyfin House, the seat of Sir Charles Coote, Bart., designed by Sir Richard Morrison, who, in point of taste, has been accounted the first architect in this country. There is a very beautiful villa near this, some time since erected, viz. Clontarf Castle, the seat of Mr. Vernon, with a very good gateway, in the same style as that of the Norman baron's castle. I am not sure who was the architect, but I think Morrison's son since dead was. The builders, however, were Gilbert Cockburn and Sons, 165. Great Brunswick Street, Dublin. There is also a very odd, but a very costly and rather imposing, villa further towards Howth, St. Ann's, the seat of Benjamin Lee Guinness, Esq., who is very fond of architecture, &c., and would, I think, readily accede to an application for plans on your part. There are some good new things at the south side of Dublin, on Lords Longford and De Vesci's estates, designed by a young man just getting into practice as an architect, G. Mulvany, Esq., jun.—*N. Near Dublin, Feb.* 17. 1842.

Art. IV. *Retrospective Criticism.*

Mr. Niven's Stove for various Purposes. — I am sorry that Mr. Niven has declined answering "Catius" concerning his "Stove for various Purposes." Mr. Niven declines on the plea of "Catius" not having given his real name and address. Now, what's in a name? I should have thought that Mr. Niven would have been glad of the opportunity of defending his stove and its arrangements. For my part, I think that Mr. Niven was rather premature in giving us the glowing description that he has done of his stove. Had he waited a little longer, we would have had something at least a little more practicable.

Mr. Niven says that the house had only been a few months at work when his account of it was written. Now, Sir, is it at all likely, that the experience of a few months only was sufficient to enable him to judge of the working of a house filled with the plants Mr. Niven describes? We shall see!

Well, then, to begin with the musas. They occupy recesses in the back wall, the depth of which are, I suppose, 16 in. or so; this will give a little room; be it so. A full-grown plant of Mùs*a* Cavendíshä will cover a space with its leaves, the diameter of which will be 9 ft.; therefore the row of musas along the back of Mr. Niven's stove will shade the two back rows of pines in the pit. The musas were young when Mr. Niven wrote about them, but what are they now? The plant has beautiful foliage, certainly; but it takes up too much room to be grôwn in a pine-house.

The granadilla comes next, and is a very desirable plant, certainly, provided you have room for it. Mr. Niven will find this rather scarce if his musas have grown well.

The guava is next in order, and, to grow both guavas and musas well, a difference of from 20° to 30° of Fah. is necessary

The next in Mr. Niven's assemblage is the pine-apple, in growing which Mr. Niven thinks he has found a panacea for all the ills attending the "old burning system." What makes it a burning system? It is not so when properly managed. Indeed, with all Mr. Niven's additional expense of chambering, piping, &c., he has to use 2 ft. of half-decayed leaves, and they are not got for nothing; when they are rotted down, they must be taken out and replaced again with more half-decayed leaves. Now, with the "old burning system" 3 ft. of tan are enough, and 18 in. of fresh tan are sufficient to be put in at one time, turning it into the bottom, and bringing up the half-decayed to the surface to plunge in; by so doing, I am never troubled with any of the burning effects of tan. Mr. Niven here treats us to something new, or, rather, he gives us an old friend with a new face. Mr. Niven's pine plants were chiefly queens, and "were, of necessity, started at only two years of age; which plants, notwithstanding their *youth*" — here we may stop. Who was Mr. Niven writing for when he penned the above about the queen pine? If it was for the gardeners of the present day, he has certainly drawn largely on their gullibility. I should like much to know what Mr. Niven considers a fair age for queen plants to be started at, if 24 months be a youthful age. From 6 months to 12 and 16, is ample time to grow the queen plant; and I would take a well grown 15 months old plant against Mr. Niven's 24 months, and beat it too. We hear nothing of the weight of the fruit grown in Mr. Niven's stove.

The curvilinear metal roof is considered essentially important by Mr. Niven towards the proper maturation and flowering of the pine-apple in Ireland. Now if it had not been proved over and over again, that pines, both large and highly flavoured, have been grown in common houses and pits built of wood, there might be some reason for this; in the present case there is none whatever. It seems that Mr. Niven has advised the growing of black Jamaicas instead of queens in future. I suppose the queens were not very large, owing to their youth.

Then come the cucumber and melon; and here Mr. Niven comes out, and no mistake. "In the course of six weeks after the seeds were sown, cucum-

bers were cut, cultivated in this way, from 18 in. to 2 ft. in length; and a constant supply, &c." If Mr. Niven is behind the pine-growers of the day, he has, at least, precedence of the cucumber-growers. What a pity that some of the recent writers on the cucumber had not been able to give a case or two like Mr. Niven's, it would have made their works sell, surely! Mr. Niven does not say at what time of the year the seeds were sown. Will he have the goodness to state at what time he could cut by sowing on the 1st of November, December, January, and February, respectively? We shall then see the value of the plan. Then, "A summer crop of melons may also be obtained with *equal ease* in the same way." Did Mr. Niven ever try it? I trow not; or he would not have said it was easy of accomplishment. In speaking of the musas, I have shown that their leaves will over-reach the space allotted to them in Mr. Niven's plan, so that, in fact, there is no room to grow cucumbers or melons.

With regard to Mr. Niven's pipe-heated vine border, I may just state that I agree in all that "Catius" has said on the subject: a dry arid air under a vine border is ridiculous.

The forcing of strawberries then follows. If Mr. Niven has a pit to set the fruit in before he brings them into the stove he may succeed, if not, he will fail.

For forcing shrubs, the front and back kerbs of the pine-pit are set apart. A few may be set on the front kerb; there is no room on the back.—*W. Hutchinson. February* 9. 1842.

The Difference in apparent Magnitude between the Rising and Setting Sun.—In p. 100. it is said that, "The sun when rising and setting appears larger, because it can be compared with the smaller terrestrial objects." I conceive that it appears larger when setting, from the diminished light that it emits, compared to what it does when it is more vertical; just as the embers of any consuming substance appear larger and deeper coloured after the flame that was emitted from it has become extinct, &c. May not the sun, when at its height, be compared with the aerial objects, as birds, clouds, &c., of small dimensions, as well as when it is setting?—*T. Torbron. Feb.* 12. 1842.

The Banana or Plantain. (p. 42.)—Amongst the various communications tending to promote that grand object which we all have at heart, none seem better calculated for effecting it than the publishing of accounts of visits to gardens, when such accounts are given in a correct form; since by means of such communications proprietors of similar situations and their gardeners are often reminded of what fruits, flowers, or vegetables they might have, but do not possess. In p. 42. is such a communication taken from the *Ayr Observer*, the greater part of which is good, but it contains a few blemishes which, I think, you, in your editorial capacity, might with propriety have corrected; and first, as to the banana or plantain (Mùs*a* paradisìaca). The plantain only is meant; as the banana is the Mùs*a* sapiéntum, which grows to the height of 40 ft., and has the merit of producing a much finer-flavoured, although not more useful, fruit. Both the M. paradisìaca and the M. sapiéntum, as well as the M. Cavendísh*ii*, as described a little further on, form a beautiful curve with their flower spikes; and their spikes hang down, not by the weight of the fruit, but by their own natural propensity, as will appear evident to every one, when it is known that the spikes tend quite as much to a downward direction before the fruit is formed, or the first flower has opened, as after the fruit is mature. What are called two-rowed branches of fruit are in the West Indies called hands, from their finger-like appearance.

The Cárica *Papàya* is one of those plants that I feel much interest in. In the present communication the writer, I think, must be wrong in supposing that there are two species at Williamsfield, as we have raised both kinds from the fruit of the female plant, that is, the one which bears at the axil of the leaf upon short axillary peduncles; and also from the fruit of the male plant, that is, the plant which at the axil of the leaf produces a panicle of male flowers on a footstalk of from 4 in. to 7 and 8 inches long, with occasionally a female

flower at the extremity. I do not leave to chance the impregnating of such flowers, but carefully impregnate both kind of females. Should Mrs. Fairlie have no other Passiflòra but edùlis, I would recommend the P. *l*aurifòlia (water lime), and the P. quadrangulàris (granadilla), both of which we grow for their fruit. They, however, will require a little more attention when in flower, as they do not set their fruit well unless artificially fecundated. As we have to perform the operation with many plants in the season, I generally devote from 11 to 12 o'clock; not that that time is better than every other, but finding that, when a certain portion of time is set apart for doing any business, the chances of its being well performed are greater than when the order to do so is only given.—*G. M. Elliot. Ripley Castle, Ripley, Yorkshire, Jan.* 25. 1842.

Standard Pear Trees suitable for the Climate of Inverness.—Although I may not build immediately, yet I must not delay planting and getting rid of a lot of bad apple trees grown in any shape that nature ordered, which I intend replacing by pears. You would oblige me much by giving me a list say fifteen, of the best standard pears which you know, from the earliest to the latest keeping sorts, which you think ought to answer in the latitude of Inverness, where we regularly grow and ripen excellent peaches and nectarines on the wall, even in unfavourable seasons. In this country good pears are all but unknown, while apples are run upon till they have become a perfect drug, and few gardens have two pear trees for every twenty apple trees. I have got Citron des Carmes, wall; Crawford or Lammas, and Camack, standards; Beurré d'Aremberg, Beurré Diel, Beurré Rance, Beurré de Pâques, Napoleon, Marie Louise, Hazel, Hacon's Incomparable, and Jargonelle, wall: but I want fifteen to twenty others for the garden as standards, and having no dictionary to direct me, but your *Encyclopædia*, edition of 1828, which is now a little aged perhaps in the pear department, I am induced to trespass on your kindness, the first leisure hour you can spare, for a list of such standard pears as you would advise my planting. Of course, quantity of produce, as well as quality of fruit, will be considered.—*D. M. Jan.* 25. 1842.

The sorts recommended are: Williams's Bon Chrétien, Dunmore, Aston Town, Fondante d'Automne, Seckle, Louise Bonne (of Jersey), Beurré Bosc, Althorp Crassane, Van Mons Léon le Clerc, Thompson's Winter Crassane (Knight's), Glout Morceau, Passe-Colmar, Nelis d'Hiver, Knight's Monarch, Ne Plus Meuris. If more than fifteen plants are wanted, we recommend the remainder to be of the Glout Morceau.—*Cond.*

Art. V. *Queries and Answers.*

Increasing the Flavour of Fruit by alternate Heat and Cold.—Are you aware that the flavour of fruits can be much improved by exposing them to considerable heat, and suddenly cooling them; of course I do not mean such a heat as could injure their texture. The effect is most remarkable in wines: for experiment, bring a bottle of Madeira from the cellar in the morning and expose it to the sun or warm atmosphere, carrying it back again into the cellar for a sufficient length of time to cool before drinking; the wine will be so improved in flavour as hardly to be recognised for the same.—*C. P. F. H. April* 16. 1840.

We have long been aware of this mode of improving the flavour of Madeira, and we know of some instances in which there is a bin in the pine stove and another in the outer ice-house for the purpose, the key of each being kept by the butler: but we do not see what this has to do with improving the flavour of fruits, such as the peach or the pine-apple.—*Cond.*

THE

GARDENER'S MAGAZINE,

APRIL, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the Conductor.

(*Continued from* p. 150.)

From Glasgow to Uddingstone the road is broad, firm, and smooth, accompanied by an excellent footpath; the fences are in good repair, the hedges well trained, the stone walls substantial, and frequently of ashlar-work. The crops of wheat, potatoes, and oats, and clover and rye-grass, are most luxuriant, without the appearance of a single weed, except in the margins of the fences, where they are not unfrequent, and at present coming into flower. This is a crying sin throughout Scotland. With the finest crops in the interior of the field that could possibly be wished, the vilest weeds, such as docks and thistles, are found flowering and running to seed in the hedgerow margins. We cannot make an exception in favour of any part of the country between Stirling and Kinross on the north, and Berwick-upon-Tweed on the south. It seems difficult to reconcile this slovenly conduct with reference to the margins and the road sides, with the care and culture exhibited in the interior of the fields; but we suppose it arises from this, that the benefit from keeping the crops clean is direct, while that from cutting down the weeds in the margins, being the prevention of their dissemination, is comparatively remote. We were particularly struck with the luxuriance of the weeds by the road sides in the neighbourhood of Paisley, and between that town and Glasgow; but we were soon able to account for it from the personal habits of the mass of the population, which are the very reverse of delicacy or cleanliness. There ought certainly to be some general law, as there is in some parts of Belgium and Germany, that all weeds whatever ought to be cut down before they come into flower, and that when this is not done by the occupant of

the land on which they grow, it ought to be effected by a district officer, whose business it should be to attend to this and other public nuisances, at the occupier's expense. In some parts of the Continent parochial rewards are given for the unexpanded flower-buds of weeds, for the cocoons of insects, and for the young of different sorts of vermin; but we are not yet arrived at this degree of agricultural nicety.

We cannot help remarking that in the midst of fields covered with the most luxuriant crops, the rows of cottages by the road side had the most miserable appearance. No variety in their form, magnitude, or materials; no difference in the size of their windows, or in their chimney tops; no porch; no front garden; no creepers or climbers on the walls; no flowers to be seen anywhere; and few or no windows, except those on the ground floor, to give the idea of a bed-room floor. The same line of dull stone side wall, and of slate, stone, or thatched roof; the walls with small windows, the broken panes of glass in which are often stuffed with rags; occur at intervals all along the road, forming a notable contrast with the wealth displayed in the villas, the farm-houses, the fields, and even the fences and roads. The agricultural labourers' cottages, in short, seem the only part of the general scenery in Scotland that has undergone little or no improvement. We know scarcely any difference in their appearance now from what it was forty years ago, when we first passed through this part of the country. The farm-houses and fences, on the other hand, have been almost everywhere entirely rebuilt since that time. We saw only one attempt at an ornamental cottage between Glasgow and Uddingstone, and that was at a turnpike-gate. Every attempt at improvement deserves to be encouraged, and the only fault that we shall find in the present case is, that the side walls of this cottage were much too low. There is an idea prevalent among architects, more especially in Scotland, that the dwellings of the poor must exhibit an appearance of poverty and humility, however much they may be ornamented; and hence the low side walls and the narrow dimensions of gate lodges and other ornamental cottages built on gentlemen's estates, which, however, are ornamented exteriorly to an extent most ridiculous, when compared with the low ceilings and scanty accommodation within; as if a poor man did not require as large a volume of air to breathe in as a rich one. This is, no doubt, in part owing to the want of thought in architects, but it is, we are persuaded, in part also to the sycophant properties inherent in our countrymen, and to their want of moral courage (see p. 135.). In an agricultural country like Scotland, where a great many feudal prejudices still exist, a man who has risen by his professional merits so as to be admitted to the tables of the aristocracy, is ashamed to urge anything that would remind his

employers of his own low origin, and thus bring into view the immense gulf, like that between Dives and Lazarus, that exists between them. In a country where commerce prevails over agriculture this is not the case; and hence we find that it is not in the Lothians, Berwickshire, or in Northumberland, where the cottage of the labourer has been improved, but in Lancashire and other parts of England, and in those spots in Scotland, such as New Lanark, Deanston, Catrine, &c., where manufactories have been established. Nothing can exhibit a more lamentable picture of society than Berwickshire and Northumberland, where the proprietors and the farmers live in houses that may be called palaces, and enjoy all the comforts and many of the luxuries of life, while the farm labourers are worse lodged than the horses, cows, and pigs. This is no exaggerated view. We refer to Dr. Gilly's pamphlet (p. 31.), and to the excellent work of Mr. Donaldson, reviewed in a future page.

Uddingstone is associated in our minds with Mr. Wilkie, a celebrated manufacturer of agricultural implements, whose communications will be found in some of our earlier volumes. He and his family, we were informed, have passed away; but we were introduced to a lady of the same name, Mrs. Wilkie of Knowtop, who possesses a very handsome villa and grounds, and is remarkably fond of her garden. The kitchen and flower gardens were admirably cultivated, and displayed a profusion of appropriate productions. The Californian annuals were in the greatest abundance and beauty; and the roses, and pelargoniums, fuchsias, petunias, calceolarias, and many other articles of the kind, were in great beauty. In the shrubbery we noticed fine specimens of the snake-barked maple, *S*ambùcus racemòsa, and *E*uónymus latifòlius. The thorn hedges were remarkably nicely cut and kept, and the whole place was in high order and keeping.

Bothwell Castle is known as one of the best kept large places in Scotland; and, what adds to the merit of the noble proprietor, he has no particular taste for gardening, and has the place equally well kept when he is absent as when he is resident. The ruins of the ancient castle and the modern house are both situated on the summit of a very high and steep bank, varied by old wood, which slopes precipitously to the Clyde; and the walks down to and along the river are numerous, and, as may be supposed, singularly grand and picturesque. We went over the whole of them in 1804 and 1806, but we could not, on this visit, undergo that fatigue. We were gratified to find, as far as we did go over them, that the style of keeping was exactly what we recommend: edgings not much higher than the gravel, and the grass clipped, but never cut. Where the edgings had got high, we found them being undermined by the spade, so as

to reduce them to the proper height. Some dry ground among old shrubs was also being turfed over, a practice which we have had frequent occasion to recommend as a great saving of labour in keeping, and as much more consistent with the age of the shrubs, to which digging is labour in vain, and consequently a dead loss.

In the flower-garden there is a greenhouse, containing an excellent collection of admirably grown heaths; Mr. Turnbull, the very intelligent gardener, being, in the culture of that genus, second only to Mr. M'Nab of Edinburgh. Mr. Turnbull is said to grow his heaths chiefly in peat, mixed with a little loam and leaf mould; so, at least, we were told some days afterwards.

In and about the kitchen-garden there are some borders of flowers of the choicest kinds, and in the very highest degree of culture and keeping. Those that require tying were supported by props, in a manner sufficient without being conspicuous, and all the plants were in distinct tufts, round in the plan and conical in the elevation; the alpines often on cones of pebbles, about 5 in. at the base and 3 in. high. Many florist's flowers, such as calceolarias, lobelias, gladiolus, &c., were particularly rich and beautiful; and there were a great many choice herbaceous plants and alpines, besides a general collection of herbaceous plants in a different part of the garden. Penstèmon Murray*ànus* was 10 ft. high. In the stove were some fine specimens, particularly of *N*epénthes,. Mr. Turnbull is very successful in propagating *S*tátice arbòrea, we suppose in Mr. Cunningham's manner, by cutting the stems above the joints, to stimulate them to throw out shoots, to be taken off as cuttings (see *Sub. Hort.* p. 270.). There was but a poor crop of fruit on the walls and espaliers, which we attributed to the borders in both cases being cropped, and to the want of protection for the blossoms in spring. Gentlemen in Scotland have no idea of the care and expense taken and incurred in England to protect the blossoms of wall fruit trees. If they have laid out a kitchen-garden and built the walls, they think it quite enough, just as a planter of forest trees thinks the work is finished when he has filled the ground with so many thousand plants per acre. By not cropping the borders, by thatching peach borders occasionally in rainy autumns to prevent the rain from penetrating them, thereby checking the growth and ripening the wood, and by careful covering with canvass during the blossoming season, crops of wall fruit might be rendered nearly as certain and as abundant as crops of gooseberries. But very few country gentlemen in Scotland would go to the necessary expense.

There is an excellent gardener's cottage, in the Gothic style, recently built here, with cast-iron hooded chimney-pots, to prevent the smoke from being blown down the chimney; the situ-

ation being surrounded by high trees. We were informed that the plan was successful. We left Bothwell Castle deeply impressed with the grandeur of the scenery and the noble river, and full of respect and esteem for the moral worth and professional skill of Mr. Turnbull.

(*To be continued.*)

Art. II. *The Principles of Gardening physiologically considered.* By G. Regel, Gardener in the Royal Botanic Garden at Berlin.

(Translated from the *Garten Zeitung.*)

(*Continued from* p. 160.)

I. On the Propagation of Plants — *continued.*

2. Means of accelerating the formation of roots.

It has been shown above that the formation of roots is intimately connected with the assimilation of the nourishing matter; to hasten the rooting, therefore, we must apply some means of forwarding the process of assimilation.

This consists, as is the case with seeds, in a moderately warm state of the ground: the time must also be chosen in which the same process is going forward in the parent plant. Of some plants particularly difficult to root, such as Scótt*ia*, Dracophýllum, Cosmèlia, some species of *E*rìca, &c., it is necessary to take as strong compact-growing cuttings as possible; and, as soon as circumstances permit, the plants intended for propagating should be planted out in an open bed in the house. Those plants which can be propagated successfully late in the summer, such as heaths, may be planted out quite in the open air in summer; from which this advantage is to be expected, that, by their naturally much stronger growth, much more nourishing matter will have been deposited by the end of the season.

For cuttings of all the difficult-rooting greenhouse plants, the best heat for the ground is from 10° to 12° R.; for those of hothouse plants from 12° to 16°, which should be as regular as possible. This, which is often neglected, is of great moment to insure the success of the cuttings; for, if they are kept at a cooler temperature, the greater part of them form a callosity, but, for want of the necessary heat to assimilate the deposited nourishing matter, no roots are formed. The callosity continues in many species to grow (such as *Q*uércus, Hàke*a*, and Pròte*a*), and often becomes of so considerable a size, that it not only covers the face of the cut with a thick layer, but also penetrates between the wood and the bark. When this is the case,

and the callus is not cut away, no roots are made, and the cutting often remains several years without dying.

In the use of beds heated by manure great circumspection is necessary; for the cuttings should neither be exposed to the exhalations arising from it, nor immediately stuck in warm sand or charcoal ashes (tan and sawdust, on account of the insects lodging in them, are not so desirable). About eight days should, therefore, elapse before any thing is put in the bed; and by turning over the sand, &c., the noxious vapour will be diminished: the pots are then to be placed at first only on the bed, and not plunged till the heat is diminished. As soon as the bed has cooled, another must be made; for, when this is neglected, not only those which have formed a callus make no roots, but many that had formed roots, by the excitement of the heat, become sickly. Plants that root easily thrive best in a bed moderately warmed with leaves, on which, instead of the sand and charcoal ashes, earth is placed, and the cuttings set in it. Treated in this manner they display much greater activity than when stuck in pots, so that, in the course of a few weeks, shading and excluding the air are less necessary. To reap the same advantage with plants that are more difficult to root, boxes 1½ ft. wide, and from 8 in. to 1 ft. high, are used. These must have holes at the bottom to drain off the water, the bottom covered with sherds, and only so far filled with earth as to leave room for the boxes to be covered with glass without the cuttings being pressed down by it. When the bed becomes cool, they can easily be removed into a fresh one; and in this way many of the most difficult-rooting tropical plants, such as Dillèni*a* speciòsa, Coccóloba pubéscens, C. macrophýlla, the species of Ixòr*a* and Banistèr*ia*, &c., grow well. Propagating houses, with beds made on purpose for heating, are always the most serviceable. When one of these beds is made, the trouble of always forming new ones is obviated; the cuttings, which can have an equal warmth of soil constantly maintained, are not exposed to the noxious vapours of the dung; and the greatest use of such a bed is, that the cultivator is not bound to any one particular season, as any time of the year will serve for propagating. In constructing a house for this purpose, which should only be covered with glass at the top, particular care should be taken that the heat should be equally directed over every part of the bed, and increased or diminished by means of valves; and the sand and charcoal ashes always kept damp, so as to preserve a sufficient moisture in the house from the vapour arising from it. For heating, the most suitable method is by water, as that sort of warmth is more suitable and beneficial to the plants. Heating by pipes, with particular precautions for the equal distribution of the heat, which we leave to the judgment of our readers, is also suitable;

but in this case the depth of the sand and charcoal ashes over the bed must be much greater than in heating by water, that the dry heat may not penetrate to the cuttings. The beds must be as near as possible to the lights; and some shelves may be placed at the back wall of the house, for the cuttings planted out.

(*To be continued.*)

Art. III. *On the Cemeteries of Edinburgh and Leith.* By —— Brown, Esq.

Edinburgh and Leith, with a population of one hundred and seventy thousand souls, contain ten cemeteries or burying-places, of which number Leith counts one fifth. These are in constant requisition, except one, which is not yet opened; and all of them exhibit visible tokens of the march of improvement having extended itself even to the sepulchres of the dead. This is evinced in the neatness of the cut grass, the trim state of the walks, the orderly and scientific arrangement of the shrubs and evergreens, and, above all, in the studied and uniform good taste of the superintendants in preventing any scattered bones of the deceased from being seen about the grave when an interment takes place; so that delicacy of feeling is unwounded, and even in sorrow and sadness for departed worth a pleasurable sensation is irresistible.

The West Church, or St. Cuthbert's parish, Burying-Ground, has lately assumed a more dressed and agreeable appearance. An increasingly beautiful row of trees on each side of the principal walks, and the newly taken in grounds well laid out, bespeak the determination of the overseer not to lag behind.

The Grey Friars, also, has even outstripped the West Church. A new recorder's office, a splendid and massive iron gate in room of the old wooden one, the walks much widened and the larger of them causewayed, the sprightly trees and shrubs, and the clean and orderly appearance of the workmen, mark a vast change for the better. These things prove that the overseer, Mr. H. P. Thomson, vies with his fellows; and we may add that, by his exertion and industry, he has rendered this receptacle of the tombs of many generations worthy not only of a passing glance from the stranger, but a place of resort to note the past history of the nation; for perhaps in no one point of Scotland are concentrated so many remains of the noble dead who stood forth in defence of their country's rights as in this burying-ground. An erect tablet stands at the north-east corner, which the overseer has handsomely encircled with a flower-plot, to signify the spot where the bodies of eighteen thousand lie who suffered death, in the reign of the two Charleses, for adhering to the Presbyterian faith and liberty of conscience. To this

memorial, and to many others equally interesting, there is now a mournful pleasure in paying a solemn contemplative visit.

Neither of these two burying-grounds already referred to, however, come up to the New Calton Burying-Ground. Here the superior order and system in all the arrangements evince the able and judicious management of Mr. Hay. The situation is most excellent, being on a gentle declivity on the south-east side of the Calton Hill, and the raised terraces at the west end of it give a most imposing appearance to the whole. The soil is chiefly marl, and, from its declivity, it is freed from that abundance of moisture so frequent in level places. To all these natural advantages, scientific skill and good taste have contributed much to heighten the beauty of the place. The walks are neatly formed of gravel, tastefully edged with grass, kept smooth and firm by rolling, and frequently mown to keep it short. A circular-built watch-house, commanding a full view of the whole cemetery, which at night is lighted with gas, and the many ornamental tombstones, with the nicely planted roots and flowers showing the affectionate regards of surviving friends, fill the visitor with a pleasing and tender melancholy.

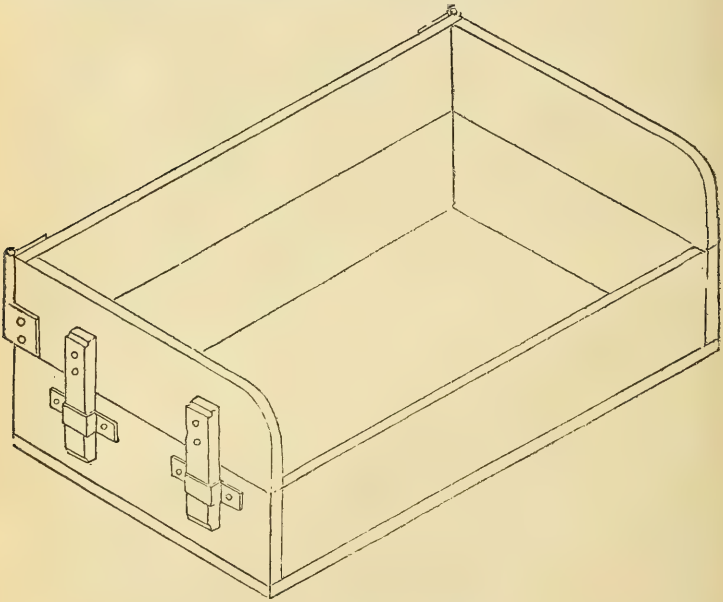

Fig. 16. *Lamb's Receiving-Box.*

But one of the many novel and wise arrangements to spare time, save trouble, and to preserve the cleanliness of the grounds, in this and in most of the burying-grounds mentioned, is, in the use of a large wooden box (*fig.* 16.), 7 ft. long, 4 ft. broad, and

32 in. deep, in which is deposited the mould or earth when cast out of the grave. The sides of this box are removable at pleasure; and the box, before receiving the earth from the grave, is raised up in a sloping position to the margin and alongside the grave, so that when the coffin or chest is lowered the grave-diggers have little else to do than loosen and take out the one side of the box, when the earth immediately runs out; and the whole of the earth being returned, then, with broom in hand, the workmen proceed to fit on the turf, and after the space of a few minutes not a particle of earth is to be seen, but everything left almost as neat as if the ground had not been disturbed.

The fees are most moderate. A man may be buried, all expenses included, for 8*s.* 6*d.*, and a child for 5*s.* At the same time there are different degrees of style in performing funerals, varying in expense from 4*s.* (the expense of burying a still-born child) to 5*l.* 17*s.* 6*d.* (the expense of a hearse, with five mourning-coaches, and all the customary paraphernalia).

It may be remarked that there is also the Old Calton Burying-Ground, as well as the new; and that both are under one system of management. The Calton Incorporation, which is a society united for the attainment of one of the most laudable objects that can engage civilised man, to provide for the widow and the orphan. The old burying-ground was much cut up by the opening of the new London road in March, 1819, and the site of the new cemetery was planned to supply the deficiency, which it has admirably done: and, besides, it has given a stimulus to church-yard improvement; for, although this Incorporation under their manager was not the first to use the box above described, yet they were the first in Edinburgh who used it; and Mr. Hay, the present manager, has the honour of having introduced it from Leith.

This receiving-box, as it may be called, is the invention of Mr. Lamb, wright and undertaker, in Leith. Mr. Lamb, about fifteen years ago, made two boxes smaller than that described, which were used in South Leith Burying-Ground, under the late Mr. Dick, with the happiest results. One of these small boxes was placed at each side of the grave; but this was found inconvenient, by keeping the mourners at too great a distance. The double boxes, therefore, soon gave way to the larger single box, above described, and the small ones are never used unless in confined places of the burying-ground, or when a greater depth is required than ordinary. Mr. Lamb has since made pattern boxes for Glasgow, East Linton, and some other places; and, without claiming any monopoly for the invention, he most honourably charges the current price of making similar boxes of the size for any other purpose. Mr. Hay took the hint from Mr. Lamb's boxes, and has acted upon it for many

years past; and, now that the utility of the invention is so demonstrable, other overseers are gradually following in the rear. Yet there are many country church-yards where such a thing is altogether unknown; and my object in sending you this account is, to make the boxes known to gardeners, who, if they approve of them, will, I have no doubt, recommend them to the attention of the clergyman of the church which they attend.

Edinburgh, Oct. 29. 1841.

Art. IV. *On destroying Vermin in small Gardens, and on relative Matters.* By Charles Waterton, Esq.

[The following letter was written in 1839, with no intention of its appearing in print, in answer to some questions of ours respecting the use of weasels, hedgehogs, birds, cats, &c., in gardens. The questions were suggested by some papers in Mr. Waterton's *Essays on Natural History* then just published, in which the value of weasels and other animals in destroying insects and vermin were pointed out by the author. Almost immediately after Mr. Waterton's letter was written, that gentleman went abroad, and we had not an opportunity of asking his permission to publish it till his return last autumn. We hope our readers will be as much pleased with it as we are.]

You say, "you will send to a gardener in the country for a weasel." You must send for two, male and female. A bachelor weasel, or a spinster weasel, would not tarry four and twenty hours in your garden. Either of them would go a sweethearting, and would not return.

You remark that your "hedgehogs soon disappeared." No doubt: unless confined by a wall, they would wander far away, and try to get back to their old haunts. You request me "to suggest some place of shelter for them, to which they might have recourse when attacked by the cats?" I cannot believe that hedgehogs are ever attacked by cats. A garden, well fenced by a wall high enough to keep dogs out, is a capital place for hedgehogs. But there ought always to be two, man and wife.

Your "frogs and toads disappeared in a very short time, notwithstanding a small cistern of water which was open to them." They would have preferred a pond or ditch. No doubt they left you in search of more agreeable situations.

"Were it not for the cats we should have plenty of birds." Granted. Cats amongst birds are like the devil amongst us; they go up and down seeking whom they may devour. You

must absolutely chase them away for good and all, otherwise there will be no peace for your birds. A small quantity of arsenic, about as much as the point of your penknife will contain, rubbed into a bit of meat either cooked or raw, will do their business effectually.

"I have often thought of suggesting to the Board of Woods and Forests the idea of feeding the birds, or rather of putting down the different kinds of food proper for the different kinds of of singing-birds, in Kensington Gardens." This would not be necessary. All our soft-billed summer birds of passage, and those soft-billed birds that remain with us the year throughout, live on insects; and insects abound during the period when these birds are in song. But if you could prevail upon the board to prevent idle boys from chasing them, and gunners from killing them, and bird-merchants from catching them, all would be right; and almost every bush and tree would have its chorister.

"If you could give any hints as to the next best quadruped to the weasel for keeping in gardens, or, in fact, any thing relative to keeping down insects, it would be of very great use." — I know of no other quadruped. The barn owl is a great consumer of slugs; and the lapwing will clear a garden of worms. Our singing-birds are the best for destroying soft-winged insects. The windhover hawk is excellent for killing beetles, and also for consuming slugs and snails: cats dare not attack him, wherefore he is very fit for a garden, and is very easy to be obtained, I could send you a dozen any season.

Were I now a writer in the *Magazine of Natural History*, I would not agree with a Master Charles Coward in his paper on "The carnivorous Propensities of the Squirrel." (See the *Magazine* for 1839, p. 311.) And so this keen observer has found out at last, that squirrels in confinement are occasionally carnivorous animals. Indeed! And so are my hens in confinement: they will kill and swallow a mouse in the twinkling of an eye, and a tame parrot will perform the same feat. All our granivorous birds in confinement will eat raw and cooked meat. My black cat "Tom," which is fed and pampered by my sisters, will often turn up his nose at a piece of good roasted mutton, and immediately after will eat greedily of dry bread. What would you think of me were I to write for you a paper in which I would state that the cat is occasionally an animal that is very fond of bread? You cannot judge of the real habits of an animal when it is in captivity. The want of exercise, the change of economy, the change of food, and the change of habit altogether, tend wofully to change the very nature of the stomach, and cause it to accommodate itself to aliment which it would never touch in a wild state. We see people out of health eating chalk; and we see others again, who spend their lives in sedentary employments,

loathing food which is very palatable to him who passes the day in the open air. Thus, the ploughman will bolt fat bacon by the cubic inch, whilst the tender young milliner will turn sick at the very taste of it. I myself cannot bear melted butter; but I can and do often thrive, by preference, on a hard crust of bread. Still this would not be the case with one of your London aldermen, who would turn up his nose at the gifts of Ceres, unless those of Nimrod and Bacchus appeared on the same festive board.

The squirrel, in the state of liberty, lives on nuts and seeds, and on the tender bark of the lime tree, &c.; but rest assured that it never touches flesh, or kills birds, or sucks eggs. The shepherds of Wiltshire, who have backed Master Charles in his important discovery, deserve a birch rod. These rural sinners, both young and old, would swear that the moon was made of Jones's lucifers, if you would give them a quart of ale apiece. All my labourers believe that the heron thrusts its legs through the nest during incubation; and they will all tell you that the cuckoo becomes scabbed at the close of summer. "As scabbed as a cuckoo." This, by the way, comes from the mottled appearance which the plumage of the bird puts on at that time of the year. It is caused by the growth of the adult feathers amongst the chicken feathers. I pity the poor squirrels from my heart. Our country squires will now consign them over to the tender mercy of their gamekeepers, and we shall hear of squirrels shot by the dozen. The squirrel is a most harmless animal, except in a nut orchard, from which he ought be expelled without loss of time, as the damage which he does there is incalculable; but I would trust him for ever in a butcher's shop, provided he were allowed to go and take his breakfast and dinner in the neighbouring woods. I can see the squirrel here just now, living entirely on the seeds of the cones of the spruce firs; I can see him in the very trees which contain nests of ringdoves, thrushes, chaffinches, and blackbirds. Still the owners of these nests betray no fears on his approach; and he himself shows no inclination for raw eggs, young or old birds, whereon to make a meal.

Walton Hall, June 3. 1839.

Art. V. *The Landscape-Gardening of F. L. von Sckell of Munich* Translated from the German for the "Gardener's Magazine."

(*Continued from* p. 172.)

XIII. *On removing Earth in general.*

1. Removing earth, particularly the excavating of valleys, lakes, and ponds, rivers, brooks, &c., ought to precede all other ope-

rations; because, with the earth, gravel, or sand thus obtained, unsightly hollows may be filled up, hills raised, or roads made and conducted over them. Removing earth is one of the most important and expensive operations in laying out grounds, as every fault committed in doing so can only be remedied at great expense, and the neglect of every advantage, of which there are many that might be taken, but which, from want of experience, cannot be seized, greatly increases the expenditure; for example, 1st, when the earth is carried to a place where it is not to remain; 2d, when hills that have been raised, or rivers excavated, must be again changed; 3d, when carting, which is very expensive, is so arranged that the coming and going is interrupted; or, 4th, when the loading and unloading take place too slowly; 5th, when for two horses less than 20 cubic feet of earth is loaded, and at the same time circuitous routes taken; 6th, when any material is brought from a distance, that can be procured in the neighbourhood; 7th, when the workmen are so arranged that they hinder each other, or cause unnecessary labour; 8th, when in trenching, for want of overlooking, the soil is not dug to the proper depth, which very often happens in work undertaken by the piece, and from which great injury accrues to the plantations, &c.

On the Formation of Hills.

2. Hills may be reckoned among those bold forms of nature which break its uniformity, and communicate variety, effect, and distinction to its pictures. A well-formed hill is of great beauty, and particularly when it is bordering on a wood, or when the wood serves as a distant background to it. Hills belong also to the most imposing features of nature; we ascend them with so much pleasure to enjoy delightful views from their summits. Buildings erected on these eminences have a greater effect, and command a more extensive view and enjoyment of distant nature. Hills are of as much advantage as foregrounds, as they are for forming bold and agreeable backgrounds.

But the choice of the spots where hills are to be placed depends upon the nature of the country, in which also nature must be consulted, and her laws followed. It is not sufficient that these hills produce the desired effect in the landscapes to which they belong, nature must also justify their being placed where they are raised, and recognise them as her own work.

3. A hill raised in an extensive plain, and in a district where nature has formed no obvious eminence, would not have a chance of being taken for one of her works.

An appropriate passage from the first canto of the Abbé de Lille's poem, *Les Jardins*, will add weight to this remark: —

"Evitez ces excès. Vos soins infructueux
Vainement combatteroient un terrain montueux;
Et dans un sol égal, un humble monticule
Veut être pittoresque, et n'est que ridicule."

"Avoid such extremes. Your fruitless care will vainly attempt a mountain on a level surface, and an humble mound intended to be picturesque is only ridiculous."

When, however, a hill is to be raised on a plain for the sake of interrupting the uniformity, it should not be formed in the middle, but placed on one side; and it must be made to harmonise in height and extent with the plain, and be surrounded with other smaller hills at various distances, and of different heights and forms: by this means the fault just mentioned will be avoided. As we often observe in nature the highest mountains gradually diminishing in height and finally ending in low hills, before the mountainous character is thrown aside, and a transition takes place into an apparently level plain, thus the landscape-gardener, when he has created a hilly country, must not let it subside suddenly into a level plain, without showing here and there distant small eminences, which appear as if torn apart from their neighbours, and yet seem to belong to them.

4. Hills cannot be formed with the usual garden instruments, viz. shovels, spades, and hoes. * The cleverest artist would endeavour in vain to communicate to his hills the varied multiplicity of forms which nature impresses on hers, so as to be mistaken for real ones.

What useless labour would be expended in forming the declivity of a hill with tools, so that it should carry on its surface every slight concavity and gentle prominence which are multiplied to infinity, and which strip a mass of earth of this description of its heaviness and uniformity, communicating at the same time the lightness and multiplicity of forms observable in nature. It also happens, that, if a hill can be thus formed artificially to resemble nature with garden tools, this labour cannot be effected by the artist alone; he must necessarily employ common labourers in the work, who have usually not the least idea of the beauties of nature or of her forms. The gently undulating line is quite foreign to this sort of people; and if, notwithstanding this, they are employed to form hills with their tools, then only such forms will be produced as neither belong to nature nor art, as may easily be expected, and of which many English gardens give very obvious examples.

5. But for this construction there is a peculiar process, by which the landscape-gardener can produce hills in his grounds

* Some hills which were formed with tools, and were not successful, put me in the way of pursuing this better method.

which shall imitate nature so closely as to be mistaken for the reality, and it is effected in the following manner: —

There are hills in nature which stand isolated, without being united to any other, and which yet produce a very picturesque effect. Others again are united by nature to smaller hills, and, finally, there are hills forming long connected ridges, but which, considered individually with respect to their height and form, appear very different, because nature, as is well known, never repeats the same forms. On these various hills nature exhibits smaller hills, and on these small hills still smaller ones, with their intermediate valleys and hollows in countless variety.

As the chain of nature descends from large objects to those which are scarcely perceptible, in like manner are the various forms of hills presented to our view.

6. In staking out it has already been observed, that with hills no outline can be drawn with stakes, nor ought it to be so; because, in nature, the outline is never clearly defined, but passes over imperceptibly into other forms, and we cannot, therefore, perceive where the beginning or end of the hill is. Hence only the highest points of the hills should be indicated with posts, and no further outline be shown by stakes. As soon as the artist has determined on and arranged the essential forms, the height, and situation of his hills, by means of a landscape and elevations drawn on paper, and small models, and committed these to memory, then the earth may be raised round the poles. The workmen who are employed in raising these hills should receive no other directions but these, viz. to assist in unloading, and to separate the heaps laid down in such a manner as to prevent the returning carts from being upset, or hindered from approaching the spot. They should never undertake, therefore, to fill up or level the hollows between these heaps, nor to level the chance prominences which may appear. Workmen who have this propensity ought not to be employed in making these hills. With these irregularities, which appear at the same time as the hills, and soon vanish with the continued accumulation of earth, again to appear, the labourers should give themselves no concern; it is precisely these chance inequalities which cause artificial hills to be considered as natural ones. In forming these hills, or in raising and lowering certain places, no orders should be given them at a distance from the spot; therefore the mere common labourer, who knows nothing of the art of levelling and measuring, is usually the best to be employed in such operations.

7. The artist, who thus undertakes the formation of hills, should never be long absent from his work, as he can depend on no one but on his own creation, which should always be present to his mind's eye. At first, however, he must only make his hill a great mass of earth of a rough shapeless form; and then he

must judge from those points of view from which it will be seen to most advantage, whether this mass requires more height or more extent, in what particular places he must add more earth to develope its form more distinctly, and with more character, truth, and nature, &c. When all this is done, then those places which are either to be small elevations or concavities must be marked out with small sticks, by which the hill will acquire more variety of outline, ease, and lightness of form, and consequently more nature and grace. These small elevations, by the repeated accumulation of earth, will be formed into masses in the same manner as for hills. Hollows in places which appear to be too heavy and flat, are produced by removing at random, and without any regard to form, a part of the earth with spades and shovels, and then smoothing the surface of the hollow thus formed with a harrow or rake. All other smaller elevations, with their various indentions and hollows, which nature unceasingly and ever variously displays, will, by this method of raising hills, come of themselves as if by chance, and consequently quite naturally; neither the artist nor the workman has any other participation in their existence, but that they have not prevented nor impeded these appearances from being produced.

8. The last operation on those hills produced by the creative art of gardening consists in turning over the surface, either with a shallow ploughing when they are of great extent, or on a smaller scale with the spade, and then scattering about the earth by means of harrows or rakes in different directions. By this last operation the rough surface will be smoothed; all stiff forms, as well as the too apparent and sharp transitions, will thereby acquire more roundness and delicacy, they will become blended with each other in a natural and harmonious manner; and a beautiful object, a gently swelling hill resembling nature, which must in gardens take precedence of rude, angular, steep creations, notwithstanding their picturesque effect, is finally presented to the eye.*

On the Formation of Valleys.

9. Valleys may also be considered as among the most charming attributes of modern gardens. How inviting is the beautiful description of the Vale of Tempe in Thessaly, which was watered by the river Peneus, and planted with ever verdant trees, with which Apollo, as conqueror, was crowned!

* When a temple or a monument is to be erected on a hill that is to be raised artificially, the foundation walls must first be raised as high as the hill itself is to be raised. The hill must rest against these walls, and the temple itself must assume its visible form at the surface of the earth; otherwise the hill must be again taken down to secure a solid foundation.

How charming the gentle declivities appear when they slope downwards to a winding stream; how refreshing is the sight of the flowery turf which clothes the sides of the valley; how agreeably the silvery brook glides in innumerable windings in the hollow, and how gratefully every violet that adorns its banks bends to its invigorating power!

These lovely valleys are usually formed by excavations, which take place in the following manner: —

In marking out valleys, it is advisable to drive in posts for the various excavations of earth, so that the labourers may not dig out the earth at random, nor go too deep.

Digging out the earth is usually performed across the valley, by which means a continual section of the new concave line and also of the old one is presented to the artist during the operation, by which he ascertains, as the excavation proceeds, whether he is going too deep or too shallow, and whether his valley is assuming a beautiful as well as a natural form. With the earth gained from the middle of the valley the sides are raised, and deep excavation rendered unnecessary. A valley dug two feet deep in this manner, acquires a depth of about four feet in the middle.

In these excavations, the chance elevations and concavities, as in the case of forming hills, should not be levelled, because nature treats valleys as she does hills, and displays them under a variety of forms. Hence a valley excavated in a regular circular concave line would resemble no real natural valley; therefore the stakes which mark out the depth should be 40, 60, or 100 ft. apart, that the excavation of the intermediate spaces may be performed mostly by chance.

10. In forming valleys, there are also cases where they are not hollowed out; for example, when it is feared that the ground would be marshy, or that a harmonious whole would not be developed. In these cases, and spots of this description, the sides of the valley must be formed by carting and raising the earth, and the concave line thus preserved without excavations.

At the termination of the sides of this valley where it ends, the earth piled up in this way would be a deformity, and at the same time betray its artificial origin; but the bounding line of the valley may be changed outwards into a natural ridge or green, which will flow imperceptibly into the line of the grounds, or into any other beautiful natural form, or be concealed by planting; as nature usually displays herself on the upper sides of the banks, and surrounds them with a thicket or wood, from which the valley bursts forth and descends.

In the numerous grounds which I have had to superintend, I have much more frequently made use of this method of proceeding, and, I might almost say, with greater success than the former.

But either method depends more or less on the particular character of the situation and soil.

11. When an apparently or really flat surface occurs in grounds, this insipid lifeless form may be made to approach nearer to the picturesque by raising gentle eminences without either making actual valleys or hills, which will communicate life and grace to these dull flats. By these improvements and additions they will even acquire a degree of beauty, and be considered as an ornament to the grounds. Elevations of this description, when they are only raised 1, 2, or 3 feet, are often sufficient to break a monotonous flat, and to communicate to it that variety which confers so much grace and pleasure.

12. Besides these new forms created by art, the old ones must either be made use of, transformed or improved when necessary, and then applied as features, or be entirely removed: for example, sloping banks that have once been beautiful, but which have been transformed into unsightly, steep, and even dangerous precipices, by land-slips, inundations, &c., and which, besides, cannot be introduced into any picturesque whole. To these appearances of violent destruction, art, as has already been said, must restore their former beautiful original features; she must rearrange those scattered dissevered forms æsthetically, harmoniously, and picturesquely and with them enrich and beautify her new creation.

There are cases in which a fine prospect, or a waterfall, is concealed by a ridge or bank. This ridge must therefore be lowered, or entirely removed, if its value as a picturesque object is inferior to that which it conceals from view. In the same manner hills formed by nature, when they are too low and without effect, may be raised, and stronger features communicated to them.

13. Marshes should never appear in pleasure-grounds: a brook, made by art to meander through them, will carry off the water, and at the same time supply earth to fill up the deep places, and make the marsh disappear. The want of earth has frequently occasioned me to make lakes, ponds, or valleys; I laid them out, however, where I thought the situation required them, and when they formed a picturesque feature, and made use of the earth for plantations, in raising hills, or in making wet sterile spots fruitful.

By either method, the beauty of the landscape was not only increased, but also the growth and healthy appearance of the plants, and the air very much improved.

(*To be continued.*)

ART. VI. *On the premature Decay of Plantations.* By J. WIGHTON.

A FRIEND of mine lately called my attention to what was once a thriving plantation, and asked my opinion why so many of the trees came to premature decay. He observed that the soil was good, and that it could not be the cause. While discussing the matter a by-stander remarked that the trees had done no good since they were thinned out; that operation not having been done at a proper time. This remark convinced me more of my belief, that the decay of this plantation, like that of others which I have observed, arose from the trees not having been properly thinned out when they were young, and that the thinning had been injudiciously done after they advanced in growth. This matter seems to be overlooked by most planters, and, it being of great importance, I shall notice the evil effects of it.

In proceeding I will not enter into the various causes why young plantations are not properly thinned out, but merely observe that old ones are often kept thick to harbour game, and small belts are kept thick to afford shelter and exclude the view. It is in the latter, when in exposed stuations, that premature decay of the trees takes place; and this is caused by their being crowded together while young, by which means they are drawn up weak, and lose their under branches for want of sufficient light and air. The soil being good, the trees at first make rapid growth, especially the spruce fir, by which they get rotten at heart, and begin to die off. In a small plantation in front of Captain Nevill Custance's house, at Stone Hill, near Norwich, there are firs in this state.

A general thinning commences sooner or later, by which the trees are exposed on all sides; they, being weak both in root and trunk, cannot withstand the blast; they are blown about in all manner of ways; the trees, of course, are injured, and many of them die, which would not have been the case if they had been gradually thinned out when young, observing always to have the hardiest kinds thickest on the outside to shelter their neighbours.

When these rules are attended to the trees get firm hold of the ground, strength is added with their growth, and they retain their under branches. It is from the want of light and air that trees lose their under branches. The following facts prove this. Trees on the outside of plantations hold their branches to the ground on the light side, and are quite bare on the darker side: this holds good even with the fir tribe, which are most liable to lose their branches. I may observe that plantations are sometimes left thick, with a view to draw up the trees with long straight stems. This I consider a good plan,

when the trees are afterwards gradually thinned, that is, not suddenly exposed ; indeed, it is the only way [except Mr. Cree's] to get fine timber free from knots, for the lower branches decay while the trees are young, and the parts where they grew are soon healed over, which is seldom the case with trees pruned in age. Although this is the best way to get trees with fine stems, still it is in some degree objectionable to treat ornamental plantations in this manner ; for the grand object with them is to endeavour, if possible, to preserve the under branches on the trees. However, by the want of light and air, as already mentioned, this misfortune often happens to the trees, and many vain attempts are made to replenish their beauty. I have been surprised to see how foolish some of these ways are: for instance, it is not unusual to see larch, and other kinds of trees which cannot endure the shade, planted under old beeches and oaks, where the sun's rays cannot penetrate ; I have also seen branches cut and bent to the ground, and stunted trees cut down with a view to their springing up afresh. All this seems to be done without ever considering that the surrounding trees had lost their branches, and that the herbage below had died off, for want of air. From what I have just stated, the folly of endeavouring by such means to get up *under-cover*, as it is called, must be obvious.

I do not pretend to say that old plantations cannot be replenished below; but, before this can be done with any success, light must be admitted by cutting down some of the trees, and then planting such trees and shrubs as will grow in the shade. The hazel, laurel, privet, &c., are good for this purpose; and it ought to be borne in mind, that no kind of tree or shrub should be planted which will not bear to be repeatedly cut down.

Cossey Hall Gardens, Feb. 9. 1842.

Art. VII. *On the Culture of the Neapolitan Violet.* By E. S.

I have just been potting some Neapolitan violets ; and, as I have often seen it done without success, those of your readers who are fond of them may not think it loss of time to peruse these remarks.

Neapolitan violets are frequently potted in the autumn, and plunged in a frame exposed to the sun, to preserve them through the winter. Formerly I did so, and sometimes have had good pots of flowers, but more frequently bad ones. I therefore determined to pursue a different course, and by doing so I have never beendisappointed.

Any time in the month of May mark out a piece of ground 1 ft. wider on all sides than any frame or frames which are likely to be unoccupied in the autumn and winter months. Dig a trench round the piece one spit deep and one wide, merely to keep the place dry on which the frame will have to stand. Let the earth be thrown on the piece, and be neatly pointed down. Plant with young plants, about eight inches apart each way, and water them as soon as planted. If the weather is hot at the time of planting, shading for a few days while the sun is on them will be of service. A little water as occasion may require, and keeping free from weeds, are all that will be necessary till October; at which time the frame or frames may be placed over. Let it be particularly observed that the situation should be as open as possible, provided the sun will not shine into the frames during the winter months. I do not like them stuck behind a north wall, as such a place is usually damp; but in most places such a situation as I have described may be found. If not, and the sun must shine upon them, let the lights be shaded when the sun breaks out; otherwise the plants will be excited, and will suffer more from cold and damp afterwards than if they had never been protected. Whenever there is no fear of rain, and it is not frosty, let the lights be kept off; and if they are obliged to be on, let them be tilted behind at all favourable opportunities, night or day, as a dry atmosphere is of the highest importance. It will be found that violets treated in this way will not lose their foliage from damp, like those which have been potted; and, being exposed to the air, the foliage will not be drawn up so as to hide the flowers. If, when the frames are put on, the soil is lightly stirred, and decayed leaves and rubbish picked out, it rarely occurs that it will be necessary to repeat it all the winter. I do not recollect that mine have been picked over since the frame was put on; and I think that you will agree that this winter has been damp enough to prove it.

By observing the above rules, abundance of flowers will be produced, and the plants may be potted a few at a time, choosing those for early potting whose flowers are most forward, and taking them into the greenhouse or elsewhere to open. If the plants are strong, one plant in a 48-sized pot will do, or two may be placed in a 32, as most convenient. I have sometimes planted a few about the borders of a conservatory; and, if they are allowed to open their flowers before they are taken from the frame, they look pretty and scent the house.

Middlesex, Feb. 16. 1842.

Art. VIII. *On the Management of the Vine.* By N. M. T.

There is no plant under cultivation more docile, more patient under maltreatment, or more certain of doing well under any system, than the vine: let the system adopted be persisted in until the plants become inured to it, and success is certain. Yet all of the prevalent systems have supporters firmly persuaded that their favourite is vastly superior to all others, which furnishes all that is wanted to prove that *system* signifies nothing; if it did, some of them must in reality be superior to its competitors, and that superiority becoming apparent would lead to its universal adoption; but, from the thing contended about having no hand in the matter, the very reverse of this is the case. All of the systems retain their adherents, all of them are capable of perfect success, being only different means employed to obtain the same end; and, if we occasionally find instances that would lead us to decide in favour of any peculiar mode, any excellence in them exhibited may generally be traced to the youth or vigour of the plants, the effects of a congenial climate, and judicious management. Still, we hear so much stress laid upon cutting to one eye, to three, four, or ten eyes (as the advocate may incline), that we are almost led to believe that the result entirely depends upon this, which in reality does not signify one farthing. I mention this as my conviction, after having seen and practised most of the popular methods; and, if plants have become inured to any of them, a change, unless imperative, or imperceptibly carried into effect, ought not to be thought of.

It may be inferred, that, considering a congenial climate every thing, and any peculiar mode of pruning of so little consequence, I would continue to conduct vines upon the same plan in which I might chance to find them. This is true to a certain extent; but, deeming the superiority of one system over another so trifling, I have in a great measure abandoned them all, and taken as a guide what is palpably important; and, instead of cutting at a given eye, I cut where there is a requisite number of *good* ones; allowing their position upon the shoot to weigh as nothing, as the inferior eyes, used to produce fruit in the close-spur system, can be rubbed off, and the wood in the house as easily regulated in this case as any other. It may be supposed that this rule in cutting would in some cases require to be infringed to procure available wood in proper places, but where vines are in a healthy state this can never prove a difficulty. Thus, cutting at or before prominent well ripened buds capable of producing shoots of proportionate excellence is, I think, the only thing that ought to be definite in winter pruning; yet winter pruning has often been elaborately defined, while the

stopping, or pruning of the growing shoot, probably of tenfold importance, is left comparatively a matter of hap-hazard; stopping at a joint before the fruit, or leaving a foot or two of a shoot to fill a gap, as it may happen. Now, the important functions performed by the leaves considered, this, of all others, would appear a matter deserving our attention, not only as it regards vines, but all other plants, especially those that bear some affinity in their mode of fruiting, as melons and cucumbers. Such plants are generally stopped near the fruit, ostensibly that the plant may not expand its energies in the production of useless leaves; a practice tenable only on the supposition (which it clearly implies) that plants derive the whole of their support from the soil; that the juices forming this support are collected by the roots, and by them forced up into the plants, performing all their functions in their ascent; in fact, that, independently of leaves, roots are capable of forming plants and maturing fruit: but, as the reverse of all this is the case, since it is evident that plants increase in substance more readily without roots than without leaves; that a very considerable portion of their constituent parts are supplied by air and water through the leaves, and that watery juices supplied by the roots are unavailable until assimilated and converted into "true sap" by the leaves, benefiting as regards adding to the substance of plants in their descent only; surely we are entitled to pause before ruthlessly destroying so many indispensable auxiliaries. The impossibility of any fruit ripening without being preceded by a leaf to supply elaborated returning sap shows the inefficiency of all those between the root and the fruit (however numerous) to accomplish this. The lesson thus enforced has taught us to respect one leaf at least, knowing that upon its preservation, all hopes of success depend. We have also proof from the very scanty portion of foliage often left, that little is required to perform the task, that is, a single leaf, properly situated, will do enough to prevent absolute abortion: but the question is, would not an ample portion of what is so indispensable perform that task more effectually? This is hardly to be questioned: a leaf is requisite to mature even a single bud; and it appears highly improbable, that so small a breadth of foliage can properly perfect the crude matter contained in a bunch of grapes of 4 lb. or 6 lb. weight; which renders an insufficient surface of foliage exposed to the action of light one of the most probable of all the endless conjectures as to the cause of the shriveling of grapes; grapes shriveled for lack of sufficient foliage, and peaches suffering from the same cause, differ in nothing.

Grapes grown in the open air being less affected by this disease also tends to confirm the supposition. In this case, space

is less an object than with those under glass, consequently, more space is generally allowed them to produce leaves, while, from the influence of light acting upon them directly, much less foliage is required to produce the same effects; and the greater breadth of foliage plants generally develope in the deteriorated light under glass is probably an effort to counterbalance, in some measure, its inferior quality.

We may often considerably deviate from the method adopted by unassisted nature in the culture of plants; still, studying the nature of a plant in that condition is likely to afford hints tending to insure success; and here the natural method of bearing of the vine would point out a mode the very reverse of close-stopping, as the fruit is invariably produced within a few eyes of the preceding year's wood, while an indefinite quantity of foliage is afterwards produced to mature it, and contribute by its caterings to the growth of the plant. It has again and again been shown, that the removal of leaves as produced is the most certain of all methods to reduce in vigour, and ultimately to destroy, the plant so treated. It is very evident that without frequent stopping, and regulating of the summer shoots in a vinery, the whole would soon become a tangled mass of confusion, which would, by creating darkness, produce the very evils intended to be cured; but, without leaving enough to do this, as much as can be judiciously retained ought by every means to be fostered, as the best (or in early forcing the only) way of sustaining, rather than the means of expending, the energies of the plant. But, even supposing plants to be fed solely from the root, it requires far greater exertion to produce the fresh leaders necessary by continual stopping, than to go on to any reasonable extent in the addition to that already started: to prove this, decapitate a plant barely able to exist, and its destruction is almost certain to follow, being previously in a condition to prolong existence by means of a few leaves, but unable, these destroyed, to produce more.

Plants under glass depend more upon their leaves, and less upon their roots, than those in the open air, from the possibility of maintaining around them a continually feeding, instead of an occasionally exhausting, atmosphere; this alone most assuredly supplies the bulk of their food, if it does not, why so strenuously endeavour to keep up an atmosphere in which food abounds? otherwise, this would be of minor importance. There is probably no plant less dependent upon its roots than the vine. I recollect seeing somewhere a statement of repeated trials, tending to show that the fruit was nearly matured before the roots became excited; and, in early forcing, I am apt to think, this is always the case, else the covering of the border with hot dung or materials to keep it warm and dry would be an

improvement; but I affirm that I have seen no case where covering produced any good. If the roots are perfectly dormant it cannot, if they are active it may do much evil, by excluding light, rain, and all atmospheric action from the soil containing the imprisoned roots. The methods of applying heat to the roots, by means of combustion or otherwise, are only so many mischievous absurdities. To create a corresponding action between the branches and the roots may be the aim of such appliances, and such an intercourse would seem natural and desirable, but what would be gained were it established? Are grapes produced of better quality, or less subject to disease, at a season when this may be supposed to take place naturally? They are not; therefore, such things form an addition of wasteful machinery, answering no desirable end. Portable coverings to resist extreme frost or cold rains, to be removed when not wanted, could not do harm; but, as a permanent covering, glass only could effect such an end, were it desirable.

Observing a vinery placed at the bottom of a declivity of considerable extent (a most objectionable site, I admit), down which all heavy rains rush until stopped by the wall against which the vinery is placed, and where the water is often lodged several inches in depth, led me to conclude that little intercourse could take place in so unnatural a position, else the vines in the house must have suffered from its chilling effects, which is not apparent; and an experiment upon a large vine, which it was determined to do away with, leaves little doubt upon the subject. The whole of its roots were cut off a few feet from the stem, which was allowed to remain in its position; yet the plant so mutilated is in no respect different from the others in the house, which are now in bloom. The temperature has in cases of sunshine reached 100°, without any disposition in the plant to blow. This I think a strong instance of the possibility of feeding a plant by what are so often thoughtlessly removed, to save it the trouble of maintaining them. The leaves situate between the roots and the fruit are not necessary towards the mere maintaining of it, and these may, in cases of melons or plants of annual growth, be removed with less injury; but on the vine these are so situate that their removal is a most direct robbery, and highly detrimental to the welfare of the buds, upon which too many depend for succeeding crops. Frequently grapes produced at the bottom of a house are much inferior to those near the top of the rafters; caused in some measure by the disposition of the sap to reach the top, but also greatly aggravated by all the leaves within reach being pulled off to give light, or to send with the fruit. A bunch of grapes, and a basket full of leaves to garnish with, is no unusual order; in the execution of which the first leaves that come to hand are plucked off;

instead of this being suffered, they ought to be grown on purpose out of doors.

Folkstone, March 10. 1842.

ART. IX. *New Grape from Ohio.* By N. LONGWORTH, Esq., of Cincinnati.

JAMES HOWARTH, being about to visit England to purchase plants, takes with him some roots of my Ohio grape, and requests me to give a description of it.

This grape I discovered a few years since, and have parted with none till the past season. It is now for the first time for sale in New York, at 5 dollars per plant. It is not known in the eastern states, or for sale except at Thorburn's, who has 100 plants only.

The grape and bunch resemble the Black Prince, but the bunch is larger. It has none of the hard pulp common to the American grapes, and is equal as a table fruit to the Miller's Burgundy, with bunches four times the size. They grow with me as large bunches as the Black Hamburg. I am trying it for wine, but cannot yet speak with certainty of its qualities, but fear it will not be as good for wine as for the table. It is a free grower, not subject to mildew or rot, perfectly hardy, and would stand the winters of Canada. For a period of thirty years I have been collecting native grapes from all parts of America; I have tasted near a hundred kinds; this is superior to them all. With us, and indeed in all parts of the United States, except our dense cities, foreign grapes do not succeed and are not worth cultivation. I have forty acres in grapes, and cultivate American grapes only, with one exception, and that was sent me as a native. But it is clearly a Burgundy grape of the Pineau family. It is a delicate grower, but stands our winters tolerably, and is a fine wine grape. It is what Prince sells for a native, and calls the Missouri.

Cincinnati, U. S., Sept. 30. 1841.

ART. X. *On an American Ever-bearing Raspberry.* By N. LONGWORTH, Esq., with a Memorandum by Bishop PURCELL.

WHEN driven into the interior of the state by the cholera, in September and October of 1832, I found a raspberry in full bearing, a native of our state, and the only ever-bearing raspberry I have ever met with. I introduced it the same winter into my garden, and it is now cultivated by me in preference to

all others, and my table is supplied from the beginning of June till frost.

By means of heat, under glass, it might be made to bear well through the winter. The first of June it produces a most abundant crop, about ten days earlier than any other variety. The wood producing that crop dies through the early part of the summer, and the second shoots begin to ripen fruit before the crop on the old wood is over, and continue to bear till frost, and then produce the June crop of the following season. The fruit is black, of good size, and is preferred by a majority of persons at my table to the Antwerp. The vine is a native of the northern part of our state, where the summers are not as dry and warm as at our city, and they have a substratum of clay. In my garden the substratum is gravel, and our summers are dry and hot. From these causes it does not bear as well with me through the heat of the summer as it does in its native region, and will do in a cooler and moister climate. I sent some to my sister, 9 miles from New York, where the substratum is clay, and the climate cooler and less subject to drought. With her it produces double the fruit in the heat of summer that it does with me. From these causes I have believed it would bear most abundantly in most parts of Great Britain. It does not increase by offsets as other raspberries do, but in September and October the shoots descend to the ground, and each one as it strikes the earth throws out six or seven small shoots, that immediately take root and throw up shoots. I say it is a native, because I have never seen or heard of it except the few plants in a particular location where I found it in 1832. It has not yet been offered for sale, except a few plants by Mr. Howarth, who now contemplates taking his entire stock to England. It is unknown out of this vicinity, and there is but one person who has more than a few plants, as there have been none for sale. Our seasons have been dry of late years, and, anxious to supply my own garden, I could spare none, except a plant to a particular friend. All beyond what are wanted in my garden, my gardener furnished to Mr. Howarth. The vine is very hardy, is not killed by frost, is of rapid and vigorous growth, and requires no particular cultivation, except that, from its vigorous growth, it should have a higher trellis than the Antwerp. I have given Mr. Howarth a few bottles of wine made at my own vineyards, the pure juice of an American grape, for distribution among the English horticulturists; it is two years old only.

Cincinnati, Ohio, Sept. 30. 1841.

Memorandum.—From long and intimate acquaintance with N. Longworth, Esq., one of the wealthiest, most intelligent, and enterprising citizens of Cincinnati, and at the request of Mr. Howarth, I feel happy in expressing my perfect assent to what has been stated above, on which the most perfect reliance

can be placed. Mr. Longworth has no interest but the public good and the advancement of horticulture to promote, by his bringing before the people of England this luxurious, hardy, and indigenous variety of the raspberry. As far as my judgement goes, I have never tasted a finer species of that fruit, nor do I think we need to envy the vineyards of other climes, while our own, under the judicious and patriotic care of Mr. Longworth, produces such wine as that to be exhibited by my friend Mr. Howarth in the metropolis of England.

(Signed) J. B. Purcell, Bishop of Cincinnati.

[Plants of this raspberry are in a London nursery, but none of them will be sold till the worth of the variety is ascertained.]

Art. XI. *A select List of Pears suitable for a Garden of limited Extent.* By a Lover of Horticulture.

DESSERT PEARS.

	Season.	Aspect.
Autumn Bergamot	October	S.
Swan's Egg	November	S.
Chaumontel	November to March	S. W.
Saint Germain	November to January	W.
Crassane	November	S. W.
Colmar	November to January	W.
Winter Bergamot	November	S. W.
Gansell's Bergamot	November	W.
Green Chisel	September	S.
Green Sugar	July	S.
Citron des Carmes	July	S.
Williams's Bon Chrétien	September	S.
Knight's Monarch	December and January	S.
Passe-Colmar	December and January	S. W.
Doyenné Blanc	October	S.
Beurré Van Mons	November	S.
Marie Louise	November	N. & S.
Beurré Spence	September	S.
Glout Morceau	November to January	S. W.
Urbaniste	October	W.
Beurré de Capiaumont	October	S.
Beurré d'Aremberg	December and January	W. S.
Easter Beurré	January to March	S. W.
Bishop's Thumb	October	S.
Beurré de Ranz	March to May	S.
Doyenné Gris	October and November	S. W.
Beurré Diel	October and November	S. W.
Forelle	November to January	W. S.
Ne plus Meuris	November to March	S.
Hacon's Incomparable	November	S.
Flemish Beauty	September and October	S.
Jargonelle	July and August	S. W.

KITCHEN PEARS.

Franc-Réal d'Hiver	December to March	S.
Cadillac	December to March	S.
Uvedale's Saint Germain	January to April	W.
Bellissime d'Hiver	November to April	S.
Spanish Bon Chrétien	November and December	S. W
Chaptal	December to March	S.

The sorts which I have enumerated above I have tried, and found to be of first-rate excellence; and I consider them most suitable for a garden of limited dimensions. They may be either dwarfs or standards, and on walls or espaliers; and, with judicious management, they may be made to produce an abundance of fruit.

Exeter, March 12. 1842.

REVIEWS.

Art. I. *A Treatise on Manures, their Nature, Preparation, and Application, with a Description and Use of the most approved British Grasses; to which is added a Miscellaneous Article on Farming, with an Estimate and Description of an Example Farm of three hundred Acres, illustrated with Cuts of Farm-buildings.* By John Donaldson, Land-Steward; Editor of the Fifth Edition of "Bayldon on Rents and Tillages," and Author of a Number of Agricultural Essays. 8vo, pp. 416. London, 1842.

We expressed our high expectations of this work in January last (p. 34.), and its appearance, so far from disappointing us, has exceeded our expectations. It is not, we think, too much to say, that to the practical man it will be found by far the best treatise on manures that has yet appeared. The chapter on grasses shows a thorough acquaintance with the subject, both botanically and agriculturally; and it contains much that interests the gardener as well as the farmer.

"The general and very fatal mistake committed in sowing permanent pastures arises from the land not being sufficiently prepared by fallowing and manuring, from the usual dread of expense and labour. No success can be expected from small and tender seeds sown on a rough uncultivated surface, unreduced by culture, and abounding in weeds; the land must be enriched by manuring, reduced by working to a fine tilth, and thoroughly cleaned from any weeds that may interrupt the growth of the tender plants. This purpose may be effected by summer fallowing the land, or by fallowing by green crops, by which methods the land will be ready in August, or in April after the green crop has been removed. The soil must be completely wrought and cleaned, and every stone and weed removed, and the land enriched by manuring and also by a previous improving rotation. Experience, or opinion at least, seems to prefer to sow the seeds without a corn crop.

"Experience has long ago confirmed the important fact, that permanent pastures are unprofitable, and that all lands where the plough can work are more useful under a system of alternate cultivation. If any exceptions occur in the case of the most valuable pastures, it must be remembered, that the rich herbage on such lands has been formed by nature, and can hardly be improved by art, or reformed by human skill. The inferior or smaller grasses constitute the short sweet herbage on the dry and elevated downs of South Britain, which have likewise been formed by nature, and which, if broken up, it might be impossible to clothe with verdure during the lapse of many ages. Inferior lands, both wet and dry, will not bear a good sound herbage, and any attempts to produce it permanently by cultivation will prove abortive. The grasses useful for culture are confined to those plants which will yield in one year a produce that proves the most valuable in quantity and quality, these latter properties being very considerably modified by other circumstances that are inseparable from vegetable growth. Great bulk of produce can rarely be

obtained without a corresponding degree of coarseness; and it requires an almost impossible or unattainable degree of quality in a smaller quantity of produce to equal in value a greater bulk, when the latter is attended with a fair portion of the nutritious property, and when the difference in quantity is very considerable."

The two chapters on farming are, perhaps, the most valuable part of the work. In the first chapter a general history of British agriculture is given from the peace of 1815 to the present time, in which every point connected with the subject appears to be touched on. We must find room for the last paragraph.

"Much of the prosperity of any country depends on the distribution of wealth, and the state of easy competence in which the different classes of the population are placed: the unequal distribution and misapplication of capital has constituted a great evil in all ages and countries in the world, and nations progress in civilisation and improvements in proportion as these barriers are broken down and removed. The upright character and correct moral conduct cannot exist in a state of abject poverty; the evil parts of human nature are called into action in the struggle to obtain, by any methods, that which should be got by industry and application. The moral strength of an united or an individual state of existence bears a high ratio to the physical, and the value of integrity and upright feeling in every class of society is inestimable. Education and early impressions exert a powerful influence; but it happens that writers on such subjects wholly neglect to lay the foundation, from too great anxiety and haste to rear the superstructure. The means of procuring and receiving education must first be afforded; the physical wants must be supplied before the moral; the cravings of nature admit no excuse. The beautiful principles of demonstration, and the abstract truths of morality and social wisdom, cannot be taught to a starved being; he will not listen to us; he must be clothed and fed, and then taught; and hence the necessity of providing the means and of putting them in the power of all classes, and by affording employment and remuneration, finally produce that elevation of character which constitutes the true strength of society. It is natural to suppose that the power or means which has raised one or more classes above crime and immorality will raise others. A highly improved physical condition may be attained without a corresponding moral developement; but no great mental excellence ever will be produced without a generally improved physical state arising from an abundance of the comforts and necessaries of life. But the moral world and the relations of society have hitherto presented only a painful spectacle of the perpetual warfare of jarring elements contending for the mastery, arising from a resistance and an opposition to the laws of nature and of reason, which have marred the face of the fair creation, and have spread misery and desolation over the globe. When we contrast that deplorable view of human iniquity, plunder, fraud, and violence with the simple, uniform and harmonious plan on which the natural world is conducted—with the beautiful order which is unfolded in the unceasing operations of production and reproduction, and with the amazing grandeur of the stupendous works which are produced in the profound tranquillity and undisturbed regularity of nature's workshop, so gradual in operation as almost to elude the perception of our senses, there naturally arises in our minds the simple, the pleasing, and at the same time the very sublime idea, that the great Cause, and ultimate end of all things, will conduct the moral world through a number and variety of different states of existence to a similar termination of beauty and of order, the full completion of which may be reserved for ages that are removed beyond the reach of our limited comprehensions, and verging into or forming a part of an inscrutable eternity."

To give an idea of the important matters treated of in the second chapter on farming, we shall quote its contents.

"Cultivation of soils. Northern system oppressive. Capital, stock, and implements required on an improving farm of 300 acres. Description and

use of the rotations of cropping. On clays. On loams, sands, and gravels. On lands pared and burned. Observations on them, and on preparing the various soils, and altering crooked ridges. Draining. Arable and grass lands. Soiling. Permanent pastures not required. Farm buildings. Description of two plans of farmeries. Dwelling-house. Cottages. Improvements much wanted in them. Soiling of different kinds of stock. Small sheds in pasture fields. Gloucestershire example farm. Such farms necessary. Director required. Qualifications requisite. Practical skill essential. Failures from unprofessional and ignorant practitioners. General acquirements requisite. Expensive seminaries not generally useful. Increasing knowledge will dispel the jealousy and acrimony so adverse to improvements. Ireland. Causes of the backward agricultural state. Remedies."

In conclusion, we most strongly recommend this work as one of the best which has appeared in the course of the present century on the subjectsof which it treats.

ART. II. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those which are considered the most interesting.*

THE Cowthorpe Oak, from a Painting by the late George William Fothergill, from accurate Sketches made on the Spot, expressly for this Work. Drawn on Stone by William Monkhouse. With a descriptive Account, by Charles Empson, Author of "Narratives of South America," "Antiquarian Miscellany," "Scenery of the Andes," &c., containing such Historical Memorials, Local Particulars, Botanical Characters, Dimensions, and various Information as could be obtained on the Spot relative to this most famous Oak, "the Glory of England and the Pride of Yorkshire." 4to, pp. 18, 1 lithograph. London, 1842.

There is a great deal of curious matter brought together in these pages, but we are sorry that we cannot commend the lithograph, which is totally deficient in the characteristic touch of the oak. Let the reader compare it with any of Mr. Strutt's engravings of oaks, or with any of the oaks in Lewis's *Portraits of British Forest Trees*, reviewed in our Volume for 1838.

The true Principles of Pointed or Christian Architecture; set forth in two Lectures, delivered at St. Mary's, Oscott. By A. Welby Pugin, Architect, and Professor of Antiquities in that College.

Mr. Pugin is known among his professional brethren as a great enthusiast in Gothic architecture, in which it is universally allowed he has a thorough knowledge, and an excellent taste. The work before us is not his first production, for he is the author of *Contrasts*, in which the modern degeneracy of architectural science and taste, and the great superiority of the Gothic style over the Grecian, are enforced by architectural caricatures. The object of the present work is the same, but the author has set about it in a more moderate, and consequently more effective, manner. In short, his taste as an author has been improved, though it is yet far from being good. Notwithstanding this, we do not know any work on Gothic architecture that is so likely to improve the taste of the general observer, because the arguments are all such as every one can understand, and they are well illustrated by numerous and beautiful engravings. The following points are what the author endeavours to enforce and illustrate.

1. That all the ornaments of pure pointed edifices were merely introduced as decorations to the essential constructions of those buildings.

2. That the construction of pointed architecture was varied to accord with the properties of the various materials employed, as shown by ancient examples of stone, timber, and metal construction.

3. That no features were introduced in the ancient pointed edifices which were not essential either for convenience or propriety.

4. That pointed architecture is most consistent, as it decorates the useful portions of buildings, instead of concealing or disguising them.

5. That the true principles of architectural proportion are only found in pointed edifices.

6. That the defects of modern architecture are principally owing to the departure from ancient consistent principles.

The great error into which Mr. Pugin has fallen, in our opinion, is in condemning every thing and every body that does not exactly square with his views. Mr. Pugin is a newly converted and consequently a zealous Catholic; but what Catholic of sound sense, in the present day, would publish such a passage as the following:—"Mechanics' institutes are a mere device of the day to poison the minds of the operatives with infidel and radical doctrines; the church is the true mechanics' institute, the oldest and the best. She was the great and never failing school in which all the great artists of the days of faith were formed. Under her guidance they directed the most wonderful efforts of their skill to the glory of God, and let our fervent prayer ever be, that the church may again, as in days of old, cultivate the talents of her children to the advancement of religion and the welfare of their own souls,—for without such results talents are vain, and the greatest efforts of art sink to the level of an abomination." (p. 33.)

The following passage may be considered by some as objectionable; but here it will be observed that the author is speaking of principles, and, taking the passage in this sense, we entirely agree with him.

"We can never successfully deviate one tittle from the spirit and principles of pointed architecture. We must rest content to follow, not to lead: we may indeed widen the road which our Catholic forefathers formed, but we can never depart from their track without a certainty of failure being the result of our presumption." (p. 9.)

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Species and Varieties.—When the willows, and several other genera of trees, are cultivated and studied for many years in an arboretum, the number of species will be greatly diminished, and, doubtless, many new varieties originated. Indeed, there is nothing in any of the species of *S*àlix that would lead us to doubt the possibility of there being only one original species; assuming as the characteristic of a species some mark always present, and indestructible by cultivation, soil, or climate. There are some genera, some of the species of which are so decidedly distinct, that it is impossible to conceive that they can ever be mere varieties; and equally impossible to suppose them distinct genera. For example, no one ever supposes that *A*'cer Pseùdo-*Pl*átanus and *A.* campéstre are not specifically distinct, and yet no one would ever think of raising them into separate genera. In like manner, *Q*uércus *R*òbur, *C*érris, *I*'lex, rùbra, vìrens, &c., are all decidedly distinct species; and yet, by the commonest observer, they would all be pronounced oaks. This, however, is not the case with the genus *S*àlix, nor with *U*'lmus, *A*'lnus, and some others. It is easy to conceive any one kind of elm changed by culture, locality, or climate into any other kind, and equally easy in the case of the different kinds of *A*'lnus.

Hitherto botanists have been chiefly enabled to study ligneous plants from specimens obtained from their native habitats; but with the progress of civilisation, and the consequent establishment of botanic gardens and arboretums in all parts of the country, they will be enabled to study species in a living state, and under a degree of uniformity in external circumstances which had

never previously been done. It will then appear, as we think, that the greater number of plants, both ligneous and herbaceous, hitherto considered as species, will not even continue to exist as varieties. On the other hand, as varieties which have been created by difference of locality disappear, others will be originated through culture and cross-fecundation. It must never be forgotten, that varieties of plants originated through culture afford by far the most valuable products for mankind, and therefore, in point of utility, are of much greater interest than either natural varieties, that is, such as are produced by difference of locality and climate, or even species. (*Extracted by T. W.*)

Effect of Mercurial Vapour on Vegetation. — A paper was read by Mr. Fortune, the superintendant of the hothouse department in the Society's Garden (Feb. 16. 1841), upon the effect of mercurial vapour on vegetation. The author stated that in consequence of reports that wood prepared with corrosive sublimate, under Kyan's patent, was injurious to vegetation, a series of experiments had been tried in the garden for the purpose of ascertaining how far these opinions were well founded. In one experiment a small portable greenhouse was prepared with Kyanised wood, and, thus pickled, was introduced into the atmosphere of plants under hand-glasses, but without injurious effects in such cases. But when Kyanised wood, or shavings moistened with corrosive sublimate, or crude mercury, or salts of that metal, were introduced into vessels containing plants exposed to the dampness and high temperature of a hothouse, in every such case the plants became sickly, recovered when removed from the influence of the mercurial vapour, and sickened again when again exposed to it. (*Proceedings of the Hort. Soc. for* 1841, p. 203.)

Comparative Value of Coke and Anthracite as Fuel in Hothouses. — Mr. Fortune presented, from the hothouse department, the following "Results of some comparative Experiments with Coke and Anthracite, consumed in the conical hot-water Boilers, invented by J. Rogers, Esq." The experiments are now ended which have been in progress throughout the winter, to test the efficiency of the improved conical boiler, and to ascertain whether coke or anthracite is the cheapest and best fuel to burn in it. So far as the boiler is concerned, the results have been perfectly satisfactory. When the apparatus connected with it is strongly constructed and well built in, as it has been in this case, it is easily managed, and as economical as any boiler with which I am acquainted. I think, however, its chief recommendation is, the kind of fuel which it will burn (coke or common cinders); and the certainty with which it may be left, without any attention for ten or twelve hours, to keep a stove to 60° in the midst of winter with the external atmosphere so low as 6°, or even zero of Fahrenheit. This is owing to the manner in which the fuel falls down into the fire, to the great quantity of air which is continually rushing in through the bars, and to the complete power of regulating the supply of this, when the apparatus is as it ought to be. The fuel was tried in the following manner. In the months of October and December we burnt coke, in November and January anthracite, and in February coke and anthracite every alternate night. The results, together with the mean temperatnre of the different months are now laid before the committee. The stove was kept between 60° and 65°.

	Nature of Fuel.	Quantity of Fuel consumed.	Mean Temperature of the Months.		
			Max.	Min.	Sun.
October -	Coke -	43 bushels -	56·32	36·96	74·39
November -	Anthracite	1 ton 5 cwt. -	49·96	36·46	54·66
December -	Coke -	92¾ bushels -	37·55	26·45	38·03
January -	Anthracite	1 ton 16 cwt. 3½ lb.	39·90	28·61	41·11

February.	Coke.	Anthracite.	Quantity of Ashes left from each.	Temperature.	
	stone.	stone.	lb.	Max.	Min.
1	8½	- -	- -	31	23°
2		13	- -	31	18
3	9	- -	- -	28	14
4		14	- -	30	22
5	9½	- -	- -	30	26
6		14	- -	28	24
7	10½	- -	- -	27	24
8		14	- -	29	26
9	6½	- -	- -	30	27
10		9½	- -	32	27
11	6	- -	- -	41	37
12		7	- -	51	38
13	5¼	- -	- -	51	44
14		7	- -	52	41
15	4½	- -	- -	49	42
16		7	- -	51	39
17	5½	- -	- -	46	36
18		7	17½	53	38
19	4	- -	4½	50	35
20		7	17	56	40
21	5	- -	6	56	29
22		7	19	42	38
23	5	- -	4	44	32
24		7	21	40	36
25	5	- -	6	42	35
26		7	- -	48	35
27	5	- -	- -	45	32
28		7	- -	47	32
	89¼ = 28¾ bush.	127½ = 15 cwt. 7½ st.			

In judging of the difference in quantity of the two kinds of fuel, the temperature is not the only thing to be considered. When the weather is calm less fire is required than when it is windy, the temperature of the external air in both cases being the same; and even the mean sun heat given above will not enable a person to form a correct idea unless he knows at the same time how long the sun has shone. The sun may shine for one hour in a day in which the registering thermometer may indicate 70°, or it may shine the whole day and the thermometer only rise to 70°, yet every one knows that much less fire heat would be required in the latter case than in the first. Taking these things into consideration, we cannot compare December with January, and get a correct result. We are more likely to come nearer the truth if we compare October with November, and the alternate days of February with each other. By referring to the quantity burned, and taking coke at an average price of 20*s.* a chaldron, and anthracite at 32*s.* per ton, we will find that the expense of heating the orchidaceous house in October last with coke was about 1*l.* 3*s.* 10*d.*, and the expense of heating it in November with anthracite was 2*l.*; or if we take the alternate days of February, 14 against 14, we find the expense of heating with 28 bushels of coke 15*s.* 6*d.*, and 16 cwt. of anthracite 1*l.* 5*s.* 7*d.* If we take the two months in which coke was burned against the two in which anthracite was burned, which will not be fair, owing to the nature of the weather, the following are the results:—Coke, 3 chaldrons 27 bushels, 3*l.* 15*s.* anthracite, 3 tons 1 cwt. 2 st., 4*l.* 18*s.*

These results speak for themselves so far as economy is concerned, and, therefore, the only thing to be considered beyond this is, which is most preferable with regard to management. A measure of anthracite will last much longer than one of coke, but the quantity of heat given out by each will be nearly the same. In the month of December last, when the weather was very cold, it was not possible to keep the orchidaceous house to 60° with one boiler filled with the best anthracite, but this could be done when coke, broken into small pieces, was used instead. When both boilers were filled with anthracite this temperature could easily be maintained, and they would last twice as long as one filled with coke. So that it comes to this, equal bulk produces an equal quantity of heat; or, at least, a chaldron of coke will give out as much as a ton of anthracite, the one being 20*s.*, the other 32*s.* But as anthracite does not burn so fiercely as coke, it lasts longer, and gives a very steady heat. This property may make it desirable for greenhouses where the expense is not considered; but in a stove with a well regulated conical boiler, for every thing depends upon this, coke is not only the cheaper of the two, but is much the easier to manage, requires less stoking, and burns clearer, as may be seen by referring to the quantity of ashes left by each. A mixture of the two kinds, in equal proportions, answers very well, with, of course, intermediate results.

The orchidaceous house, in which these experiments were carried on, was last year heated by a flue, when we ascertained the following to be the quantity of fuel consumed in the month of February, viz.:—

February.	Thermom. at 8 A. M.	Thermom. at 8 P. M.	Lowest deg. during Night.	Coal consumed in 24 Hours.
				bush.*
19	65°	64°	61°	2½
20	65	65	64	2½
21	65	65	65	2
22	65	65	64	2
23	66	65	65	2
24	66	67	65	2
25	66	67	63	1½

The aggregate amount of fuel consumed on the above seven days and nights was 8 cwt. 2 stone 4 lb. This, however, cannot be considered as the maximum quantity, for although the thermometer out of doors was so low as 24° at night, yet the days were generally clear, and the house was much heated by the sun. In mild weather, about 1 bushel of coals was sufficient to keep the house at 65° for 24 hours. (*Proceedings of the Hort. Soc. for* 1841, p. 208.)

Oyster-Shell Manure.—Pounded oyster-shells have been advantageously employed as a manure on light lands, drilled in with turnip seed at the rate of 40 bushels an acre; and this quantity has, in Norfolk, been found equal to 8 tons of farm-yard dung an acre. They have also been beneficially used for wheat; 4 cwt. of oyster-shells and the same quantity of rape-dust have proved of equal efficacy. (*Camb. Chron. and Journ.*, Feb. 29. 1842.) —*W. H. B.*

Bran as Manure.—A correspondent invites the attention of farmers to bran as manure: he says that having discovered an increase in the growth of grass from the accidental application of bran, he was induced to try an experiment with it, and he found one third of a ton of bran, which cost 37*s.*, caused an increase in a crop of hay of half a ton, worth at the time 3*l.*; thus

* The weight of the bushel used is 64 lb.

showing a profit of 1*l.* 13*s.* per acre from the use of bran. He has since drilled bran at the rate of 1 ton per acre for turnips, and he has the satisfaction of finding the crops quite as good as where farm-yard manure was used. (*Camb. Chron. and Journ.*, Feb. 26. 1842.)—*W. H. B.*

Hedges.— All deciduous hedges may be pruned and repaired during December, January, and February. They ought always to be moulded into such a form, that the base should be several inches wider than the top, otherwise they are certain to become naked below. A hedge 6 ft. high may be 1 ft. wide at the base, and 6 in. at the top. Hedges should never be clipped, but always cut with the hedge-bill, unless we except hedges of privet, furze, and the like; but, even in these cases, the cutting shears should be used, and not common shears, which bruise off the shoots, instead of cutting them. — *D. December*, 1841.

Means of producing Flowers of R*hododéndron arbòreum soon after Christmas.* —" The circumstance which I am about to relate," says Sir Charles Lemon, Bart., V. P., "is of trifling importance; but may, nevertheless, interest those who, like me, cultivate the Rhododendron arboreum, and have seldom an opportunity of seeing its beautiful blossoms. I have for some years been in the habit of pruning the several varieties or sub-species of this plant, as trees; and I find that they bear the knife well, and readily assume the character which I wish to give them. Last November, while engaged in this operation, it occurred to me that I might make some use of the branches which I had cut off; either by ripening the seed-vessels left from the flowers of last year, or by forcing into early blossom the buds already formed. With a view of accomplishing the first object, I placed some of the branches bearing seed-vessels in the dry stove; but they soon withered and came to nothing. Others were placed in the mud of a tank in the damp stove, in which were growing Limnocharis Humboldtii and other aquatics. This was done about the end of November. The leaves, however, drooped, and the cuttings remained unchanged for above a month; when, to my surprise, I found that the capsules were becoming turgid and full of sap, and that a strong shoot was coming from each cutting; which shoot, when I left the country, had attained nearly the length of 5 in. Whether or not roots had been formed I have not ascertained, for I was unwilling to disturb the cuttings so soon after their apparent vegetation; but it is difficult to suppose that such strong shoots should be pushed forward and sustained by nourishment derived only from absorption by the bark and wood. A cutting bearing a flower-bud was at the same time placed in the above-mentioned tank. In about a month, it began to swell; and at the end of a fortnight afterwards, it expanded most beautifully. Thus I had an opportunity of seeing the blossoms of my own Rhododendron arboreum, at a season of the year when I am usually at home, and when flowers for decoration are much in request. As the plants of Rhododendron arboreum are greatly improved by such pruning, I intend to repeat the experiment on a larger scale next season; and shall be happy if what I now write will enable others to partake of the pleasure of seeing the June flowers of Rhododendron arboreum in abundance soon after Christmas." (*Proceedings of the Hort. Soc. for* 1841, p. 203.)

Pears, grafted on the Stock of the Mountain Ash (Fogel-Beer, *Pỳrus* Aucupària), by Herr Weimar, Försthaus, Ems. The practice derived from Herr Roth, Ober-förster, now resident in Altenkirchen, not far from Limburg, Duchy of Nassau. He lived formerly at Ober Ems, Amt Idstein, Nassau; in his garden there he had, in 1812, trees of full growth thus worked. The crops were there abundant and sure; in a climate and site, on the high plateau of the Taunus Mountain, where neither pear nor apple would previously fruit. The soil poor and shallow, upon rock. The effect is to retard the blossom and give vigour to the constitution. Flesh and flavour said not to be affected. Budding and grafting alike successful on old stocks or on young, by the usual process; care must, however, be taken to remove none of the young shoots which the stock may make during the first season after working. In the

succeeding spring, before vegetation commences, all such redundant growth to be cut out closely, and the graft alone permitted to push in freedom. Its growth will be luxuriant. (*R. A. Hornby*, in *Proceedings of Hort. Soc. for* 1840, p. 183.)

With reference to the above communication, the following observation was made by the vice-secretary:—

We have long ago tried some experiments upon the mountain ash as a stock for pear trees, it having been one amongst the various kinds of stocks on which the pear was grafted in the garden of the Society. The trees grew very well, but scarcely so vigorously as those on the pear stock, or even on the quince. The fruit was produced at an earlier age, of good size, and *there was no perceptible difference in the flavour*, when compared with those produced under similar circumstances, but on pear stocks. We did not observe the blossoms retarded. The trees, however, did not seem as if they would be long-lived, owing to the unequal swelling of the respective species. The pear increased in diameter more rapidly than the mountain ash. But as the latter species is more hardy than the quince, and will thrive in almost any soil, it might be used advantageously in some situations. (*Ibid.*)

Treatment of Pear Trees.—I beg to offer to the Horticultural Society a few Marie Louise pears, which I have been enabled to keep to this late period by a system of treatment, a short account of which I here annex. I selected a tree trained downwards, in the balloon style, and in the winter, as is my usual custom, I cut round the roots, about 3 ft. from the stem, extending each year the length of cutting (in consequence of having only 9 in. of natural earth above a rank gravelly clay). About June I covered the ground round the tree with rotten manure, and occasionally watered it through the manure until the month of October. In August I cut off the whole of the upright strong shoots of this year's growth, by which plan it appears to me that I throw the whole strength of the tree into the fruit. At the same time, being much annoyed by the birds, I netted the tree, with some very fine fruit on it. About the first of October I matted up the south and west sides of the tree, leaving it open to the north-east. The tree was then in full foliage, and continued so nearly three weeks later than the other trees of the same kind. The fruit continued on it until the 20th of November, when, from the continued hurricanes which prevailed, I was compelled to gather them, as they were more than half destroyed by being whipped by the branches, in defiance of my training, netting, and matting. Had it not been for this tempestuous weather, I have no doubt some specimens would have been on the tree until this present time. Some of the pears were as fine as any I have ever seen grown on walls, and the smaller ones, I have no doubt, will enable me to have Marie Louise pears on my table on Christmas day. To some it may appear strange, that on a clay soil I should water my trees, but having, in the making of my garden (the refuse corner of a brick-field when I took it), placed brick drains within 20 ft. of each other, directly across the garden, I have no stagnant water, but am perfectly dry, and in the summer months I invariably cover with manure the roots of all trees which have a full crop, and water through it, for which trouble I am abundantly repaid, both in the size and quality of my fruit. (*H. Crace*, in *Proceedings of Hort. Soc. for* 1840, p. 195.)

Packing of Fruit.—Mr. Thompson reported from the fruit department that the packing of fruit in baskets lined with kiln-dried straw had been found to answer well with such varieties as had kept up to the present period. The straw so dried that it will scarcely bend without breaking does not communicate that musty flavour which is perceived when hay or straw retaining their natural juices is employed. (*Proceedings of Hort. Soc. for* 1840, p. 197.)

A new Description of Indian Corn.—We have received from a friend settled in the state of New York a communication relative to a description of Indian corn recently cultivated to some extent in the United States of America. The new variety is termed the Chinese Tree Corn, and, it would appear, yields a very extraordinary return. A piece of land, something less than an acre

is described to have yielded 120 bushels of ears, giving more than 20 quarts of corn per bushel when shelled. This is at the rate of 75 bushels of shelled corn per acre! The growth of the plant, we are told, is exceedingly luxuriant. Whilst upon this subject, we would impress upon some of our experimenting friends the desirableness of trying what they can do upon our former suggestion of growing a closely planted crop of Indian corn stalks for soiling. We have written to our American correspondent for some seeds of the Chinese Tree Corn, and will hand it over with great pleasure to the most successful experimentalist in raising green corn. (*New Farmer's Journal.*)—*W. H. B.*

Brinsden's Self-acting River-Valve, a recent invention, promises to be beneficial in a great variety of cases, more especially in Scotland. It "is intended to prevent the injury that the owners of property adjacent to weirs annually sustain from the overflow of rivers, by which their lands are materially deteriorated, and movable property liable to be destroyed. The self-acting river-valve is so constructed, that a portion of the weir is removed at such times as the excess of water above it requires removal, and it again closes when the head-water has abated to the level at which it is required, viz. the top of the weir. The extent of the aperture made is regulated by the size of the river, varying from 20 ft. to 50 ft., and its depth by the water below it at winter level. It is not for new weirs alone, that may be in course of erection, the river-valve is intended; its principal use is in adding to the old weirs a means of carrying off the excess of water above that required by the mill adjoining it. Its great value lies in being self-acting, as the river itself, when above the height it should be, opens the valve, and the absence of water above that level enables the river again to close it. Another advantage it possesses is the simplicity of its action, the only wear that it sustains being upon a wrought-iron column, thereby requiring in a number of years but little attention or reparation; and a third claim it has to public favour is the comparatively trifling cost of it, when the yearly enhanced value of the property it protects is taken into consideration."—*J. B. Ballinasloe, County Galway, January*, 1842.

The new French Tile (p. 143).—I am glad to learn that you are putting the square tiles in the way of being made known. Our machine tile-makers here say they see no difficulty in making and keeping them quite true; and it seems obvious, that if the French, with imperfect machines, have succeeded in executing them, that our powerful machines, which are fitted to work the clay in a stiffer state, should achieve the task with more certainty, and be able to make a denser and smoother-surfaced article. I shall be extremely glad to hear of your Worcester friend's success, and, if possible, to get a specimen of his produce.—*J. R. Edin., Jan.* 17. 1842.

Ainslie's Tile-making Machine.—I send you a copy of Ainslie's specification, which does not work so well as, I am told, the machine itself does: it is adopted by various parties in substitution for former ones, and tiles produced by it gained the premium at the Berwick show.—*Id.*

Charred Peat as Fuel.—Have you any acquaintance with Mr. C. Williams of the Dublin Steam Packet Company, Liverpool? He mentioned a circumstance to me some time since which may have extensive influence in some localities, viz. that in the course of his trials to manufacture peat char for the canal steamers, he found, contrary to his expectation, that the soft spongy turf was a far better material than the dense deep-seated peat. Might not towers like lime-kilns be erected in peat mosses, and a profitable manufactory of char be carried on? A body of incandescent material being once established, raw peat being thrown on the top would, in the first place, have its moisture dissipated, and would then become char, and in its turn serve to prepare successive supplies. "Winning" peat in the usual way is a precarious operation, and the carting it requires means which may be wanted for other purposes; and the char would be less exposed to loss in wet seasons, and would be easier transported.—*Id.*

Art. II. *Foreign Notices.*

ITALY.

Monza, February 8. 1842. — I have read *Gardening for Ladies*, which Mrs. Loudon has been so kind as to send me, from beginning to end. I find it written with a full knowledge of the subjects treated of, so that it is a book of great interest and information, and one which should be in the pocket of every gardener. The chapters, for example, *Manuring the Soil, Manure, Transplanting, The Management of Fruit Trees*, and the *Pleasure-Ground*, gave me great pleasure. The single chapter *Pleasure-Ground* is well deserving of attention, as by studying that even the blockhead might become a creator of pleasure-grounds. I must, however, intimate to the accomplished authoress, that in the article "Mulberry" a few mistakes have crept in; which, in a new edition, I beg of her to remedy. She says that the leaves of the black mulberry (*M*òrus nìgra) are positively injurious to the silkworm. The leaves of the black mulberry are not absolutely injurious to silkworms, since, before the introduction of the white mulberry (*M*òrus álba), they were fed exclusively with the leaves of the black (see Crescenzio); but the worms, especially in the early stages of their growth, do not eat them very eagerly on account of their rough surface. In various countries, such as Spain*, for example, and the Levant, where the white mulberry is not common, silkworms are reared entirely on the leaves of the black mulberry. The principal reason of the white mulberry being preferred is, that the silkworms reared on the leaves of the black mulberry produce a coarser silk. I have no doubt, also, that the leaves of the red mulberry (*M*òrus rùbra) are not injurious to the silkworm; and I am confirmed in this opinion from what is said by J. M. in *Gard. Mag.*, vol. xv. p. 573. Perhaps, however, they are not eaten with as much relish by the silkworms as even the leaves of the black mulberry, on account of their being still more rugged. I believe my brother Louis, backed by what is said by the above-named J. M. in your excellent periodical, intends making this year comparative experiments. It cannot be denied that the silkworm does eat the leaves of the lettuce; and by experiments made by eminent agriculturists it results that they either die before making a cocoon, or if they do make one it is in a state of disease, and consequently the produce is worthless. It is easily explained when we consider that the lettuce does not contain the mucilage necessary for the formation of silk, a mucilage peculiar to the mulberry, which is the food destined by nature for the insect. The silkworm has been reared entirely on the leaves of the scorzonera (*Scorzonèra* hispánica), but the results were not satisfactory. In all other respects, the person who should translate this excellent manual into Italian would do an important service to horticulturists as well as to his countrymen in general. If I had time, I should be delighted to render myself useful to my brethren; but my numerous avocations do not leave me a moment's respite!

The following is what Professor Dr. Giuseppe Moretti says in his *Prodromus di una Monografia delle Specie del Genere Morus.*† "In the *Arboretum et Fruticetum* by Loudon, a work of eminent merit, there are eighteen species of

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* The black mulberry is also called Spanish mulberry (Gelso di Spagna).

† I have already called the attention of the professor to the circumstance that Mrs. Loudon, in her *Gardening for Ladies*, says that there are only three species of mulberry cultivated in Europe, i. e. *M*òrus nìgra, *M.* álba, and *M.* rùbra; and told him that in my opinion he had only read your excellent *Arboretum et Fruticetum* superficially before writing his *Prodromus*, as you also only give three species and not eighteen, as he asserts. I imagine he has thought that you have given as species *M*òrus (a.) constantinopolitàna and *M.* (a) tatárica, not observing that a. only means álba, and consequently *M.* álba var. constantinopolitàna, &c.

mulberry given, besides a numerous series of varieties; but in reading this work we soon discover that the English horticulturist, although a learned botanist, does not, however, know exactly either the history of the introduction of the species and varieties given by him, or the distinctive characters of each. For example, he calls Dandolo's mulberry, that is Gelso Dandolo, the *M*òrus macrophýlla or *M.* Morettiàna of Jacquin, while this variety was not known till several years after the death of Count Dandolo. He, with Loddiges, makes two varieties of the *M.* macrophýlla and *M.* Morettiàna, while they are only one and the same plant. He constitutes as a variety of the *M.* rùbra of Linnæus the *M.* canadénsis by him attributed to Lamarck. (*Encyclopédie Méthodique*); and then under this he places the *M.* canadénsis of Poiret and *M.* rùbra of Willdenow, not being aware that the article Mûrier of that encyclopædia was not written by Lamarck but by Poiret; and, that therefore, his two Canadian mulberries, which he makes distinct, are, in fact, only one and the same species." [See note in preceding page.]

The following is his division of the species and varieties: —

"*First Section.*

"Mulberries cultivated by me frequently by seeds, by grafts, by cuttings, and by layers.

Species I. — *M*òrus nìgra *Linn.*

1. *M.* laciniàta *Mill.* not Poir.
2. *M.* scàbra *Mor.* (Moretti), Bibl. Agr. 1st ed. not Willd.

Species II. — *M*òrus álba *Linn.*

1. *M.* macrophýlla *Mor.* *M.* Morettiàna Jacq. Ger.; *M.* chinénsis *Bertol.*, *Lodd.*, *Loud.*
2. *M.* latifòlia *Poir.* *M.* multicaúlis *Perott.*, *M.* tatárica *Desf.* not Lin., *M.* crenellàta *Bonaf.* not Mor., *M.* índica *Hort. Patav.*, *M.* álba bullàta *Mor.*
3. *M.* itálica *Poir.*
4. *M.* japónica *Nois.* *M.* álba crenellàta *Mor.* not Bonafons.
5. *M.* constantinopolitàna *Poir.*
6. *M.* nervòsa *Del.*
7. *M.* pùmila *Nois.*
8. *M.* álba heterophýlla *Mor.* ined.
9. *M.* álba flexuòsa *Mor.* ined. *M.* tortuòsa *Audibert.*

"All the other mulberries cultivated for rearing silkworms are not varieties, but only variations produced by climate, soil, and cultivation, viz., those vulgarly called succulent-leaved, double, Spanish, Piacentina (also called dwarf or Tuscan mulberry), ròsea, Veronese, morellona, Romana, colombassa, furcàta, ovalifòlia, dùra, seraissaini, &c.

Species III. — *M*òrus rùbra *Linn.*

1. *M.* canadénsis *Poir.*
2. *M.* scàbra *Willd.*
3. *M.* pennsylvánica *Nois.*, *Lodd.*
4. *M.* missouriénsis *Audibert.*

"*M.* caroliniàna, and those plants which the brothers Audibert of Tarascon thought to be so many hybrids produced from the mulberry of the Philippine Isles (*M*òrus álba bullàta *Nob.*) and this species, or with *M.* rùbra, are only variations obtained from seed.

"*Second Section.*

"Mulberries which are not cultivated in Europe, but were received from foreign parts as dried specimens, and examined by me in the herbariums of De Candolle at Geneva; of Webb, Delessert, and of the Museum of Plants, at Paris; of Lindley, of Bentham, of the Linnean Society, and of the British Museum, in London.

Species IV. — *M*òrus atropurpùrea *Roxb.* Flor. Ind., vol. 3. p. 595.; n. 2. of our Monograph, plate I.
1. *M*òrus rùbra *Lour.* Flor. Cochin., 1, 2. p. 555. sp. 2. (not of Linnæus, and without synonymes), edition of Willdenow, pl. 2. p. 679.

Species V. — *M*òrus víridis *Ham.* ined., Comp. angl. des Indes, n. 465. (Wallich); our Monograph, pl. II., *M*òrus alöísia *Herbar. Delessert.*

Species VI. — *M*òrus lævigàta *Wallich*, ined. Herbar., De Candolle Comp. angl. des Indes. Our Monograph, pl. III.

Species VII. — *M*òrus cuspidàta *Wallich*, ined. Herb., De Candolle, Comp. angl. des Indes., n. 4646. Our Monograph, pl. IV.

Species VIII. — *M*òrus mexicàna *Bentham*, Plant. Hartw., p. 71. n. 514. Our Monograph, pl. V.

Species IX. — *M*òrus pendulìna *Endlicher*, Prod. Flor. Norfolk., p. 40. n. 84. Our Monograph, pl. VI.

Species X. — *M*òrus mauritiàna *Jacq.* Icon. rar., vol. 3. pl. 617.
1. *M*òrus ampàlis *Poir.*

" *Third Section.*

" Mulberries mentioned by various botanists; but of which there are no specimens in any of the herbariums I have examined.

Species XI. — *M*òrus *c*eltidifòlia *Thunb. et Kunth*, Synops. Pl. Æg., pl. 1. p. 370. vol. 1.
1. *M*òrus mexicàna *Benth.?*

Species XII. — *M*òrus *c*orylifòlia *Humb. et Kunth*, Synops. Pl. Æg., pl. 1. p. 370. vol. 2.

Species XIII. — *M*òrus insulàris *Sprengel*, Syst. Veget., vol. i. p. 492. n. 12.

Species XIV. — *M*òrus tomentòsa *Rafinesque*, Flor. Ludovisiana, p. 113. n. 379.

Species XV. — *M*òrus serràta *Roxb.* Flor. Ind., vol. 3. p. 599. n. 7.

" Finally, the other species of mulberries given as new, but not described, are the following: 1. *M*òrus bifària *Wall.*; 2. *M*òrus cálcar-gálli *Cuming*; 3. *M*òrus javánica *Blum.*; 4. *M*òrus scándens *Wall.*; 5. *M*òrus *Taitàba* Arab. V. Steudel Nomencl. Botan. 2 ed. vol. ii. p. 161."

I think that the *A*cer Pseùdo-*P*látanus may also produce oil. This year Professor Longoni will make comparative experiments on all the species of *A*cer. I shall communicate the results to you at the proper time. Further observations on the oil of the *Negúndo* have proved that it has no acidity, as a drop placed upon a plate of brass gave no signs of containing any, while a drop of olive oil corroded it immediately after the first day, and on the third day it was quite green. It is more desiccative than linseed oil, and will therefore be excellent for painting; it does not begin to freeze till —9° of Reaumur [11° Fahr.], an advantage in lighting exteriorly; its specific gravity is 0·922; and finally, when tried with the diagometer, it is an easy conductor of electricity.—*Giuseppe Manetti.*

RUSSIA.

Sudden Death of Trees in Russia.—It is a very common thing in our climate for trees to flourish for a series of years, and then, in one cold winter (say severe), to be destroyed. This was ascribed to the action of the frost upon the stem, the branches, and the root. But, last winter, I lost two cherry trees, and found under the roots of one of them hollows, as if some animal had burrowed under it, and discovered the fibrous roots, as I thought, eaten, or torn away. Yet I have no small animals in my garden. The other cherry tree died also, except one branch on the side where the gardener was forced to work, and of course, tread the ground, close to the tree, both being surrounded with bulbous roots. Well acquainted with the irresistible power of frost, which swells the earth, and raises up posts to the surface, small build-

ings, and even heavy boulders which nature has planted in the soil, I came to the conclusion, that the frost raised the trees, and left hollows about the roots, tearing away the fibres used for the supply of nourishment. Next spring I shall stir the earth with a pointed stick round every tree, and bind it about the roots with moderate treading. A horsechestnut tree, the pride of my garden, and planted with my own hand in the year 1814, showed symptoms of illness. Taught by the cherry trees, I immediately loosened the ground, and trod the earth about it. Upon this, it sent out fresh shoots, which are, I trust, sufficiently ripened to stand the winter.

While I am describing the mischief brought on by frost, I must, on the other hand, enumerate the many blessings it showers upon us, by being instrumental in supplying our markets with every thing, say every luxury. I went up to Petersburg a fortnight ago and brought down a supply of poultry and fish, and stowed them away in my cold pantry, like so many logs of wood. The prices per pair: capons per pair, 4*s.* 1*d.*; ditto, smaller, 2*s.* 9*d.*; turkeys, 10*s.* 1*d.*; ducks, 3*s.* 8*d.* Game: gelinot, something like the perdrix rouge, 1*s.* 8*d.*; such as have the breast the least grazed by a shot, but excellent for fricassees and ragouts, 7*d.*; cock of the wood, capercailzy, 2*s.* 9*d.*; grouse, 1*s.* 10*d.*; and these purchases were made in the best and dearest market in Petersburg. Fish per lb.: Archangel cod, 4¾*d.*; Archangel halibut, 5½*d.*; pike, perch, 7¾*d.*; white bait, 2½*d.*; salmon, 5½*d.*; Wolga sterlet, 7¾*d.* You may hence conclude that we live here luxuriously during the winter; and the beauty is, that these things are taken out when wanted as you would lift a spelding, and only demand time enough to be thawed before being cooked. A fish soup I had at my table, the stock, I think, ruff, with perch fillets, enough for three people, cost 8*d.*, adding the value of the pepper and salt. I found it most excellent, but the poor in England would reject it as part of their dinner. The quotations of prices I have made are not formed from market lists, but from purchases I made for my own table. —*B. J. Near Strelna, January*, 29. 1842.

WEST INDIES.

Residence of Edward Otto at Cuba. (Continued from p. 139.) — From Cafetal el Fundador we now made more distant excursions, both by land and water, to Cardonnas, which, within the last three years, has become a city, and is situated on the sea coast near Lagunilles and Cafetal St. Juan. The latter place pleased us very much, although our stay there bore more the resemblance of a military bivouac. A magnificent avenue of coco palms leads through the coffee plantation to an adjoining forest, in which are seen *F*ìcus, Rhizóphora *Mángle*, *Anòna*, *S*ìda, Mimòsa, and a strong kind of Bómbax. All the trees were entwined by passifloras and convolvuluses, but unfortunately but few of them were in flower. In a marsh adjoining the forest, I found, to my great astonishment, a considerable space covered with *C*ánna, probably *C.* stolonífera; and between their bluish-green leaves a profusion of flower-stalks, which, with justice, gave the expectation of the most beautiful blossoms. I seldom saw Orchídeæ on the trees here, and almost always the same oncidiums, and Epidéndrum cochleàtum with thick stems extending 5 or 6 feet up the trees. The coffee plantation consisted only of shrubs, as they are never allowed to grow up to trees; perhaps because they are more productive in this state, and the coffee more easily gathered. The enclosure was low, consisting only of anonas, Tradescánt*ia* díscolor, and *A*rum esculéntum. Mùs*a* sapiéntum paradisìaca and Oreodóxa règia grow between the coffee shrubs; the latter, however, frequently loses its fronds, which are taken off, partly because when the wind is high they are blown down and injure the coffee shrubs, and partly because they are in request as a covering for the roofs of the houses. In another plantation I saw an avenue of the same sort which led to the dwelling-house, and the trees entirely consisted of stems without fronds, which gave more the appearance of rows of pillars than of an avenue of palms. The part near the house consisted almost

entirely of *Còcos* nucífera and oreodoxas. The former has a stem from 10 ft. to 15 ft. in height, about 6 in. in diameter, and a beautiful, large, but always yellowish-looking, head. The oreodoxas, on the contrary, with disproportionately strong stems, attain the height of 40 ft., and have, according to the thickness of their trunks, a small, but beautiful green, head. In the neighbourhood of the Camina river, where the soil is black and of a clayey nature, I saw oreodoxas which, at a moderate computation, were 70 ft. in height. They are generally upright, and the cocos almost always in an angle with the level of the soil. The Mùsa sapiéntum and paradisìaca, planted between the rows of coffee, have not a very agreeable appearance. The leaves hang down from the trees in a half-withered state, and those that are fresh are tattered and torn by the wind, as if it had been done with some particular intention. If the fruit has been taken from the stem, ripe or unripe, it is cut down, and left to lie there till destroyed by the weather. When the palms are suffered to grow in their natural state, they certainly look extremely well, because they are as seldom attacked by insects as the coffee ; but the yellow spots on the leaves, which so much disfigure our palms at home, are also seen here. On the sea shore, and particularly in the bays, are an amazing number of Rhizóphora *Mángle* and *P*sídium pyríferum (guajava), from which an excellent jelly is made; also the Magnòl*ia*, but whether obcordàta or rotundifòlia, I am not certain. Several banks in the sea near Matanzas are entirely covered with mangle, and I saw it very near the time of flowering. I also found a small zamia, but could only secure a few of its leaves, as the plant had its roots interwoven among stones, and I could not uproot one with all my unwearied efforts. Ferns, such as *A*diántum formòsum, *A*. assímile, *B*léchnum occidentàle, several polypodiums, Aspídium, and *P*tèris, cover the rocks and stems of trees in the thickest forests. *Pòthos* is seen twisting itself to the tops of the highest trees, and only *Pòthos* crassinérvius takes up its abode generally on the stems of old felled trees. *Vanílla* (satìva ?) extends itself from one tree to another, hangs down and winds about the underwood, and then ascends other trees. I did not find it in flower in January and February, as stated by Morrens, and must console myself with the assertion of Swarz, that it flowers in July, and have patience till then. Although our excursion gave us so much pleasure, and although in various places we only found the same genera and species, yet in this thinly peopled and uncultivated country it is natural to suppose that we met with difficulties, and sometimes even with sad misfortunes. During an excursion on the 12th of February, from Fundador to the interior, we ascended a high plateau on which we only found two species of fan palms. One had small round leaves, silver white underneath, a short stalk, and covered with a fine cottony texture ; the stem from 1 ft. to 20 ft. in height, with a small head. The other resembled a Córypha, had large yellowish leaves, the stalks longer, the highest with a stem 6 ft. high, and already done flowering. The stem of the former was 20 ft. in height, and 3 ft. in diameter. We determined on carrying off specimens of these palms, and also to make drawings of them, and with great difficulty we made our way back over the plateau, but without having attained the object in view ; as we were no sooner roused from our bivouac than we had but one desire, that of returning to Fundador. The rain fell in such torrents, that a duration of forty days would not have been necessary to give rise to the wish for Noah's ark. There are no inns on the roads, and in many places no roads at all, and the nearest plantation we knew was farther off than Fundador. The water soon reached the horse's middle, and, from the colour of the clay, looked almost as red as blood, and became like a raging mountain stream, rushing against us. After twenty-seven hours' ride, we at last arrived at Fundador, but without the specimens and drawings of the palms ; and even the greater part of the collection we had made on the excursion to the plateau was destroyed, and our cloaks and other parts of our dress could only be used again on a similar undertaking, which, notwithstanding our enthusiastic love of plants, we had not the courage to wish to repeat.

It was necessary, however, to continue our journey to other parts of the island, because latterly we had found nothing new, and in the more distant parts of the northern coast of Cuba we could not expect a rich booty. Most willingly would I have gone by the steam-boat, which leaves Havanna every month for St. Jago de Cuba on the south-east side, where no one has yet searched for botanical treasures, but the necessary means were wanting; and it was the same with Dr. Bellard, who visited the island to examine the mineral springs and baths, and who had with him a dozen of negroes, by the permission of Governor Tacan, to conduct him wherever he pleased. I meditated a journey in company with a German of the name of Herrmann, a native of Berlin, who intended to use the warm baths for his health at St. Jago (probably St. Jago de Vega), four days' journey from Havanna, but this also was not accomplished, and I now determined to visit the southern coast of the island, viz. Trinidad de Cuba. On the 2d of March I set out from the suburbs of Havanna, called Garcini, by the railroad to Guines and St. Felipe, which we reached in the course of two hours, at 10 o'clock in the morning. The train consisted of fifteen carriages and twenty-four passengers, besides fifty newly purchased slaves not yet emancipated. We did not go at a more rapid rate than the trains do between Berlin and Potsdam, and we did not proceed over sandy flat surfaces, and under the shade of the sombre-formed pine tribe, but through sugar and coffee plantations and under the palm and the musa. St. Felipe consists of only six houses, and our journey from here was obliged to be continued on horseback. Forty persons were going the same way; I only required one horse for my luggage, but the others required from three to five, which were chosen at high prices out of hundreds, the swiftest of them, however, could hardly have gained the prize in a race course. Three ladies, as many priests in their pontificals, French, English, and Americans, journeyed agreeably with me to Batabano, where we arrived, half-roasted and covered with dust, in the course of three hours. We had our passports examined here, and then set out on our journey towards the coast, where the steam-boat lay that was to convey us to Trinidad. The slaves, who came from St. Felipe on foot, did not arrive till 11 o'clock at night, and the ship sailed at half-past two in the morning. I had obtained one of the sixteen beds, and on the following morning found we were at sea. After sailing for twenty-four hours between sandbanks and the so-called cajas overgrown with mangle, we arrived in the small but very safe harbour of Cienfuego, a small town with white wooden houses and unpaved streets, and here the ship remained eighteen hours. We set sail again about midnight. There were no longer any banks, and the sea was deep and rough, so that some of us were sea-sick; and when on the 5th of March I appeared on deck at an early hour in the morning, I saw the beautiful chain of hills along the coast, and afterwards the city of Trinidad appeared in view, and at 8 o'clock we entered the harbour, having been conveyed from the northern to the southern coast of Cuba in the course of three days and three nights. Trinidad may be said to be as large as Potsdam, only more solitary, and human beings are almost only seen in it after the sun is down. It is situated at the foot of beautiful and tolerably high mountains, which, however, like the environs of the town itself, have a scorched and melancholy appearance, and I found the temperature, compared with that of Havanna, considerably higher, being 5° or 6° R. warmer. Some of the streets are in a slanting direction towards the sea, and but badly causewayed, and those that intersect them are not causewayed at all, and terminate with the most miserable negro huts covered with palm leaves. Negroes and mulattoes seem to be the only inhabitants, and they were astonished to see me in the streets with a fishing apparatus and collections, and looked upon me as an unknown inhabitant of some menagerie. I put up at the first hotel in the place, where, besides my bed, I had the greatest difficulty in procuring a table and a chair. But what are these inconveniences compared with the expected booty on this southern coast? (*Garten Zeitung.*)

AUSTRALIA.

The Timber Trees of Australia.—The forests of New Zealand present an abundance of materials, literally inexhaustible, for the purposes of the builder, the shipwright, and the cabinet-maker. Upwards of sixty kinds of more or less valuable timber have been sent to England as specimens; and, doubtless, in the impenetrable recesses of these forests there are many trees whose existence is unknown to the botanist. In illustration of this remark, I will mention, that a missionary showed me a piece of wood under the hands of an experienced cabinet-maker, which had been floated down the Kaweranga river, and which we all pronounced to be undistinguishable from mahogany. It was the first specimen of the wood that Mr. Pruce had seen, after a residence of many years in the district. A brief notice of the principal and most plentiful species will be interesting.

Kaori (erroneously pronounced *Courie* by Europeans) is the Dámmara *australìs* of botanists. It is a gregarious tree, generally inhabiting the sides and declivities of clayey ranges, and attains the enormous altitude of from 50 ft. to 90 ft. without a branch, and a circumference of from 15 ft. to 30 ft. near the base. The bark being of a silver-grey colour, the stem resembles an enormous antique column. Round its base there accumulate large masses of the gum resin which it exudes: it is a very clear and transparent substance, which burns freely with a black smoke, and tastes very resinous. It has been employed at the Bay of Islands as a varnish, and a good many tons of it have been carried to America, where it has been sold for 18*l.* a ton; being used, it is said, as a substitute for gum copal, or, more probably, in the adulteration of that substance.

The kaori tree, being very light in proportion to its strength and its noble dimensions, is used by the Admiralty for the masts of men of war, and one or two cargoes, worth from 100*l.* to 200*l.* each tree, are annually sent home to her majesty's dockyards. Its timber is as easily cut and wrought, and is therefore as well adapted for ship-building, as the white pine of Canada or the larch, and it is more buoyant than the British oak and the Indian teak wood. Nearly all the coasting craft of New Zealand is built of this wood; the largest vessel constructed of it, as yet, is the Sir George Murray, which was built at Ho-Rianga. The kaori is limited to the country north of Tauranga.

The *kaikatea* (*Dacrýdium excélsum*) inhabits low wet soils, and is found extending in belts along the margins of rivers, as the Thames, the Hutt, the Piako, &c. Its great height and straightness would render this a valuable tree, but for the softness of its wood, which speedily decays when exposed to alternations of wet and dry weather. The timber of the kaikatea, being subject to decay when exposed to alternate wet and dry weather, is only suited for inside work, and will doubtless be cheaper than the other kinds of timber, being found on the banks of rivers, and therefore very accessible. The kaikatea becomes less spongy in texture towards the south, and at Stewart's Island it is said to be nearly as durable as kaori.

Totora (Táxus), a tree which inhabits rising grounds, and attains frequently a height of from 50 ft. to 60 ft., without branches. The wood is reddish, splits well, and is very hard. Its general appearance is that of a yew.

Rimu (*Dacrýdium cupréssinum*), an elegant tree, with a very graceful bright foliage, which has been compared to that of the weeping willow, or to a cluster of ostrich feathers. Its wood is hard, dark, rather brittle, and emits a resinous odour. The diameter of its trunk, when full grown, seldom exceeds 4 ft.

Kawaka (*Dacrýdium plumòsum*) has a very fine hard grain, is well adapted for cabinet-work, and said to resemble the tulip wood of Moreton Bay.

Puridi (*Vìtex littoràlis*), called, from the hardness and durability of its timber, the New Zealand oak, furnishes strong and durable timbers for ships, and ground-plates for houses. It is dark, close-grained, and takes a good polish, but is unfit to be sawn into boards, owing to its being much perforated

by a large grub. Its stem is from 12 ft. to 20 ft. in circumference, and it grows to a height of 30 ft. without branching.

Rewa-rewa (*Knightia excélsa*), a slender tree, growing to the height of 50 or 60 feet, furnishes a brown wood, beautifully mottled with red. It is durable, and splits easily, and is therefore well adapted for fencing.

Mairi (*Podocárpus*), attains a height of from 40 ft. to 60 ft., but its circumference never exceeds 12 ft. It furnishes a red, smooth-grained, and durable wood, of great weight.

Tanekaha (*Podocárpus asplenifòlius*) grows to the height of about 45 ft., with a girth of only 2 ft. It furnishes excellent masts for small craft, posts and floors for verandahs, and planks for decks of vessels. Its wood is rather darker and more durable than that of kaori, and smells strongly of turpentine.

Miro (*Podocárpus ferrugíneus*), of the same size as the preceding, furnishes a berry, the principal food of the wood-pigeon, which becomes very fat at this season. Its value as a timber is considerable, being the most durable of all the pines.

Toneai, also a *Podocárpus*, a tree similar in its dimensions to the preceding. It is said never to grow in the same forest with kaori.

Aki, a short crooked tree, varying in the diameter of its stem from 6 in. to 1 ft. Its wood is finely marked and close-grained, takes a most beautiful polish, and is therefore adapted for the finest fancy cabinet-work. It is called the lignum vitæ of New Zealand.

Pohutukana (*Callistèmon ellípticus*), a tree of great size, but of irregular form, with a dark and umbrageous foliage, resembling the *I*lex. Between December and January it assumes a splendid appearance, being covered with flowers of the richest purple. It always grows by the sea-shore, on rocky precipices almost destitute of soil, and gives much beauty to the sequestered bays and inlets of New Zealand. The wood, when polished, would form a good substitute for rosewood.

Hinau (*Dícera dentàta*) grows to a large size, and inhabits rich alluvial lands. Its bark furnishes a fine light-brown dye, which withstands washing. It is first pounded, and then thrown into water, which holds its colouring matter in solution.

Rata (*Metrosidèros robústus*), a tree which attains a great size, with habits very peculiar, and as yet little understood. Its trunk and branches send down shoots to the ground, which sometimes become so massive as to support the old stem, having apparently exhausted its vitality. In fact, the rata is an enormous epiphyte, growing *to*, not from, the ground, which will explain the saying of the natives — that this tree is never young. Its timber is robust and durable, and its branches are well adapted for ship timbers. There is a remarkable circumstance, to which my attention was directed by Mr. Waterton, a brother of the celebrated naturalist of that name. At the base of the rata, and no where else, as the natives declare, is found a vegetable grub, or, to describe its appearance in two words, a wooden caterpillar. From its head there issues a long process, terminating in a point, closely resembling the fibrous root of a plant. As I had not an opportunity of inspecting the interior of this seemingly anomalous piece of Nature's handiwork, I shall not attempt to theorise on the subject, or to pronounce whether it is or is not a chrysalis.

Many of the smaller trees in the forests of New Zealand belong to the lauraceous order. Of these the most notable is the *Tarairi* (*Laúrus macrophýlla*), which produces a berry resembling the damson in size and appearance, and is eaten by birds, but is noxious to man. The timber is valueless; but, as a highly ornamental tree, the tarairi deserves notice. The *towai* (also a lauraceous plant) produces berries of the shape of a small sloe, which are also noxious, but are sometimes eaten by the natives, who boil them previously to use. Of the New Zealand ferns fifty or sixty species have been collected, the most remarkable of which is the tree fern, which arrives at perfection only in damp and shaded situations, to which the beautiful divergent form of its branches gives a tropical appearance. There is another variety of the tree fern (called by the

natives the Mother of the Ferns), the stem of which is eatable towards its root. In the plume-like disposition of its branches it bears a resemblance to the *Cycas* tribe of plants, which constitutes, like the palms and ferns, a principal feature of antediluvian or fossil vegetation. (*New Zealand, South Australia, and New South Wales; a Record of recent Travels in those Colonies*, p. 332.)

Art. III. *Domestic Notices.*

ENGLAND.

A common Laurel (*Cérasus* Laurocérasus), of the following dimensions, is now growing at Totteridge in Middlesex: height 25 ft.; circumference of the space occupied by the branches, 81 ft. There are six principal branches, which recline upon the ground, and their circumference respectively is as follows: — No. 1. 42 in.; No. 2. 33 in.; Nos. 3 and 4., 27 in.; and Nos. 5 and 6., 20 in. — *R. T.*

SCOTLAND

Edinburgh, March 4. 1842. — Brówn*ia* coccínea has just flowered in the Botanic Garden, and Mr. J. M'Nab has made a beautiful drawing of it. His exertions for procuring funds for getting up an exhibition hall have been very successful. I went from Edinburgh to Ayr the other day by railroad in five hours, and returned here in the evening! When shall we be able to reach London in one day and return the next? In about five years, as near as I can calculate, if the projected railroad from Edinburgh to Newcastle is begun next year, as I trust it will. A rule is about to be made at the Horticultural Society's Garden here, "That regular entries shall be made of all donations of seeds, plants, &c., made to the Society, and a monthly report furnished by the superintendant, specifying the employment which may have been made of them, and an account of the results of any trials made of them in the experimental garden." This will probably be attended with useful consequences. — *W. W. B.*

Art. IV. *Retrospective Criticism.*

Books on Gardening, &c. — "Don't you think there is a great deal too much fiddle-faddle in books on gardening? So far as my experience goes, there is no need of following their empirical directions in growing plants. What necessity, for instance, is there for a person who has got a garden that will grow kitchen produce well, to follow Mr. ———'s advice about the cultivation of lobelias; see the article "Lobelia," in a recent work, where this passage occurs: — "In the beginning of May the soil is to be taken out to the depth of 1 ft., and the bottom loosened up; the bed is then filled to within 2 in. of the top with one half loam, rather stiff than light, and one half good rotten dung from a cucumber or melon bed; it is afterwards filled up with some of the soil that was taken out, and, as soon as settled, the plants," &c. Now, to a novice in gardening, such directions must be deterrifying, if I may coin the word, and puzzling at the same time. The labour of taking out the soil would deter him, probably, from growing lobelias, or, if not deterred, he would be puzzled to know what the writer meant by loam, whether a stiffish subsoil or a stiffish soil; and whether no sort of rotten dung but that from a cucumber or melon bed would suffice. Thus he might be put to great inconvenience by blindly following such directions to the letter, which would not befall him if the reasons for observing those directions were made manifest. But it would be difficult to assign reasons in this, as in most cases, where deer droppings, bullock's blood, coal ashes, road scrapings,

and such like articles are recommended. Such mixtures as the latter remind me of the heterogeneous mass of nauseous stuff which enters into the composition of specifics, which have, frequently, nothing but their dirtiness and want of simplicity to recommend them; and whenever I see such prescriptions without explanations of their use, I am led to suspect quackery. — *R. T. March* 3. 1842.

In Calendars for Cottage Gardens I could point out various errors and absurdities. The truth is, gentlemen's gardeners are not, from their expensive modes of raising produce, so well fitted to become instructors of cottagers as market-gardeners, who have a rent and living to make from their skill and labour. — *R. T.*

Art. V. *Queries and Answers.*

Seymour's Mode of training the Peach. — I duly received yours of the 23d ult., and, in reply, beg to say that, in my opinion, Seymour's system of tree training, if properly understood, is by far the best I have seen practised. It is generally much admired in this part of the country, and deservedly so, but there are men who pretend not to like it; but they are, I am convinced, those who do not thoroughly understand its merits. It is a method of training that will produce the finest and most beautiful tree in the shortest time, It likewise produces the finest fruit, and for this reason, that, if well attended to, there is nothing left on the tree in the shape of wood or fruit that is not wanted, consequently, the whole sap and strength of the tree are thrown into the principal shoots and fruit. I have trained on this system eighteen or twenty years, and with the most gratifying results. I have six trees on one wall, that three years ago, I think I may say without fear of contradiction, were never surpassed for their age in size and beauty; but then, unfortunately thinking I had too many principal or main shoots, I cut away one from each side of my trees, and owing to the severity of the winter before last, as I fancy, it caused most of the shoots of the trees that those were cut from to fail, so that I lost two branches instead of one. However they are fine trees still, and this experiment will teach me not to cut old shoots out of peach trees if it is possible to avoid it. It is a practice I would advise all other gardeners not to follow. — *Jas. Tinker. Byram Gardens, March* 5. 1842.

Art. VI. *Obituary.*

Died, February the 16th, at his residence, Ladbrook Terrace, Kensington Gravel Pits, *Archibald Menzies*, Esq., F.L.S., &c. Mr. Menzies was an ardent lover of plants, and the discoverer of many Californian species, dried specimens of which he brought home between thirty and forty years before seeds were introduced by Mr. Douglas. Among these plants may be mentioned *Ribes* sanguíneum. Mr. Menzies sailed round the world with Vancouver as surgeon, and is supposed to be one of the last, and perhaps the very last, survivors of those who made that voyage. Some of our readers will recollect Mr. Menzies's brother, who was curator of the Edinburgh Botanic Garden at the end of the last century. The gentleman who has just died had the same amiable manners and obliging disposition: he had attained upwards of eighty-eight years of age, and died after a very short illness, experiencing at this or any period of his life scarcely any bodily pain.

THE

GARDENER'S MAGAZINE,

MAY, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Further Remarks on the Application of Terrestrial Heat to the Roots of Plants, and some Observations relative to his Stoves for various Purposes.* By N. Niven, Landscape-Gardener and Garden Architect, &c.

But for the many duties connected with numerous professional engagements, I had intended, some time since, to have recurred to the consideration of the subject which forms the primary object of this communication, namely, the application of terrestrial temperature to the roots of plants. This unavoidable delay, however, notwithstanding the importance I attach to the subject, I am rather glad of, inasmuch as I can more at length report progress as to results in the application of the system advocated.

There is, doubtless, at the present day, much to interest every lover of the country's best interests, from the rapid advances that are making, through the medium of chemical science, bearing practically upon the composition of soils and subsoils, as well as on the constituents of manures and their application; and, although I am not one of those who would run wildly away after every nostrum that may be patented in the shape of manure, still I would hail with satisfaction and pleasure every step that was taken in the profitable application of those substances more immediately within our reach, that may in any way tend to the amelioration of the soil and the nutriment of the plant. But many will, I am sure, agree with me, that, besides the suitability and application of manure, we have, properly and profitably to effect our purpose, another most important principle to carry along with us in their application; it is this, the improvement of the temperature of the soil agriculturally by means of proper drainage, and horticulturally by drainage along with other artificial means equally within our reach: these to be applied in either case as may be found requisite for the

more perfect developement of the particular crops or plants under cultivation.

Every cultivator knows what bad consequences result from over-saturation, be the surface soil, or bed of the plant, ever so good. The appellation of "cold," being applied to wet retentive subsoils, well and fitly describes the lowering of temperature that arises from such a cause. Therefore, it becomes highly important that, along with the application of manures, the practitioner should fully understand this, and so endeavour suitably to adapt the soil for the growth of the plant, by proper drainage and a consequent raising of its temperature. This, in the course of my experience, I have found very much to stimulate vegetable growth, especially when means were taken, by surface mulchings, to counteract excessive evaporation in dry hot summers, Nor is it difficult, I think, to obtain the requisite data to guide us in this respect (sufficiently, at least, for all practical purposes); for we have only chiefly, I conceive, to ascertain the circumstances of climate and the nature of the localities, as to soil, subsoil, and exposure, where the plants we wish to cultivate grow in greatest perfection, in their respective countries and habitats: and seeing that, so far as has been gone in such investigation, we have always, more or less, a mean terrestrial temperature of from 1° to 2° above the mean of the atmosphere, both with regard to these and other latitudes, as so ably set forth in Professor Lindley's admirable *Theory of Horticulture*, I think, with such facts before us, and the experience we are obtaining, that there is quite sufficient to guide the persevering practitioner in the application of this important principle.

In a paper written by me in 1841, and subsequently published in this *Magazine*, I ventured to throw out certain hints relative to the matter in question. I then submitted a distinct plan and statement of the method I proposed of supplying terrestrial heat to vine borders; and I also went so far as to express the strong interest I felt as to its important bearing on the practice of horticulture generally, but especially in the cultivation of exotic plants and fruit.

Having, since the paper alluded to was written, had various opportunities of testing the correctness of my anticipations relative to the subject before us, I proceed at once from the premises to the results already obtained.

In the spring of the year above noted, in a range of pits I had erected for the growth of the pine-apple plant, I had arrangements made, by the formation of a suitable bed of soil over a moist hot-air chamber, as the section shown in *fig.* 17. will more fully explain. In *fig.* 17. *a a* are hot-air tubes, or open pilasters, that can be opened or shut at pleasure; *b* is the bed of compost, &c., as hereinafter described; *c c* are hot-water pipes; *d* is the

hot-air chamber; *e*, the steps and platform; *f*, the line of water; and *g* the ground. This was for the purpose of ascertaining

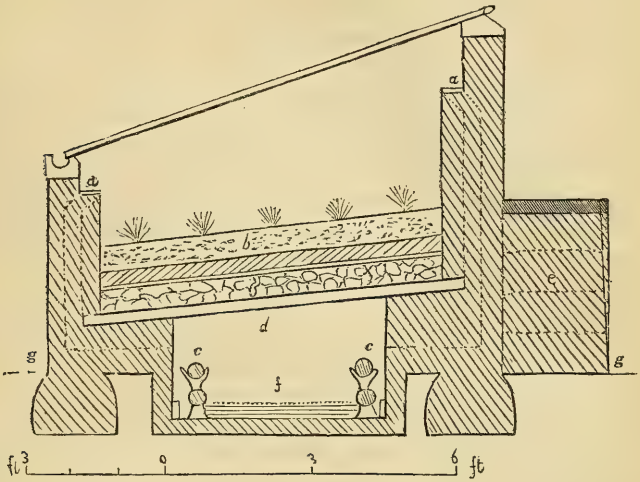

Fig. 17. *Niven's Pine-Pit.*

what the effect would be from the application of a powerful heat from below on a bed of soil immediately above, and, consequently, on the crowns and suckers placed free under such circumstances. It may be well here to premise that the whole extent of the bottom of the pipe-chamber beneath said bed or border is capable of being made an evaporating surface at pleasure, by the introduction of water; an arrangement, in my opinion, that must in all cases accompany the introduction of artificial heat to the roots of plants; but which, it will at once appear, is as simple as the method of introducing the heat itself. The manner of constructing the artificial bed of soil thus to be heated was exactly a miniature of what I have described in the case of the formation of my vine borders, namely, a substratum of broken brick-bats, about 6 or 8 inches in thickness; then a thin sod, turned grass side down, neatly laid all over; whilst over this were laid about 3 in. of half-rotten leaves, and then a light, rich, sandy compost of suitable soil, about 6 in. in depth; the whole being firmly pressed down previously to the insertion of the plants. After these simple preliminaries the crowns and suckers were inserted firmly in the bed of soil, with a small portion of sea-sand around the stem of each. They were placed in lines along the bed, the plants alternating with each other, and at such distances as to allow of free and full growth throughout the season. Thus, at once, without any delay in waiting for the rising or falling of the heat, the whole was finished off complete. The only care afterwards, throughout the

season, being moderate attention to shading in the outset, air, and watering; the latter application being, at proper intervals, freely and liberally supplied. Throughout the summer months a single fire at night was generally sufficient to keep up the requisite charge of temperature in the chamber below. The mean temperature of the bed of soil above was about 90° of Fahrenheit. Never, in the whole course of my observation or experience, have I witnessed a more interesting progress than the growth of the plants alluded to. In less than six months from the time of planting they had attained a strength and luxuriance equal to the best two-year-olds I have ever seen grown in pots, their leaves in many instances being upwards of 4 in. in breadth.*

In consequence of not having it in our power to get up a second range of pits according to the original plan (both being to be heated by one small boiler), in sufficient time last autumn to receive the above-described plants after being potted, as was intended, in September or October, the said plants were left in their summer position throughout the winter; and, having been lately carefully lifted and potted, are now placed in their fruiting-quarters, namely, my "stove for various purposes."

I saw the pine-growing at Versailles. When I visited France in 1838, I was struck with the excellence of the principles of cultivation practised there, as well as its extent. I was favoured, through the polite attention and kindness of M. Massy, director-general of the royal gardens, with a minute inspection of its details, which I thus most gratefully acknowledge. There is, undoubtedly, excellent pine-growing in England, and in Scotland too; but nothing to exceed what I there witnessed. It is, then, the application of the same principles of culture that I am pursuing in connexion with hot water (at Versailles it is chiefly with dung heat). I am endeavouring to reduce the system to the easiest and simplest practice, which I shall shortly go over.

For the growth of the plants, I provide the above-described pits, which may be in two or more ranges or divisions, according to the quantity of fruit required. In February or March, the crowns and suckers are arranged as described. They remain in growth under a high temperature in a close moist atmosphere, without check or interruption (if ordinary attention is paid to shading, air, watering, &c.), until the

* The late lamented Mr. West, who was one of the most intelligent and discerning horticulturists in Ireland, one who had seen much, and could well appreciate pine growing; with all the frankness and candour for which he was so remarkable, admitted to me that he had never before witnessed such a result, and had actually authorised me thoroughly to remodel his pitting arrangements, when he was suddenly called away from the midst of life and usefulness. In him gardening has lost a zealous and ardent patron.

month of September or beginning of October, when they are to be lifted, disrooted, and potted in rather under-sized pots. They are then to be plunged in leaves over the hot-air chamber, in the pit prepared for them, and kept there till February or so, when larger pots are provided, into which they are shifted, and then transferred to the fruiting-stove.

Now, with respect to the culture of the pine-apple, notwithstanding the many able instructions we have from British as well as foreign horticulturists thereon, I would, with due deference, make a few remarks. I think that a strong enough line of distinction has not been drawn between the structure best adapted for the growth, and the structure best adapted for the fruiting, of the plant; I mean as regards circumstances of heat and moisture, light, air, and exposure, &c. During the season of growth, close compact low pits, well supplied with heat and moisture, and a moderate quantity of light and air, are, I conceive, indispensable for the vigorous growth of the plant; whilst, for the purpose of fruiting it, a very powerful transition is, I think, required, namely, a house so constructed as to be capable of the utmost command of heat, light, and air; a house some part of whose roof should, some time every day of the year, be at right angles with the sun: for I maintain that it is impossible to obtain that high degree of flavour of which the pine is susceptible, unless we so expose it; and when fruited in low flat pits, as is so frequently done, I equally maintain that superior excellence of flavour cannot be obtained; and why? simply because the ripening principle, so essentially depending upon heat, light, and air, cannot, under such circumstances, if I may so speak, be accumulated; certainly, by no means to the same amount as they are under a suitably disposed, well ventilated, curvilinear roof. It is possibly true, that perhaps larger fruit may be grown in such pits than under the circumstances I describe, but that is yet to be proved; and although this should turn out to be the case, what, I would ask, is an overgrown fruit? Not much better than a turnip, compared with one of moderate size that has excellence of flavour. Who is it that would not much rather prefer the latter? Such, very briefly, are the principles upon which I recommend the culture of the pine-apple; and, so far as I have gone at present, I feel thoroughly satisfied of their correctness, simplicity, and economy. Nor have I arrived at these conclusions without some experience, much observation, consideration, and care; for, as a professional man, I hope I sufficiently feel my responsibility to the public at large, not to mislead by any statements that from time to time I may advance on such matters; my object in all cases being, however short I may come, faithfully and fearlessly to discharge my duty.

With regard to the application of terrestrial heat to vine and other borders (for why may not the London market-gardener take up the subject and apply the principle, particularly in the forcing of his early vegetables), some time must elapse before I can make any particular statement as to results, having only so recently applied the principle. In the meantime, however, I have sufficient evidence to justify my expectations that it will be found not less salutary as applied to the vine, than it is found in its application to the growth of the pine. With respect to the objection that has been urged from what is called "baking the soil," this, it will appear, can never occur; for, in the case of the annual renewal of my pine border or bed, not the smallest appearance of this kind was indicated, nor should I ever expect it where moisture is supplied with the heat. In my vine border, this is obtained by a simple arrangement in the bottom of the front, or pipe, chamber. Nor can the roots ever be injured, for the pipes (if my sagacious friends who object would consider) are not in contact with the soil. Nor shall I be at all sorry or alarmed hereafter at finding some of the roots even in the chamber, where, I have not the least doubt, a moderate portion of their requisite elements, heat and moisture, may in a short time draw them. As to the expense, what is it? For a border of 50 ft. about 20*l.* or so are sufficient for the pipes. If what is called shanking of the branches, and shriveling of the berries (which I consider arises chiefly from lowness of temperature induced by wetness of the soil), be thus remedied, then it is nothing; nor do I consider it too much to anticipate that such will be the result. Not by any means do I mean that the principle of application introduced by me may not be variously modified, and even improved upon; all I contend for is, that whether it be in close pipes with an evaporating surface, or by circulation in open tile gutters, it will be found safe, salutary, and correct. So much in the mean time on the above subject.

I now turn for a few moments to notice some remarks respecting the arrangement of my "stove for various purposes," which, but for what I feel I owe the public, for whom I act and write, I should have passed by in silence. These remarks, it will be remembered, appeared in this Magazine in the course of the past year, first under the suspicious mask of an anonymous name, and next, from what appears a source not far removed from the above, namely, from a Mr. Hutchinson, but of where he does not tell. Now every man, I admit, has a perfect right, in this respect, to write as he likes, if he chooses it; but it is a sort of cowardly shooting-behind-the-hedge system that I confess I dislike, and never shall countenance, neither, I trust, practise. If I am to be cut down, let it be in the fair, broad, stirring battle field, where I can see and measure my antagonist; and

if I am vanquished, let it be manfully, honourably, and fairly. But for the ambuscade I allude to, sooner than this (had he afforded me the satisfaction I requested, namely, the honour of his acquaintance) I would have measured swords with him on common ground. But be it so, he seems to have tried me upon another tack; and now I shall slacken sail a bit, and give this heroic privateer a fair chance of "coming to" if he will. Perchance, he may be tempted for the glory of his country (wherever it may be) manfully to hoist his colours. My flag is unfurled, and floats in the breeze. The decks are cleared, and all is made tight for action. Sea-room, he may rest assured, I have plenty; and I shall cruise about near the bright broad bay of Dublin until the month of September next, when, at the Royal Horticultural Society's exhibition (of which due notice as to the day will be given), I shall (as both so much desire to meet my stove and its productions in competition) place against them my excellent old commodore, either for the best collection of fruits, or for the best pine, the best grapes, the best melons, the best bananas, the best guavas, or any thing else they choose. So let there be no drifting out of the way, no nonsense; a fair field is all I ask, and no favour. I conclude on the subject of my stove by the following facts, and it may be as well to do so in the easy manner of question and answer. Well then, Mr. Catius and Mr. Hutchinson, by whom, and from where was it, in the spring of 1841, that, at the Royal Horticultural Society's exhibition, the prize was obtained for the finest early cucumbers? By whom, and from where was it, in September last, that at the Royal Horticultural Society's exhibition, the prize was obtained for the best pine-apple? By whom, and where, was it, that, at the same interesting competition, the collections of fruits were grown that drew forth the following well-merited encomium (vide *Saunders's Newsletter* of September 18. 1841)? Under the head of the Hamilton prize for the best collection of fruits I find the following, viz.: "First prize to Mr. Cormick, gardener to the Earl of Charlemont; and a second prize was recommended by the judge to a very superior collection, sent in by Mr. Brandon, gardener to the chief secretary, which, not being in strict conformity with the conditions of the competition (on account of the size of his basket), they felt themselves compelled to disqualify, a decision which, from the intrinsic excellence of the specimens it contained, they made with regret." Again, by whom, and where was it, that the articles were grown, concerning which, at the Royal Horticultural Society's late winter exhibition, the following notice was published (vide *Saunders's Newsletter* for January 1. 1842)? "There were but few competitors in the vegetable classes. These included a brace of cucumbers, 23½ in. in length from the garden of the chief secretary,

Lord Eliot, for which the Society's prize was awarded." With the exception of a few of the above-noticed collection of fruits, the whole was produced by Mr. Brandon, my excellent and much valued old foreman, in my "stove for various purposes."

But, besides these substantial evidences of the adaptation of my house for the purposes described by me in my paper of last year, the following is also the fact: of the guavas, upwards of thirty dishes were obtained from one tree in course of the season; and the dwarf bananas are now coming into flower, occupying only the surface allotted to them, namely, the niches in the back wall, their leaves forming a delightful shade over the head of the visiter. The last time I had the pleasure of calling at my old residence, which was the 5th of March, I found, from cucumber seed sown in said house on the 5th of February, plants with fruit just coming into flower, exactly one month from the time of sowing. As to the silly objections urged by the last writer alluded to, as to the gross impropriety of growing the Chinese plantain and the guava together in the same house, he might as well have urged it against the growth of those plants together in their native regions. All I aim at, in my stove arrangement, is, (with the exception of the strawberry and other hardy plants for forcing, for which I give the best of accommodation,) the useful occupation of every superficial foot of surface under the scope of my semi-curvilinear roof; and that simply by fruits chiefly the productions of tropical climates: and why, let me ask, should not the same fruits be produced in the same house that are produced in the same climate? As to the vine, if proper wintering can be given to it, every one who knows any thing about gardening knows with how much advantage it may be grown for the production of summer or even autumn fruit in such a stove. In short, the partial shade of the vine is important, if properly distributed under such a roof. Any one turning to the description I have given will see how the wintering of the vine is provided for; and, also, how even a succession of grapes in the same house may be obtained. As regards sectional divisions at all in houses used for stove purposes, I much question their advantage. There can be none, certainly, as to the effect. In no case have I seen this exemplified with better effect, and to greater purpose, than at Mrs. Sherburne's beautiful place (Hurst House) near Liverpool, where the centre of an extensive range is a citrus-house, and the extended wings succession pineries, vineries, and plant-houses. In all such cases, as well as in that of my stoves, unless order, adaptation, and suitability are the principles that are followed in fixing the position of each fruit or plant introduced, disappointment and failure must be the result. When, I say, these essential requisites are properly carried out, every

thing will appear in its proper place; all will be regularity, luxuriance, and neatness. Nothing, truly, is more to be deprecated than the masses of confusion which one sometimes meets with in the garden of the mere tyro. Time is indeed a sad tell-tale, as well as being a "test of the truth." If I do not much mistake, the time is not distant when very material changes will take place, not only in the practice of horticulture and botanical cultivation, as it regards the application and means of producing terrestrial temperature, but also as it regards its effect on agriculture, as connected with the improvement both of soil and climate through the medium of drainage. In the mean time, I may be allowed to add, that I hope to live to see some more of these results than have been thus so crudely set forth.

April, 1842.

Art. II. *A few Hours at Mount Vernon, formerly the Country Residence of General Washington.* By C. W. Elliott.

It is proverbial, that what a man can have for the asking he undervalues; and visiters know more about the curiosities of our cities than the residents themselves. I have spent nearly a year in the neighbourhood of Mount Vernon without having been there; but, when on a visit of but three days, I made it a point to go over the place where Washington spent the happiest part of his life, and where his ashes now rest.

A bright October sun consoled me for the disquiets of a jaded hack and a hard saddle; though, under such circumstances, I could not forget myself and the present, and go back to the time when on this same road La Fayette and Washington waved from their carriage windows their last farewell; to the days when the master spirits of the age, with a host of others, carried to Washington in his retirement the tribute of their esteem and love.

The gate opens between two small stuccoed cottages, which are simple, and good only in comparison with the common negro houses of the country; the old woman took my "bit" (6*d.* sterl.) with a curtsy that might have done honour to a duchess, and I rode in upon the soil that bore the foot-prints of Washington. The carriage-way winds among the native monarchs of the forest, and is in extent nearly half a mile to the house; it is much neglected, and washed by rains so as to be almost impassable, but takes its way naturally and gracefully, giving one an idea of taste and of domain which could not be the result of a strait and meagre way.

There was no living thing in sight, and in the deep shadow, or the open sunlight, the leaves seemed to whisper the name of Washington. The silence was so profound, that at the twirling

of a leaf or rustling of the wind, I involuntarily turned to see the grey shade of him who had loved to walk here, when in the fulness of his strength, as the statesman, the soldier, and the man. The road approaches upon the rear of the house, and, passing along a range of offices, leads between them and the house to the door, which is on one of three sides of a hollow square. Though the effect of a full view of the house (upon the approach) is lost, yet it is somewhat compensated by the expectation which the house, veiled and sheltered by a varied foliage, rising above the range of outbuildings, excites, and which expectation, in this case, is not disappointed. The carriage-way turns in a circle, forming a kind of court, which stretches away into a shrubbery; on each side are the offices, beyond which are continued walled gardens for fruits, flowers, and vegetables. These walls are hid from the house by shrubs, and a variety of foreign, with the choicest of our own, forest trees; and I saw among them, for the first time in perfection, the rich and beautiful holly, its deep shining mass of green sprinkled with its coral berries.

I knocked at the door, wishing much to get a sight of the interior, but got no answer; at last a voice from one of the offices told me that the family (of Mr. John Washington) were all absent, and that no one was admitted unless he brought letters, or was a friend of the family. I could not press my request upon either of these grounds; but as she mentioned that visiters from abroad sometimes left their cards for the family and were admitted, I at once added that I was a great stranger, and was very anxious to take advantage of this visit, as it was doubtful if I ever should be there again, and, moreover, that I would pay her for her trouble. "Is you *very great* stranger?" I felt bound to say that I was. I felt sure now that I should succeed, and took one of her little "pledges" to show me the tomb, while she should see the woman who had the keys. This (the tomb) is as inelegant a structure as red bricks and mortar can well make it, and excited in me only a feeling of regret and a spirit of criticism; instead of such more noble thoughts as should, like the vine, cluster around the "tomb of Washington." The old vault seemed to me infinitely more appropriate, and certainly more picturesque: a group of cedars covers the arch, and wave their arms in deep shadows over his resting-place; fit guardians for his remains.

Of our fathers it is said:—

> ——————"Green sods
> Are all their monument, and yet they tell
> A nobler tale than sculptured urn, or the
> Eternal pyramids."

In such a place, improvement and ornament should harmonise,

and not contrast, should soothe rather than excite; almost all will assent to this, and yet these things are almost invariably garish and offensive.

I dismissed my attendant and walked over the lawn; it slopes gently towards the river for a short distance, when it falls away suddenly and is covered with a dense wood, which belts in what may properly be called "the lawn." The house is high above the river, and looks over an extensive prospect to the east, and also commands a distant and beautiful view down the river. The exterior is very well shown in most of the common representations of it that I have seen, and (except that the wood is in imitation of stone) is altogether a fine mansion, and in good keeping with the place. The keys, with the woman, were waiting for me on the piazza; she showed me into the library of General Washington, which is still used as such by his descendants. I looked to see the books that he used, the chair that he sat in, the table, the drawings, the pictures that were his, but they were not there; and I learned, with regret, that these many little evidences of his character and taste had been dispersed among his relations and friends. The key of the Bastile, which was given to him by La Fayette, hangs in the hall (an offering at the shrine of freedom), and is almost the only little thing that was shown to me as his. I wished, and expected to find, as much as might be, every thing preserved in the same state as when he lived, but all seems and is changed. The great room, on the north of the house, which was used as a dining-room on state occasions, and is, for this country, a large well-proportioned apartment, is ornamented by a mantelpiece of coloured marbles, which was presented to Washington by the officers (or some of them) of the British army; it has three very pretty bas-reliefs, representing rural and agricultural scenes; but I could get no particulars beyond this.

The house contained little to interest, and I soon turned my steps to the gardens; these, as I mentioned, are both walled. The flower-garden is laid out in right angles, and is bordered with box, which has now grown large; every thing was untrimmed, and showed a want of care. The greenhouse contains some fine orange and lemon trees, some pomegranates and bays, and a few aloes and other plants; but they are all crowded, and want the hand of a master and an amateur.

A number of suggestions have been made relative to the purchase of this estate (or a part of it, including the house) for some national purpose: it is a place that interests all Americans, and it is desirable that some feeling of love and veneration for that which is good or beautiful in itself or by association should be preserved and (with us) encouraged. We do not look back, but ever forward, and we either fail to see, or else neglect, the

lessons that history teaches. I am not aware that any attempt has been made to purchase the property, or to ascertain from the family how it could be purchased. There is, at present, a good deal of attention to agricultural interests, which has resulted in the formation of a national society; if the situation of the estate, soil, and other circumstances, are such that an agricultural school could grow up there, it would seem to me worthy of consideration; for we find that the love of the country, its pursuits and amusements, held a prominent place in Washington's dispositions and tastes. He was educated where the occupation of a planter was not only the most respectable, but (if I may say so) the most aristocratic, manner of life; this tended to give it a character and desirableness which it does not possess among a more mercantile community, and which, under ordinary circumstances, would have resulted in its rapid progress as a science and art. Washington, in a letter to Sir J. Sinclair, 1796, says, one advantage that Pennsylvania possesses over Virginia and Maryland is, "that there are laws there for the gradual abolition of slavery, which neither of the two states last mentioned have at present, but which nothing is more certain than that they must have, and at a period not remote." Political and military pursuits are perhaps as engrossing as any others, but Washington, amid his toils and anxieties, found time to direct his various agricultural, horticultural, and ornamental projects. We find him, after he left the army, resuming his old habits with ease and pleasure, leaving them for the presidential chair with reluctance and regret, and again returning to them with increased delight, to spend his last days in the pursuits and amusements of his early life. It becomes an interesting speculation, as to the influence that this love of nature, and this facility for finding occupation and pleasure, may have had upon his whole life, and in directing him to the true uses and ends of power, rather than to its consequence and excitement to himself.

Cincinnati, Ohio, 1841.

Art. III. *On extending a Knowledge of, and Taste for, Horticulture.* By Peter Mackenzie.

More than 150 times have I read that part of the titlepage of the *Gardener's Magazine* which has the appearance of rays of glory, and reads, "Register of Rural and Domestic Improvement." Much intended for the benefit of the rural population has been registered in the volumes of your Magazine; but I am afraid that a large portion of the good meant for them resembles the light of the distant suns which astronomers tell of, but which has never yet reached our planet. Among all the horticultural

periodicals that exist, there are none that I know whose pages are entirely devoted to the use of the cultivators of cottage gardens. Many a useful article slumbers in the by-gone volumes of the *Gardener's Magazine*, that might be awakened into life and vigour, and scattered by thousands, in the shape of monthly horticultural tracts, among the cottagers of our country. Many objects have been furthered by means of tract circulation, and why not gardening? If public taste be rapidly advancing in favour of painting, sculpture, architecture, and gardening also, surely any laudable means that has for its object the advancement of knowledge and comfort among the labouring classes of the community ought to have the support and goodwill of every benevolent individual. A little encouragement from landed proprietors and horticultural societies would do much to promote the circulation of tracts, which might even be given gratis for a time, until a taste for reading them were formed in the minds of the individuals for whose benefit they were intended. With an extensive circulation, a four-paged tract may be produced for a halfpenny, or perhaps less. If the love of gardening has a tendency to improve and humanise the whole man, surely the small cost at which that love may be fostered should never be looked upon as money thrown away. It would be employed for one of the best of purposes, if, by means of these monthly messengers, the cottager should be enabled to grow better vegetables, and increase the quantity and quality of his fruit, and to decorate his garden with finer and rarer flowers; and be led to examine the works of his Creator with a philosophic eye, to institute a higher-toned morality, and become a better member of society.

Although Chambers's *Edinburgh Journal* and the *Penny Magazine* have been in existence many years, yet they have never reached the dwellings of thousands of our rural population. It is melancholy to think that there exist such a multitude

> "Who loathe to taste of intellectual food,
> Yet surfeit on old tales of Robin Hood."

Instead of transmitting traditional stories, and revelling in the superstitious annals of hobgoblinism, the horticultural tracts might be made the vehicles for conveying intellectual aliment suited to the rustic capacity. In whatever circumstances human beings may be placed, there is generally one station left which may be occupied by all, namely, that of physical enquiry; and perhaps there has never been any age, since the world began, that could match the present for investigation into the laws of nature.

The reasoning faculty is no longer forced to tread the beaten path of custom, and many are the human minds that show signs of awakened energy in the various departments of nature. The

astronomer is still making discoveries in the unlimited field of space, the geologist is getting more familiar with the wonders of his department, the chemist is still finding out new combinations which will yet benefit the world; but with all this activity, there are still masses of human minds that remain in darkness, which, if enlightened, might give hopes of future Fergusons and Franklins, and Arkwrights and Watts. By combining the rays of knowledge into a focus, we may expect in due time the bursting forth of light and heat, that will extend their beneficial influence to the remotest tribes of our globe. Among chemical bodies, there are two great classes called acids and alkalies; the one may be intensely sour and corrosive, the other hot, bitter, and caustic, and yet they may be made to neutralise each other, so that even paper stained with litmus and turmeric will not be affected by them: in like manner, the humanising effect of gardening upon the minds of a nation may have a tendency to curb the overgrowth of those passions that often disturb the peace of society; those who engage in that delightful pursuit may be led to look upon the green earth and the blue and the boundless heavens in a new and unexpected aspect, and admire the wisdom and goodness of our Creator

" In rocks and trees, in every blade and flower."

West Plean, April 5. 1842.

Art. IV. *Flower-Gardens and Song Birds.* By Charles Waterton, Esq.

" Inutilesque falce ramos amputans,
Feliciores inserit." *Horace.*

With pruning-knife, the useless branch he cuts,
And in its place a graft prolific puts.

How I prize the gardener! He is Nature's primest jeweller; and he has the power of placing within our reach all that is nutritive, and luscious, and lovely, in the enchanting domains of Flora and Pomona. Without his assistance, Nature would soon run out into uncurbed luxuriance; the flowery lawn would disappear, and ere long the hemlock and the bramble, with a train of noxious attendants, would lord it all around. To the industry, then, of the gardener we are indebted for scenes of rural beauty quite unparalleled; and to his science we owe the possession of every wholesome fruit and root. In times too, now long gone by, ere the ruthless Reformation smote this land, the gardener's nomenclature was truly Christian; for scarcely a flower, or shrub, or root was known, the name of which did not tend to put us in mind of future happiness in the realms of eternal bliss. Hence, the gardener is my friend; and wherever I have an opportunity of surveying lands which

bear marks of his interesting labours, I wish him well from my heart, and I hope that he may not fail to receive a remunerating return for his many useful services to us.

Were I asked my opinion of a highly cultivated English flower-garden, I should say that it is the loveliest sight in rural nature; and, moreover, that if it afforded me an opportunity of listening to the song of birds, I should pronounce it little short of absolute perfection. But, in general, the charming melody of birds is of rare occurrence in the modern flower-garden; and I fear that any observations which I may make on this head will not have sufficient weight with them to attract attention to it on the part of the horticulturist. Nevertheless, I will venture for once to offer a remark or two to Mr. Loudon's readers on a subject which always interests me; and, if what I shall say does not meet with their approbation, may I hope that they will give me credit for good intentions. I wish not to appear dictatorial. A few brief observations, penned down without the least wish on my part to be considered in the light of an innovator, will, I trust, not be wholly lost.

To me, whom kind Providence has destined to spend the best part of my time in the open air, the song of birds is soothing beyond expression; and, whilst I am admiring the beauty of the rising flowers around me, I know no greater addition to my gratification than that of listening to it. How enchanting is it to inspect the early snowdrops, those "fair maids of February," whilst the stormcock is pouring forth his newly acquired notes from the top of a neighbouring elm! and how delightful it is to hear cock-robin's carol on the thorn that affords a shelter to the humble primrose! The lily of the valley, too, sweet, lovely, lowly daughter of May, how I gaze in ecstacy on its virgin whiteness, whilst the stranger cuckoo's note sounds through the dell, and insures me the return of warmer weather! The chaffinch, too, and the whitethroat, and the thrush, and the blackbird, with pretty jenny-wren, and the hedge-sparrow, all add charms inexpressible, by their sweet voices, to the rising flowers of the dale. And this brings me to another bird not seen now in this country, but interesting to us on account of the place which it occupies in Holy Writ. Its history is but little known to the world at large, and its identity is exposed to be called in question, on account of the name which it erroneously bears. The bird to which I allude is the *P*ásser solitàrius; in English, the solitary sparrow; and in Italian, passera solitaria. Would Mr. Loudon's readers lend a patient ear for a short time, they shall have both the history and the true name of this bird placed in a proper light.

The royal psalmist, whilst bending down in penitential prayer before his offended Maker, exclaims, "Vigilavi, et factus

sum sicut passer solitarius in tecto." "I have watched, and am become as a sparrow all alone upon the house-top." I have often wondered what bird this could be; knowing, by daily experience, that it could not actually be the house-sparrow; for the house-sparrow is not solitary in its habits. I despaired of being able to trace its character satisfactorily, and I should probably have long remained in ignorance of it, had I not visited the southern parts of Europe.

My arrival in Rome let me at once into the secret. The bird to which the repentant king of Israel compared himself in the seven penitential psalms is a real thrush in size, in shape, in habits, and in song; with this difference from the rest of the tribe, that it is remarkable throughout all the East for sitting solitary on the habitations of man.

The first time I ever saw this lonely plaintive songster was in going to hear mass in the magnificent church of the Jesuits at Rome. The dawn was just appearing, and the bird passed over my head, in its transit from the roof of the Palace Odescalchi to the belfry of the Church of the Twelve Apostles, singing as it flew. I thought it had been the Italian blackbird, with notes somewhat different from those of our own; for its song was partly that of the blackbird, and partly that of the stormcock, but not so loud as the last, nor so varied as the first. I found out my mistake in due time; and, on seeing that the bird was the true solitary thrush, I paid particular attention to its habits.

It is indeed a solitary bird, for it never associates with any other, and only with its own mate in breeding time; and even then it is often seen quite alone upon the house-top, where it warbles in sweet and plaintive strains, and continues its song as it moves in easy flight from roof to roof. The traveller who is fond of ornithology may often see this bird on the remains of the Temple of Peace, and occasionally in the Villa Borghese, but much more frequently on the stupendous ruins of the Baths of Caracalla, where it breeds in holes of the walls, and always on the Colosseum, where it likewise makes its nest; and, in fine, at one time or other of the day, on the tops of most of the churches, monasteries, and convents, within and without the walls of the eternal city.

It lays five eggs of a very pale blue. They much resemble those of our starling. The bird itself is blue, with black wings and tail; the blue of the body becoming lighter when placed in different attitudes.

Whilst I lodged in the Palazzo di Gregorio, this solitary songster had its nest in the roof of the celebrated Propaganda, across the street "dei due Macelli," and only a few yards from my window. I longed to get at it; but knowing that the Romans

would not understand my scaling the walls of the Propaganda, in order to propagate the history of the solitary thrush, and seeing, at the same time, that the hole at which the bird entered was very difficult of access, I deemed it most prudent to keep clear of the Propaganda, and to try to procure the nest from some other quarter.

The many promises which Roman sportsmen had given me of a nest and eggs of the solitary thrush having entirely failed, and I myself not being able to go in quest of them, on account of an attack of dysentery, which bore heavy on me, I despaired of obtaining the object of my wishes, and I should have left Italy without either nest or eggs, had not the Rev. Mr. Cowie, vice-president of the Scotch College in Rome, exerted himself, as he had already often done, in the cause of natural history. This learned and worthy gentleman sent expressly for a nest to the vineyard of his college. It was found in the roof of the house, and had four eggs in it. The lad who took it had succeeded in capturing the female bird. Having examined the poor captive as minutely as though I had been a custom-house officer, I turned it loose into the world again, and as it flew away I hoped it would have better luck for the time to come. I sent the nest and eggs to England by a different route from that which I myself pursued. Had I taken them with me, they would have gone to the bottom of the Mediterranean Sea, for, in the night of the 16th of June, 1841, my sisters-in-law, Miss Edmonstone and Miss Helen Edmonstone, my little boy, my servants, and myself, were wrecked off the Island of Elba. We had only fifteen minutes to save our lives before the vessel foundered, and we lost every thing except the clothes on our backs.

The solitary thrush is seen in all the countries of the East, up to Syria and Egypt, and probably much farther on. This bird is solitary to the fullest extent of the word. Being an assiduous frequenter of the habitations of man, I cannot have a doubt but that it was the same bird which King David saw on the house-top before him, and to which he listened as it poured forth its sweet and plaintive song. Moved by its melody, and comparing its lonely habits with his own, he exclaimed, in the fulness of an afflicted heart, "Vigilavi, et factus sum sicut passer solitarius in tecto." "I have watched, and am become as a *thrush*, all alone upon the house-top."

Walton Hall, April 10. 1842.

Art. V. *On the Cuckoo.* By J. Wighton.

Though the cuckoo's note is familiar to every one, there are some things connected with its habits which are known but im-

perfectly, and still open to discussion. It is the common opinion of naturalists, that the cuckoo deposits an egg in the nest of some small bird, and that the egg is hatched, and the young bird reared, by its foster-parent. There are some, however, who doubt this generally received opinion. Among these may be instanced Mr. Mudie, a very accurate observer of nature, who has advanced some things quite at variance with the common theory. He says: "We have never met with the egg of a cuckoo along with that of any other bird, have never scared a little bird from the act of incubation in a cuckoo's nest, and never have detected one little bird in the act of feeding a cuckoo, either in the nest or out of it."

Though I can no more boast of any of these discoveries than Mr. Mudie, I still see no reason to doubt the received opinions, since so many profess to have scared small birds from the act of incubation on cuckoo's eggs along with their own. I have some recollection of having, when a boy, once seen a little bird feeding a cuckoo, which my companions called *gowk* and a *titling*. Why the bird is called gowk in Scotland does not appear to be connected with the meaning of that word, which is *fool*, but from the Scottish mode of imitating the first syllable of the bird's cry, *gowkoo*. In most languages, it has a name expressive of its peculiar cry.

Again, Mr. Mudie says: "There is another circumstance, which gives at least a colour of probability to the fact, that the cuckoo does not use the nests until they have answered the original purpose of the builders, and that is, that the hatching time of the titling, whether that titling be the common pipit, as is most common in the north and east of the island, or the hedge-sparrow (Accéntor modulàris), which is said to be the foster-bird of the cuckoo in the south of England, is earlier than that of the cuckoo." If cuckoos were reared in hedge-sparrows' nests, and their nests never found after the usual time of building, by the first ones being destroyed, there would be much plausibility in Mr. Mudie's opinion, for in general their brood is hatched before the cuckoo arives in this country. But I never knew an instance of cuckoo's eggs being found in hedge-sparrows' nests; it is in the nests of wagtails, whinchats, and titlarks that we may expect to find an egg, and sometimes, though very rarely, two, a little larger than the rest. It does not appear to have been ascertained by what rule the cuckoo proceeds to palm her eggs upon small birds; that is, whether she lays one egg in each of several nests, or whether the two eggs sometimes found are deposited by the same bird.

I am aware that other naturalists, and, I believe, Mr. Selby, mention the hedge-sparrow as the foster-bird of the cuckoo. But it is worthy of attention, that the nests of all the birds referred

to are too small for incubation by a cuckoo. It is not till after the brood are advanced in growth that the nests are pressed out beyond their original shape, and the rightful brood smothered and cast out. Much has been said of the manner in which this is effected, but it appears to be merely done from that instinct to keep their nests clean which is common to all nestling birds, and their brood are obliged to give way to the law of the strongest. Some suppose that the cuckoo cannot build a nest; others, that its formation or habits are not suitable for incubation. The Bishop of Norwich says on this subject: "Is it because, alone of all the feathered race, it is without those affections in every other species?" Here is a small mistake, for Mr. James Wilson mentions the cow-bunting of America, that leaves the care of its eggs to other birds.

Connected with this subject, Mr. Mudie observes: "The cuckoos have, in common with many other birds that feed and nidify in trees, a habit of jerking a twig of a neighbouring tree, while of that which they hover on or enter not a leaf stirs." What can this mean? Does the bird get hold of a branch of another tree that may happen to reach in among those of the tree on which it enters? If so, it is curious indeed.

The time is come for the cuckoo's arrival among us; and I shall be glad if these remarks lead others to make further enquiry into its habits.

Cossey Gardens, April 27. 1842.

Art. VI. *Remarkable Instance of Instinct in the Flycatcher.* By John Dunlop.

In the month of August, 1841, the following remarkable instance of the natural instinct, or reason, possessed by birds, came under my observation. I had for some days observed a pair of flycatchers feeding their young, which were generally perched upon the dead bough of a *C*ratæ`gus *O*xyacántha. Their attachment to this branch induced me to examine it, when, to my astonishment, I found upwards of a dozen of Bómbus terréstris thrust upon the spines as securely as if done by the hand of man. Some were living, others were dead and partly devoured, which solved the mystery. I carefully removed the bees, on purpose to watch the process of the birds in placing them there, and I soon had the satisfaction of seeing them catch them upon the wing, carry them direct to the branch, and thrust them upon the spines in the manner described. What was still more singular is, that the spines were forced through the most vital part, as you will see by the specimens I have sent you. The shyness of the birds put it out of my power

to detect the young ones feeding upon them; but all those which they had partly devoured showed that they were aware of the danger of the sting, for they only eat out the pulpy part of the abdomen. Is it not reason or something very like it, that the parents should place the bees upon the spines of a tree to deprive them of life, no doubt aware of the danger their young might sustain if they fed them upon the living insects, as is their usual habit; and also should choose a dead branch to suit their purpose, on account of the hardness of the spines. I send you these observations as an example how a fact involving an interesting speculation as to the mental faculties of these birds might be within the reach of every one who would only pause to observe.

Leigham Place, March 20. 1842.

Art. VII. *The Principles of Gardening physiologically considered.* By G. Regel, Gardener in the Royal Botanic Garden at Berlin.

(Translated from the *Garten Zeitung.*)

(*Continued from* p. 199.)

I. On the Propagation of Plants — *continued.*

3. The practical method of propagating by buds. Written in conjunction with my colleague A. Brauer.

The last section treated of the various parts that proceed from the bud, and thereby showed that most of these are of unlimited formation, and that the normal bud can only be brought to complete developement by art. The present section shall therefore treat principally of the general principles to be followed in propagating by the normal bud, and of its peculiarities, and will conclude with a short notice of the bulb and tubercle formations. For this purpose I engaged the assistance of A. Brauer, as he not only has the experience of propagating in this garden, but superintended that department two years in the establishment of M. Haage, jun., and by his means we have collected much valuable information, which we now offer to the public.

Propagation by buds is of as great importance in gardening as that by seed; and although it is often attended with greater difficulties than the latter, yet it may be asserted, that almost all the plants that have been discovered can be abundantly propagated by the one way or the other. Propagation by buds is of the greatest importance to our greenhouse plants, as many of them either do not produce seed at all, or they are only capable of doing so when the plants are old, and before they have attained that period they frequently perish. Also, as the species is generally only propagated by seed, and the bud continues

the individual with all its imperfections, metamorphoses, and peculiarities, it follows that by this means only can we procure so great a variety of our favourite ornamental plants. There are besides many annuals which rarely bear seed, and can by propagation of the bud be preserved to our gardens: such, reared in the autumn, can be stripped of their young shoots in winter; and, by continuing this practice, the most valuable can be in no danger of being annihilated. The beautiful Tropæ'olum Moritz*iànum* may be reckoned among those that have been preserved in this manner.

The most usual method of propagating in this manner is by a shoot on which are several buds, which is called propagation by division; and other methods are by single buds detached from the stem in various ways, or even by leaves on which adventitious buds have been formed. The parts to be propagated are divided into two; viz. those which, when put in the earth, produce roots, and those which are left somewhat out of the soil, and which produce shoots by the developement of buds.

a. *Propagation by Cuttings and Layers.*

Success in this manner of propagating depends upon many circumstances, all of which must be attended to if you expect favourable results to follow. Attention must be paid, in the first place, to the soil to see that it contains a proportionate mixture, the state of the air, and the necessary degree of heat and moisture in both these elements, the time of year in which the cuttings are made, the cut itself, and the nature of the cuttings. We will make it our study to unfold as clearly as possible the general established principles, and will illustrate them as much as possible by examples, and by reference to physiological rules; at the same time we must confess, that, however great our exertions may be to render the whole as clear as we can, a practice of several years' duration is necessary for a successful application of these principles. It is well known to those who have had much practice in propagating, that, with cuttings which are difficult to strike, the smallest deviation from the established principles is sufficient to produce an unsuccessful result of the operation, while, on the contrary, an opposite practice had always been attended with success. A sufficient acquaintance with all the variations of the locality, and also a careful trial of all the necessary directions proposed, are the chief requisites for a successful result in propagation.

Cuttings evince a very striking difference with respect to their power of making roots. Some of them, for instance, put out roots with the utmost ease, under all circumstances; others, again, under certain conditions; while others produce them with difficulty, under very limited conditions. In general it may be

observed, that most plants which have a rapid and luxuriant vegetation, and whose wood contains much pith, and is therefore not firm, are easily propagated by cuttings; such, for example, as a great number of our hothouse plants, shrubs, and annuals at certain periods, and many of our soft-leaved greenhouse plants, such as pelargoniums, salvias, petunias, nierembergias, fuchsias, and the different species of calceolarias and verbenas; among which but few have evergreen leaves, such as our common myrtle. Cuttings, on the contrary, of trees and shrubs that have hard wood, and generally with evergreen leaves, and a slow and tardy growth, strike with more difficulty; such as Bánks*ia*, Dryándr*a*, *A*càcia, Ardísia, Casuarìna, *L*aúrus, Camél-l*ia*, *P*ìnus, Scótt*ia*, and the different species of *Q*uércus, with many others. This is, however, by no means a rule without exception, as in many genera one species grows easily, and another with difficulty; and there are also many with soft wood which easily rot on the surface of the cut, or drop their leaves, &c.

As soon as the cutting is separated from the parent plant and put into the earth, it begins to receive the crude nourishing sap through the cut (Schnittwunde). As the vessels have been injured in making the cut, the nourishing sap no longer ascends by endosmosis in the woody body, but the buds and leaves on the cutting act by the evaporating process (Verdunstungs Progress) somewhat like a pump (as M. Meyen so emphatically expresses it), and thus draw the sap upwards to the buds and leaves, where it becomes formation sap, and, returning in the inner bark, comes out at the cut, where it becomes hardened, and forms a parenchymatised cellular tissue, which by degrees frequently covers the whole surface of the cut, and produces the callus formation.

The callus continues to grow larger and thicker till the buds on the cutting begin to unfold themselves; and when it has attained a considerable size it supplies the place of roots, as it imbibes the crude nourishing sap and conveys it to the woody body. The developement of the bud produces a transformation in the deposited nourishing sap in the cutting, which is partly used in effecting the developement of the young shoot, and partly in aiding the increased vital action, and is again returned by means of the inner bark. The young callosity is thus formed on the cutting, and also the formation of the root in close connexion with it, which always has its rise in the former and proceeds from it.

The root, therefore, generally comes out at the base of the lowest node on the side of the bud, and when the cut is properly made it comes out immediately above it; or it comes out in a similar manner from all the nodes which are under the soil, as may be seen in the closely leaved plants, such as E′pacris,

*E*rìca, Brùn*ia*, and those plants which easily make roots. In the latter the roots even sometimes proceed from the internode.

To these may be added herbaceous plants, or those that have a soft wood and are of rapid growth, which easily and quickly produce the root formation; and, as these have a much more intense vital action than hard-wooded trees and shrubs, they imbibe the nourishing sap much more quickly and form the callus more easily; and, as they are almost continually growing from the beginning of spring till late in the autumn, they are, therefore, fit at almost every season of the year to form a young woody layer, and more capable of producing the roots which proceed from it; consequently, they are not so long exposed to accidents as those which are slow in forming their roots, and before that period frequently perish.

The most suitable time for making cuttings is therefore after a period of rest, when new shoots begin to show themselves, and when the plant is in possession of its greatest activity. This time is in March and April for plants that require a cold temperature; for those that require greater heat the cuttings must be made somewhat earlier, as practical experience has fully proved. The second shoot makes its appearance in the months of June and July, but is not in a fit state for propagation, because the strength of the plant has been already exhausted by the first shoot.

With regard to the time of year, these fundamental principles can be only but very vaguely fixed, as the time must more particularly be chosen when the new shoot begins, and this varies very much according to the different zones from which the plants come. Those that easily produce roots, which we have taken less into consideration, may be made into cuttings almost all the year through. Many of these, such as the species of Calceolària, Pelargònium, Fúchs*ia*, and *S*álvia, were, for instance, in this garden, made into cuttings in the latter end of August and the beginning of September, and put in a moderately warm hotbed, where they made roots before the frost set in, so that a part of the old plant would be cut away.

The first two genera, with a few exceptions, such as Calceolària nívea, Pelargònium trícolor, &c., should have their cuttings placed in quite a cold bed, giving it air from the beginning, at least during the night. Although they will make roots more slowly, they will be more certain; and, on account of their steady and firm growth, they will be more enabled to pass the winter in a house that is perfectly cold, or, like the calceolarias, in a pit protected from the frost.

In propagating those plants that are difficult to make root, we must be very careful that the cuttings are kept in such a condition that they may be fresh and healthy at the time the root

formation takes place; also that the vital activity is hastened, so that they may be capable of a quicker absorption of the nourishing matter, as by this means the root formation will go on more quickly; and, finally, the most suitable soil should be chosen, and the cut made with the greatest care, as all these particulars greatly contribute to the success of the cutting.

(*To be continued.*)

ART. VIII. *The Landscape-Gardening of F. L. von Sckell of Munich.* Translated from the German for the "Gardener's Magazine."

(*Continued from* p. 210.)

XIV. *On excavating Lakes.*

1. THESE liquid mirrors, which appear so extremely beautiful in the landscape, cannot be otherwise than acceptable in pleasure-grounds. Besides their intrinsic value in the landscape, they communicate life and animation to nature. The sun, the moon, the lowering sky covered with dark clouds, the trees and shrubs overhanging their banks, with the company walking on their shores, are depicted every day in a new form in their waves; they impart novelty to the picture, and are of infinite value as objects of imitation by art.

In fine summer days pleasure-boats, full of gay company, float on their smooth surface, delightful harmony resounds from the islands, where the sylvan choristers unite their voices; and the moon is reflected in this picture of repose with solemn splendour.

In the season when nature is stripped of her charms, when she appears in an entirely different, naked, and forlorn condition, and is but little visited, lakes, which are then covered with a smooth surface of ice, invite us to gymnastic exercises. Active young people glide happy and cheerful on skates and sledges over the crystal surface, and recall mirth and life where both had for a time been suspended.

2. When lakes of this sort are to be made in gardens, hollow rather than elevated spots should be selected, and also not too near the dwelling-house, on account of the damp; neither should they be dug too deep, as has been already mentioned, that they may not present the slightest danger, nor occasion fear, which, in pleasure-grounds where children are permitted to stroll, and where in summer exercise is taken in boats, and in winter on skates on the ice, should be carefully avoided.

The bed of the lake should, therefore, be hollowed out of a concave form, that is, it must slope gradually from the sides, becoming deeper towards the middle, and never sinking abruptly, so that, if any one should fall in, he might easily wade out again. Excavating a lake is generally performed by piece-

work. It is a good plan to dig through the middle of the lake first, that is, to form an empty space of about 30 ft. wide, so that the carts may have plenty of room; and to distinctly mark out the concave line the bed is to assume. This sort of excavation has much resemblance to the excavation of valleys; only, in this case, it is not necessary to give any other than the usual concave form to the bed, which is under water, with the proper depth, declining towards the outlet.

When unsightly bogs or hollows have been filled up with the earth, and lawns or plantations improved, the remainder may be made use of in raising hills in suitable situations.

3. Besides the usual sluices composed of boards, which are raised and lowered by means of rollers, there is a much more simple construction, composed of movable rectangular pieces of wood, laid one upon another in grooves in pillars, by means of which the water is retained or let off. This very old invention, on account of its particular simplicity and usefulness, and because it is not visible in pleasure-grounds, and consequently cannot prove a disagreeable object, I will explain to the modern artist, who may chance not to be acquainted with it.

In the spot where a sluice is to be constructed, a paved bed must be made for the water, so that it may neither undermine the sides nor the posts of the sluice, nor become very deep, nor cause any other damage. At the same time, the two posts of the sluice, either made of stone or of oak, must be set up from ten to twenty feet apart, according to the required space or opening. On the inner sides of these posts grooves must be cut, which may be about 6 in. wide and 5 in. deep; and in these the sluice-boards (stauhölzer) are to be laid.

These two pillars or posts must be united by a horizontal beam, on which the first sluice-board may be firmly laid. When the grooves in the pillars are six inches wide, the boards may be 5 in. thick, to allow room for them to play, and from 6 in. to 7 in. deep. They may also be made as thick as they are deep; this only depends on their length, because at the same time care must be taken that they are not too heavy, that they may be easily laid in, and easily taken out again.

If, for example, the space between the pillars is 10 ft. (the depth of the groove included), the boards should only be 9 ft. 10 in. long, to allow them sufficient room to play in the groove, and that they may not be in danger of sticking when being taken out or put in. Each of these boards, the number of which is determined by the height of the water, must be provided at each end with a round plug (either of wood or of iron), projecting horizontally 6 in. on each side, so that it may be taken hold of with the hand or any instrument; and by means of these plugs the board may be taken out and put in again. By means of these boards, which are laid quite simply close over each other in

the grooves of the pillars, so that scarcely any water can run through, if they fit exactly, a lake or pond may be dammed up to any required height, and again let out. For example, as many pieces of wood of the same size are laid in as will reach to the top of the lake or pond; and when it happens that the last board is either too high or too low, a particular board may be made for this contingency, and laid on at the top.

Experience has sufficiently proved the utility of these constructions, which are in general use in the neighbourhood of Munich; so that I can recommend them with all confidence, as they are not so expensive as the common sluices, and, as I have said, cause no unsightly appearance in pleasure-grounds. When they are used, no building, roller, chain, or lever is seen above the water, nor any clumsy sluice-board in chains in the air. A sluice of this sort may be so contrived as not to be seen at all, for it is sufficient if the pillars in which the boards are laid project at most only from 4 in. to 6 in. over the water at its greatest height, which can scarcely be observed. In letting off the water, the boards which are taken out may be concealed in the bushes.

In the Royal English Garden at Munich, a waterfall 89 ft. broad was made at my suggestion, and the sort of sluices described above made use of at five different outlets, because the upper and lower brooks at that spot required to be laid dry once or twice in the year. The rocks forming these waterfalls were thrown about in natural masses before these outlets and before the pillars, and the latter entirely concealed by them. Not the least part of this artificial sluice is perceptible; and the tops of the posts, which rise about 9 in. above the surface of the water, are so contrived that they resemble the rocks. The five outlets from the left to the right have the following breadth: viz. 9 ft., 11 ft., 14 ft., 21 ft., and 29 ft.; the two posts at the broad outlet are 4 ft. square, and the others 3 ft. 3 in. At the influx into the lake the landscape-gardener should endeavour, when it is possible, to make a striking waterfall.

On making Ponds.

4. In making ponds we proceed nearly in the same way as for lakes. The banks should also gradually slope under the surface of the water, and the bed should slope towards the outlet, so that it may be laid dry when required, like that of lakes. But as the banks of the ponds should be raised 3, 4, or 5 feet, for the sake of the effect of overhanging shrubs, this should be performed here and there with masses of rock, which would prevent the danger of the earth falling in.

The spaces between the rocks may be left, as in lakes, in gentle slopes, which will create agreeable contrasts, and may sometimes only be covered with turf, without any trees or shrubs.

As it often happens that these sheets of stagnant water are rendered foul by water plants and other objects, it is necessary, besides the frequent drawing off of the water, to keep a number of swans, because the water plants serve them for food, which their long necks enable them to bring up from the bottom and thus to extirpate entirely.

XV. *General Observations on the Arrangement of Woods on a large Scale observed by Nature.*

1. Nature has adorned our earth with so many examples of various woods, in so many different situations, and under so many forms, that we can never be at a loss with those fine examples and pictures before us.

Sometimes she clothes the sides of the mountains with dense forests which the eye cannot penetrate, and where eternal twilight reigns; sometimes she only crowns their highest peaks with bold masses of lofty trees, which, veiled in clouds, defy the storm; sometimes her woods assume the character of sacred groves; sometimes they appear in distinct masses or in single trees, which serve as a foreground to the landscape; and she often accompanies streams and brooks with lightly scattered groups of slender alders and willows, and conceals and overshadows their banks with umbrageous and dark forests. She overhangs steep rocks with ivy (*H*édera *H*èlix), the virgin's bower (*C*lématis Vitálba), the honeysuckle (Lonícer*a* *P*ericlýmenum and *C*aprifòlium), the bramble and the raspberry (*R*ùbus fruticòsus and idæ'us), with the wild rose (*R*òsa spinosíssima and villòsa), with the berberry (*Bérberis* vulgàris), and with many other shrubs: or she produces from the unattainable clefts and fissures of the rocks, at fearful heights and over abrupt precipices, the fir (*P*ìnus *A*'bies), the maple (*A*'cer *p*latanòides and Pseùdo-*P*látanus), the birch (*B*étula álba), the mountain ash (*S*órbus aucupària), the hawthorn (*C*ratæ'gus *A*'ria), &c., shooting boldly up into the air and clothed in a luxuriant green. But Nature does not plant, she only scatters seeds or causes roots to be developed; thus she covers districts, miles in length, with oaks, beech, maple, birch, or fir woods, and only prevents a particular sort of tree from spreading further when the situation or soil adapted to it begins to fail, and becomes more favourable for another sort of tree. Thus arise those large masses of wood in nature, which have an expression as bold as it is harmonious, because they are mostly composed of one sort of tree.

2. Nevertheless, we see in those ancient natural forests which I here allude to, and to which man has not yet applied his art, that when they consist chiefly of oaks or any other sort of tree, other kinds also frequently occupy considerable spaces in their interior, producing the most agreeable contrasts and

interesting effects, and these trees have sprung into existence in the manner just mentioned.

3. As nature thus provides for every different sort of tree by giving to each its proper situation and soil, it consequently follows that when these requisites entirely fail the oak forest must end, and that at this spot those great transitions of the forests from one sort of tree to another must take place in which nature displays so much variety and attraction.

Transitions of natural Woods.

4. Nature does not withdraw all at once from the oak or beech tree the soil suited to its growth, therefore it does not cease suddenly to extend itself. Before, and at the spot where the transition to another tree takes place, we see large distinct masses of the wood about to end separated from the main body by small spaces; these masses become smaller and smaller, and finally appear in groups and then in single trees, sometimes on waste pieces of ground and far apart from their fellows, and thus end by degrees.

5. In the same imperceptible manner that the great forest ceases, the new one begins by filling up the small spaces left by the old wood with single trees of the new species; and, as these spaces become enlarged, the sort of tree continues to spread till it finally becomes the prevailing wood.

6. Thus Nature proceeds, her transitions from one wood to another are imperceptible, without showing a line of demarcation, and without our being able to say, Here they separate. Their transition is a delicate network harmoniously united, in which form is added to form in picturesque order, melting into each other, and at the same time displaying their delightful variety of colour.

7. This picturesque keeping, these beautiful forms and outlines of all sorts which nature displays, can be best judged of from an elevated situation. Thence are seen the different forests trenching on each other without confusion, and the oak, beech, birch, and fir forests distinctly developed in grand magnificent masses; and how one sort of tree imperceptibly gives place to another, both being so harmoniously united, and interwoven with each other, that not the slightest trace of a particular definite line of separation can be discovered, because no line of the sort exists in the ancient forests of nature. It is only in those woods produced by the industry of man, and which are often made in geometrical forms, that we see harsh boundary lines, which also not unfrequently proceed in a straight direction.

(*To be continued.*)

Art. IX. *On the relative Value of the Larch and Silver Fir.* By H. H. Maire Witham.

(From the *Scotsman.*)

Having been interested by some recent experiments made by my friend Mr. Salvin of Croxdale, in the county of Durham, upon the respective strength or toughness of the larch (*Làrix*) and silver fir (*Pícea*), I thought it proper to visit those localities where I might see these trees in the greatest perfection: 1st. to enable me to compare their respective growths in a given number of years; and, 2dly, to ascertain whether any experiment had already been made by those who had been mainly instrumental in the introduction of these valuable coniferous trees. In the plantations of Dupplin, Dunkeld, Monzie, and other localities highly worthy the attention of all planters, I have invariably found that the silver fir greatly exceeded in growth the larch, which will be satisfactorily proved by the following measurements, taken with great accuracy. After a good deal of enquiry, I could not find that any pains had hitherto been taken by the proprietors of these plantations to find out the relative strength of these species of wood. It may not be amiss, therefore, to call the attention of the owners of plantations to the advantages the silver fir holds out, which are so considerable as to render them an object of importance in a national point of view. I therefore take the liberty to communicate a few facts and remarks upon the subject to the public through your journal. I am not without hope that they may induce other proprietors to make enquiries and experiments, the issue of which may probably be to remove the deep-rooted prejudice now prevalent against the silver fir.

Trees of the Pine Tribe measured at Dupplin Castle, the seat of the Earl of Kinnoull, near Perth.

4 ft. from ground.	ft.	in.	4 ft. from ground.	ft.	in.
Weymouth pine - -	7	10	Scotch fir - - -	9	3
Larch - - -	8	9	Weymouth pine - -	8	1
Larch - - -	8	3	Weymouth pine - -	8	3
Larch - - -	8	4	Spruce fir - - -	8	8
Spruce fir - - -	8	1	Spruce fir - - -	9	1
Larch - - -	8	9	Scotch fir - - -	10	3

Silver firs, as follows:—

2 ft. from ground. ft.	in.		4 ft. from ground. ft.	in.	2 ft. from ground. ft.	in.		4 ft. from ground. ft.	in.
17	2	-	14	7	15	10	-	13	3
14	5	-	12	0	15	8	-	13	4
14	6	-	12	3	15	6	-	13	11
13	9	-	12	1	14	3	-	12	0
15	9	-	13	5					

These trees were all planted at the same time, and are supposed to be about 105 years old.

Trees measured at Dunkeld, the seat of His Grace the Duke of Atholl.

The two celebrated larches planted 1737, or 102 years old:—

	2 ft. from ground. ft. in.	4 ft. from ground. ft. in.		2 ft. from ground. ft. in.	4 ft. from ground. ft. in.
1st Larch	- 16 3	13 9	2d Larch	- 14 2	12 5

Other larches in great numbers, 2 ft. from ground, 8 ft. 11 in. on an average.

	2 ft. from ground. ft. in.	4 ft. from ground. ft. in.		2 ft. from ground. ft. in.	4 ft. from ground. ft. in.
Scotch fir	- 11 4	10 10	Scotch fir	- 10 1	9 3

Trees measured at Monzie, the residence of A. Campbell, Esq.

	2 ft. from ground. ft. in.	4 ft. from ground. ft. in.
Silver fir -	- 10 6	- 9 4

	2 ft. from ground. ft. in.	4 ft. from ground. ft. in.		2 ft. from ground. ft. in.	4 ft. from ground. ft. in.
Larch -	- 10 6	- 8 6	Larch -	- 13 3	- 11 8
Larch -	- 10 7	- 8 11	Larch -	- 10 8	- 14 7

This tree spreads 14 yards from the stem each way, and all of the above are nearly 100 feet high. The measurement of the last larch at 2 ft. from the ground, owing to its projecting roots, is greatly increased in circumference.

The above measurements leave no doubt that the growth of the silver fir is more rapid than that of any coniferous tree hitherto introduced into this country.

The trees above measured (with the exception of the two celebrated Dunkeld larches) are supposed to be about 105 years old.

I shall now proceed to give you the result of three experiments tried by my friend Mr. Salvin, to prove the superior strength or toughness of the silver fir in comparison with the larch.

The first experiment was made in November 1838, and the silver fir sustained a weight of 17 stone more than the larch before it broke.

In the second experiment the silver fir and larch were 15 ft. 2 in. long each, and each 25 years old. Both trees were seven months under cover, and were, as near as possible, of the same dimensions; the silver fir sustained 37 stone, and the larch 25 stone: difference in favour of the silver fir, 12 stone.

In the third experiment, the larch and silver fir were both cut and tried in a green state, 12 ft. long, 25 years old, and of the same dimensions. The silver fir sustained 64 stone 5 lb., and the larch 45 stone 5 lb.: difference in favour of the silver fir, 19 stone.

These experiments were made in the presence of five respectable and experienced woodmen.

Lartington, July 5. 1839.

ART. X. *Remarks on Flower-Baskets, and the Construction of Basketwork Edgings in Flower-Gardens.* By N. M. T.

As the votaries of Flora are now about to fill their baskets with her choicest productions, perhaps the following remarks may afford, to some, a hint upon the subject. About the propriety of introducing baskets, or edgings of basketwork, into the landscape, "doctors disagree"; but it is enough for the present purpose to say that, when judiciously managed, I think them desirable; not altogether on account of the variety they create, or their ornamental character, but also for their real or fancied usefulness: it is this that causes them so generally to harmonise with our notions of propriety; the objects they protect being so utterly helpless that they demand a *seeming* protection, even on the placid bosom of an English lawn. Much taste is no doubt requisite to produce a good effect, as it is necessary that they should be suited to place and circumstances, to avoid outraging the real or assumed character the scene may possess; and, even all this guarded against, it is also necessary to "suit the basket to the flowers, and the flowers to the basket," and this with the baskets generally in use is no easy task. They, so far as regards dimensions, are definite; the objects they surround subject to endless mutation: so that, at one time, instead of a basket of flowers, we have only flowers in a basket, and, at a more advanced stage, an overgrown disproportioned mass. Therefore, after all that has been urged against them, unattached materials are best suited to most purposes, as they may be contracted or expanded at pleasure; may be continued to form one basket, or divided into half a dozen. When properly placed, they are equally good-looking with those of the ordinary construction and more durable; and, perhaps, their greatest recommendation is the small space they occupy when not in use.

Being so far preferable, the next concern is to know how fitting materials may be procured at least expense. It is true that there are cast-iron edgings, of different patterns, in use for such purposes, but they are easily displaced (an objection that does not apply to those about to be recommended), and look bad when in that condition, and, besides, are so clumsy, that they have more the air of a prison-house than of an elegant support. It is scarcely possible to conceive anything more unpleasing than a gracile flower peeping through a grating strong enough for a fence against cattle; the fairest flowers of creation through the bars of a nunnery perhaps excepted. A stake, to appear appropriate, ought neither to be so slender as to seem bending beneath its burden, nor so clumsy as to make the object it supports more dependent than it really is: upon this principle I would construct edgings of basketwork; and common

wire furnishes materials in abundance for all purposes, and may be worked into any figure or device the taste or whim of the applier may direct. Subjoined are forms (*figs.* 18, 19, 20.), which

Fig. 18.

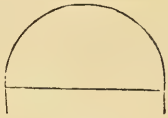

Fig. 19.

Fig. 20.

may be used as in the accompanying sketches (*figs.* 21. to 26.), or, upon the same principle, varied *ad infinitum.* I have no claim whatever to anything like invention in the matter; I have

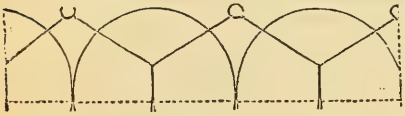

Fig. 21.

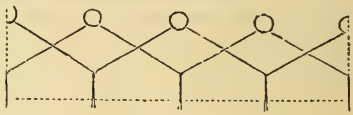

Fig. 22.

seen them frequently used, and have used them with advantage, and do not doubt that, were they generally known, they would be more common. When they are taken up for the season,

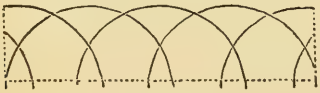

Fig. 23.

Fig. 24.

they ought to be well cleaned and painted before they are put by. They are too often left to corrode until a few days before they are wanted in spring: this ought not to be, as their dura-

Fig. 25.

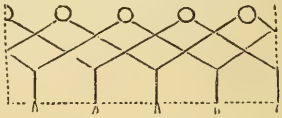

Fig. 26.

bility greatly depends on using proper precaution. Each of these pieces, 1 ft. in breadth, and made of good strong wire, costs about 2*d.*

I may fill the remaining corner of my paper by observing that single-stemmed specimens of choice trees or shrubs, planted where they are surrounded by grass, often (after all reasonable care has been taken) suffer severe injury, by the bark at the collar being cut through by the scythe while cutting the grass. There must either be a risk of this taking place, or a portion of the surrounding grass left to be removed by safer means, at a great sacrifice of time. To guard against these evils, something more than *seeming* protection is necessary; and a piece of sheet

lead, an inch or two in breadth (or more, should the largeness of the specimen, or other circumstances, require it), folded round the stem, or two pieces, the one overlapping the other, will most effectually afford this; while it is unobjectionable, or, in fact, imperceptible, as regards appearance, doing no injury whatever to the tree, which is able to unroll the lead as its growth may demand more space. With such protectors, the grass may be cut close to the stems without the possibility of injuring the plant, or even the edge of the scythe, should it come in contact with the lead. When the trees are surrounded by, or rather stand in a circle of, dug earth, such protection is not required; and this digging or forking of the ground round young and newly planted trees greatly accelerates their growth, an object for which appearances ought to be for a time disregarded; but the dug patch ought to be done away with when the growth of the tree is established. Such patches may be allowable in highly wrought or avowedly artificial scenery; but, in my opinion, they are inadmissible in that which professes to be natural.

Folkstone, April 2. 1842.

Art. XI. *On the Construction of Fruit Corridors for the Culture of the more delicate Fruit Trees.* By Alexander Forsyth.

There is perhaps no branch in the whole round of gardening so universally admired, or so seldom attained, as a complete fruit-garden. A peach tree in blossom or in fruit is not surpassed by any plant whatever in beauty, not to speak of its value as supplying fruit for the dessert; and nothing rivets the attention of the natives of the northern counties more, when they come to London, than seeing the peach do so well on the bare south wall, without glass or flues. Nothing, in my opinion, looks more truly inviting, or shows good management better, than a fine old kitchen-garden with a complete set of fruit trees on the walls, healthy and heavily laden with their fruits; and as very few families have a full supply, and as by far the greater number could use ten times as much as they can grow, I regret to see so little attention turned to this truly desirable department. Now, in planting trees, or, indeed, any other plants that we wish to perfect their fruits, it is necessary to give them every encouragement we can; if, therefore, they are natives of milder regions than our own, it becomes necessary to make up by art the natural deficiencies of our more northern climate. The manner in which this deficiency is to be made up, and the ways and means necessary thereto, form the object of the present paper.

Now, it will be readily granted that the main supply of light

and heat comes from the south, or at any rate from that half of the compass southward of east and west; the little that comes from the other half I am content to lose, in order the more effectually to secure the services of the main supply: therefore, in place of the present plain south wall, I would beg leave to introduce a sort of shelter, such as is used at the railway stations, and which I may term the fruit corridor, being a row of high pillars in front of a low south wall, with a substantial lean-to-roof, and the inside nicely lath and plastered; along the centre of the border thus roofed stand the trees or plants, and the trellis on which they are trained. It will easily be seen, therefore, that the fruit border is thus roofed from the effects of frost and chilling rains, and thereby converted, if not into a hotbed, at least into a warm bed, warmer than the other beds in the garden that are left to the mercy of the elements; this, then, is one point of immense importance already gained over common walls.

Our sharpest cutting winds generally come from the northern half of the compass, that is to say, from the north-east and north-west; and from these points also we have the torrents of cold rain, and the great body of the snow and hail, so injurious to the early blossoms. Now, when the north side is roofed, all these fall harmlessly beyond the tender blossoms, foliage, and fruit of the trees on the trellis, and the delicate spongioles in the the earth; and these organs, be it remembered, are the most vital and vulnerable parts of the tree, therefore, the slightest protection to them is no mean point gained; especially when the results of recent experiments with the fig and other trees are considered, which have perfectly convinced me that the excess of cold rain in our climate does more injury to our fruit trees than has ever been accredited to it, and is second only to our late spring frosts in robbing our orchards. By withholding water from a fig plant in a pot, a person may, as it were, command it to fruit: for, after the plant has made about five leaves or joints of young wood, let the water be gradually withheld from it till the sap by exposure to the sun gets properly elaborated (which will be in four or five weeks, with plenty of sun and heat, and only just as much water as will keep the leaves from falling off or turning yellow), and it will not fail to show fruit in the axil of every leaf; which fruits, of course, afterwards require the plant to be watered, and the ordinary treatment, to mature them. On the other hand, let any one give a fig plant always plenty of water, that is, let him keep the soil about his fig roots as moist as garden soil generally is in the open air in winter, and I warrant he will look in vain for anything but leaves on that fig tree. I mention the fig tree for the sake of the grossness of its habit, as any one may more readily convince themselves of the accuracy

of my statement by that than by more delicate fruit trees. Nevertheless, the argument holds equally good with fruit trees of all kinds. To this, as the root of the evil, may be referred the barrenness that ringing cures in the apple tree, and the grossness that root-pruning cures in all trees, by causing the sap to be more highly elaborated when the communication is intercepted, than it is in other trees and branches whose vessels are saturated with moisture of the worst kind, which they have been compelled, as it were, to suck up; rain, perhaps, at a temperature of 33°. Whilst the leaves hang on the tree, they are constantly at work on it; there is no such thing in the laboratory of Nature as a drone: for if a leaf could be idle it must die, every leaf having a debtor and creditor account to make up for every moment of its existence; it draws from the air and earth, and elaborates and returns the same in different shapes substantial and aeriform. As it is therefore necessary to supply this set of organs with proper food, it must be very evident that frosty rain cannot be the suitable sauce to be taken with it; and here lies the greatest blame in allowing it to fall in drenching torrents on the fruit border as long as it happens to continue, instead of allowing the border a moderate quantity just when it wanted it, and that, too, at a mild temperature: and though I may be told that the border is well drained, and that the surplus water soon runs off and never can stagnate, I maintain that the safest course would be, *not to let it run on.*

In order to secure the expanded blossoms and newly set fruits from the deceitful frosts of April and even May, the keeping of the trees at night perfectly dry must be greatly in their favour. This is attained by the roof only: and, as the wind is generally from the north in frosty weather, the fruit corridor will have one half less frosty wind at all times than the common wall; and the grower who wishes to shut it out altogether may use rick cloths on rollers (see *Gard. Chron.* for a plan of preparing it waterproof) by night and during storms, and roll them up at other times under the coping of the corridor, securing them there by loops of cord. I had used to roll up bunting in this manner under the coping of the peach walls at Alderley, Cheshire, and found it answer admirably and at little expense; yet it yielded little or no protection from rain to the leaves and blossoms, and none whatever to the roots in the border.

The peach-growers in the northern counties have to struggle sorely and against the stream; for the whole system of the tree is soft and watery from want of sun and dryness to elaborate and harden the proper juices, and thus bring it into a state favourable to the reproduction of its kind. We may prune and train after all the various fashions, and anoint with embrocations of all kinds, and we may waste fuel in flued walls to ripen the

wood, and all in vain; for the trees must have their native warm earth and mild air better imitated than it is now, before they produce fruits as their ancestors did in the better country. As bottom heat is so very favourable to exotics of all kinds when properly applied, surely it needs little logic to show that bottom cold must, on the contrary, be highly injurious; and the first grand stride in making our climate milder is, to endeavour, if possible, to get the elements under our control, by shutting out the foul weather and concentrating the fair. When it is taken into consideration that a fruit corridor with pillars of oak or even iron, and a roof of tile or slate, may be erected for the cost of a common south wall, and, in many instances for less; that it will yield a delightful promenade when the trees are in blossom or in fruit; and that it will afford superior facility for keeping fruits late, by having blinds in front for netting them from birds, and, if necessary, by latticework shutters for protecting them from thieves; I flatter myself that this system will be found to benefit the fruit-grower greatly.

Let no one imagine that this is some airy flight of fancy which never has been, and never may be, realised, for I must be allowed to state that there have been corridors here for half-hardy shrubs these twenty years; and it is because their uses and capabilities for culture are not sufficiently known by either gentlemen or gardeners that I have troubled your readers with this paper on the subject. I must confess that I had no idea how much the south sunshine alone, and the shelter from the north storms, would accomplish in the way of flowers, before I experienced it here.

I have known many a crop of melons lost by their running to leaf and not to flower-bud, from their roots being left at large to wander where they pleased, and from getting too much water; whilst plants from the same sowing, but confined and stunted in the nursing-pot, showed flower freely. The pine-apple is kept in a high temperature, and the soil is allowed to get very dry, to induce the plants to show fruit; and what does this amount to, but that they elaborate more highly the sap in their half-succulent stems till it becomes rich enough to secrete the rudiments of a bud for the reproduction of its kind? From the humble vine of the melon up to the wall tree, the same principle holds good, and though the failure is often laid to other causes, I think, in a great many instances, I can show the source of the evil. Our heavy rains at such low temperatures as to be little better than snow water, and our want of sunshine, produce in trees and other plants what are very properly termed "watery shoots," that is, long-jointed soft green wood, which seems to me to bear the same relation to the true wood of the tree as the milky fluid in green barley bears to the hard grain; and, as we cannot create sun-

shine to elaborate such an amount of water into proper rich sap, we must endeavour to control the element that we have power over, and curtail in the first instance the water, so that it may bear a right proportion to our limited supply of sunshine.

Earth being also under our control, the roots must not be allowed to run wild all over it, and be fed with any scraps or slops that may come in their way, but be confined to a definite space, and kept in every respect under control as to quality of soil, drainage, and roofing; for, among other advantages that some vine borders possess (those of Sir Simon H. Clarke, for example), the roof of reed covers over the leaves and dung is, perhaps, not the least essential, especially to the early ones. But to return to the wall trees: in order to make these tractable, I am convinced that a space of fruit border 12 ft. by 6 ft., and 18 in. deep, is more than sufficient for a full-grown peach tree; which small space may be readily roofed as above described: and when the fruit border is placed on brick arches and confined by walls of the same, beveled to form a bed for the earth of the form of the frustum of a pyramid inverted, the seasons will have extremely little to do with the crop, as all the elements will be under control as much as in a stove, and it will be the fault of the conductors, and not of the climate of any county in England, and even a great part of Scotland, if wall fruit be scarce any longer.

Alton Towers, Easter Monday, 1842.

Art. XII. *On the Culture of the Tomato, or Love-Apple (Lycopérsicum esculéntum), so as to insure a Crop in cold Situations and dull wet Seasons.* By C. B.

Of this plant, which is a native of South America, and was introduced into this country in the year 1596, there are three or four varieties, namely, the erythrocárpum, or red-fruited; the chrysocárpum, or yellow-fruited; and the leucocárpum, or white-fruited; with a globe variety, &c. Of these, the red-fruited is held in the highest estimation, on account of its superior size and beauty. It is cultivated extensively about Naples and Rome, for the use of its fruit in sauces, stewing, and soups, and is one of the most common articles used in Italian cookery; it is likewise very much used in France, as well as in our own country, making an excellent sauce for fish, meat, &c. It is cultivated to a considerable extent near London, there being scarcely a gentleman's garden, either large or small, in which the love-apple may not be found growing and bearing fruit in abundance; although very often the fruit will not come to maturity in cold situations and bad seasons, owing, in a great mea-

sure (as I suppose), to the seeds not being sown soon enough to allow the plants to acquire sufficient strength in the spring for turning out. The way that I cultivate mine is this. In the first week of December I sow a little *new* seed in a 32-sized pot, in light sandy soil, and place the pot upon a hot-water pipe where there is a nice gentle heat kept. When the plants get well up I move them to a shelf near the glass in a pine-stove, whence the air comes nearly upon them (being a hanging shelf that is placed at the back part of the house, nearly close to the roof). When they have made partly two rough leaves, I prick them out into pans about 2 in. apart each way, placing them upon the pipes till struck, and then remove them to the shelf again till they become strong enough for potting one plant in a large 60-sized pot; and I afterwards shift them, so that their roots may not become matted in the pots, giving plenty of water in the spring. A little sheep-dung water sometimes greatly assists them. As the spring advances, they must be gradually hardened, previously to their being planted out. When the weather is warm enough, I plant them out against a south wall, if possible, particularly in a cold situation.

I am aware that they are successfully grown near London, and in warm sandy soils, trained against palings and espaliers, and even will have fine fruit if allowed to run upon the ground like the vegetable marrow; but my plan is for a cold situation, or a bad season. I do not like growing the lovea-pple between fruit trees, as they rob the ground of much of its nutriment, besides being inconvenient for my mode of ripening the fruit.

Happening to have a south wall about 4 ft. high, running along my melon ground, I had a trench taken out about 3 ft. wide and 2½ ft. deep, and afterwards filled it up with good rich soil. When all is ready for planting, I take the soil out to receive the plants at a distance of from 4 ft. to 5 ft. apart, and put them in so as to allow a large hand-glass being put over each for a time. By growing the plants as large as possible before planting out, they have the advantage of the summer for ripening their fruit. When the glasses are removed, I nail them to the wall, using large shreds, to allow plenty of room for the stem to swell. In training they may either be nailed with an upright stem without stopping, and the side shoots horizontally, about 15 in. apart; or they may be trained fan-shape in the first instance, and afterwards perpendicularly at 1½ ft. distance, taking care to pinch out all laterals that may not be wanted, close to the stem, and not before a joint as frequently done (which causes great confusion, by making the laterals grow stronger, and shade the fruit with the thick foliage produced by cutting), and retaining no shoot but the three principals. In hot weather they should be duly supplied with water, giving them a little dung-water occa-

sionally; and about the middle of September they should have all the late fruit blossom and laterals (if any) taken quite away, and the leaders stopped, and sometimes by ending a leaf that may shade the fruit will be of use. The shoots should be examined to see that they are secure, as the fruit now will begin to be heavy. When this is all finished, I get a number of spare frame lights, and place them before the plants, securing the lights to the wall by string, so that the wind cannot act upon them. If I have not lights enough, and the nights should be a little cold, I place sticks in a sloping direction against the walls, and cover the plants with mats every evening, uncovering them as soon as convenient in the morning. By this treatment I have had the fruit both very fine and early, and I scarcely need add that, during the autumn, there will be several gatherings of ripe fruit.

You will be surprised to hear that there are gardeners, even in these days of cheap knowledge, who will not profit by the labours of others, either by reading or observing, but must go on in their own often obsolete way, yet such is the fact; for if any thing new and rather out of the common way be shown them in the shape of drawings, articles on culture, &c., they will flatly tell you they are deceptions, and that they want no "new-fangled systems." Many gardeners that have seen my love-apple plants this year will say: "Bless me! you are precious soon with the tomatoes. Why, they will be a great deal too soon," &c. I say: "How so? What time do you sow your seed?" "Oh! not before March or April." "What sort of a crop had you last year?" I ask. "Oh! I got none, they did not ripen; they were toô late." So, you see, they show their own blindness. "Well! will you have a few plants?" "Oh! yes, I will take a few; I begin to see you are right." Now, it is evident, by my neighbours' own account, that my method is worth a trial; because last year they had no fruit themselves, and I had a good crop, and a few to spare to give away. I am sorry that some are so very sceptical, and think too much of their own ways; to such I would say, "Give things a fair trial, and prove before you condemn."

April, 1842.

Art. XIII. *Culture of the Cucumber.* By N. M. T.

Almost every person claiming to be a gardener has his cucumber bed in some form or other, where he grows what he is generally pleased to call his own sort, after his own fashion; most frequently in the old-fashioned dung-frame, which still holds, and is likely to hold, its place, notwithstanding the deluge

of substitutes and systems that annually profess to surpass this and all else. These systems, whatever may be their respective merits, are worse than useless to the generality of cultivators, as they usually require apparatus to carry them into effect too expensive for people of limited means; and, whether they are better adapted for such as have the requisites at command, it is not for me to determine. Directions for these modes are so superabundant, that even a chapter upon the subject would be a work of supererogation, and in me of presumption: therefore, my remarks are designed solely for the use of non-professionals, for such as are single-handed, or even for those who have other avocations, that render the attention requisite to produce cucumbers in March or April almost an impossibility. Such persons are often unjustly branded with neglect, and deprived of the rewards of much anxiety and attention, by circumstances for which they are not to blame, and over which they have no control.

Numbers of men are engaged as gardener and groom; that is, they are expected to perform properly the duties of groom, and after that to make the most of the garden that their time and abilities may admit. Such persons, having manure at command, are generally expected to grow cucumbers. It was the answer given by a very intelligent person of this class, to the question why he had given them up, that led me to pen these remarks; and, as no one understands the difficulties of any station so thoroughly as he who has experienced them, I prefer giving the answer in his own words: "I gave up growing them," said he, "from finding success a mere matter of chance; and that my trouble was often in vain by the loss of my plants, even when upon the eve of cutting, and the loss occasioned by treatment beyond my power to remedy. I am often called away for a whole day at an early part of the morning; in such cases it is impossible to say what the day may turn out, and I must either leave my plants in darkness during my absence, or uncover them and give air at a time that is unseasonable. Should the day prove fine, there may not be much the matter; if otherwise, my plants are in little better condition than if they were growing in the open air. In a gloomy morning, if I leave them shut up, and sunshine follow, they are sure to get scorched; and, in either case, loss and disappointment are sure to succeed." Now, it is as a remedy for this that I detail the practice which I have followed during the past and present season; and I see no reason why I should ever abandon it, as success is more certain by it than by that generally followed, while the necessity of constant attendance is altogether dispensed with.

From the time that the bed is in good condition, and the seed sown, until the season is so far advanced as to render the

production of cucumbers a matter of no difficulty, the sashes of the frames are never (save to perform some necessary operation) raised to admit air; nor, during the most intense sunshine, is shading of any sort ever applied. The frame is also closely glazed, and in perfect repair: this I consider essential to success; open laps, or any sort of dilapidation, by allowing ingress of air and escape of moisture, would render this plan as liable to casualties as any other. The frames are also set so far south-east as to meet the rays of the sun directly in front, between nine and ten o'clock; this is, for the practice followed, much better than due south, as the plants are dried of any moisture that may rest upon them before the sun is too powerful. This position also makes the most of the sunshine that may occur at an early part of the day, when its influence would be little felt without such an arrangement; while the effects of the meridian rays, so often injuriously powerful, are, by the oblique direction so given, much qualified. Due south is probably the worst position in which to place a glass case for any horticultural purpose.

When speaking of the early sun drying the moisture from the plants in a frame placed south-east, I would be understood that the globules of moisture that may be concentrated upon them or the glass covering are dispersed, set in motion, and taken up by the surrounding air, which, let it be remembered, contains moisture in proportion to the degree to which it is heated; and, in the close system, upon this alone the safety of the plant depends; as, by the time the temperature reaches 100° or 130° (a frequent occurrence), the leaves may be said to float in liquid, to retain which around them the close entire frame mentioned is necessary. If the moisture, in any considerable quantity, escape, that upon the frame and surface of the mould soon gets exhausted, and a ruinous drain commences upon the foliage of the plants; drooping or flagging being the immediate consequence, from the whole nourishment required being drawn from the roots, instead of being in greater part supplied by the atmosphere through the leaves. Nor is the injury thus inflicted repaired when the frames are shut up, and the leaves have assumed their ordinary position, although it may appear to be so; for the arid, exhausting, and foodless atmosphere so destructive to vegetable, so genial to animal, life, invariably creates myriads of those pests that prey upon debility and disease, which are unquestionably the effect, instead of, as is usually assumed, the cause; and it is no small recommendation to the close system, that it maintains an atmosphere destructive to animal life, one, in fact, which is usually recommended to be kept up for a short time as an effectual means of extermination.

It is but justice to add, that the frames so treated are placed over two 4-inch hot-water pipes (see the section of the boiler and pipes in *fig.* 27.); and these pipes are sunk 2 ft. beneath

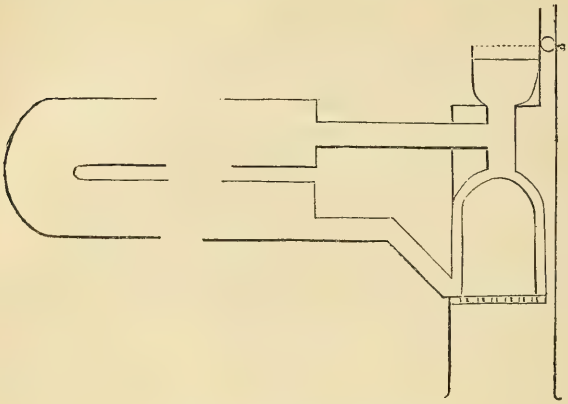

Fig. 27. *Section of Boiler and Pipes.*

the ground level, and are used to connect a vinery with the boiler that supplies the water to heat it. A cavity is formed for this purpose over the pipes; upon the top of this the dung, to the usual extent, is placed, and the air circulated from the front to the back by pipes placed for that purpose, after Penn's excellent manner. (See the section of the pit in *fig.* 28.) It is possible that the advocates of continual airing may contend that the whole success of the plan depends upon this arrangement; but others have succeeded without it. So far as the circulation of the air is concerned, it may as effectually be accomplished by simply using a wooden box of the breadth of the bed, to be laid upon the ground, with a hole cut a few inches from each end, of a proper diameter to admit the ends of an iron, or, what is much better, an earthen, pipe, of the requisite length, so that, when finished, the whole may appear as shown in *fig.* 29. This is an improvement and a saving of materials in any bed heated by fermenting substances; as heat engendered in any part of the

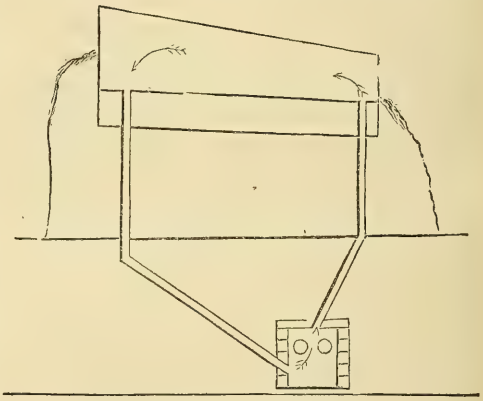

Fig. 28. *Section of Cucumber-Pit.*

mass readily finds its way to where it can benefit the plants, without being compelled to force through the soil containing the roots, at the risk of burning them. As the pipes are proposed to be placed within a few inches of the extremities, the heat from the linings is sooner felt, and greatly economised, and any impurities that it might contain rendered innoxious by being, as it were, filtered through the pipes. The whole of this applies with equal force to the culture of melons; but these are more commonly under the care of the professional gardener.

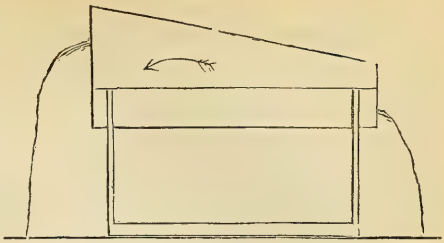

Fig. 29. *Section of Cucumber-Pit, with Air-box.*

It must be evident that, by never giving air, a great saving of attendance and materials is effected; as the heat sufficient with a close frame would be inadequate were it opened. As any rank steam or impure air must be fatal when closely confined, it is preferable, as a precaution against this, to have the materials forming the bed thoroughly sweetened, and rather old, depending for heat upon the linings: I have seen no instance of damping with this method, and damp was the only enemy that I apprehended when it was undertaken. Freedom from damp at an early part of the season may in some measure be attributed to the pipes, which must tend to qualify damper materials; and an atmosphere heated by combustion and fermentation is, in my opinion, requisite to grow cucumbers, melons, or any other class of plants, with certainty and economy. Heat produced by fire may be regulated to meet the vicissitudes of the seasons without any waste; but the climate so formed no attention can render equal to that produced by the decomposition of substances that give out gases teeming with the constituents of plants; and the facility with which they imbibe gases that so surround them, either to their destruction or benefit, renders this deserving of more attention than is generally bestowed upon it. Still, heat supplied by these alone is not easily economised, as the uncertainty of the weather in so variable a climate as that of Britain makes it necessary to expend a great deal in waste; as it is evident that a great redundancy must exist in mild or sunny weather, if the same is competent to maintain a sufficient temperature in sudden cases of severity, which often occur without an hour's notice. A bed, previously only warm enough, is sure to chill, perhaps destroy, the plants, during the day or two that must elapse before any fresh appliances can take effect; and when they do take effect, the circum-

stances that so imperatively called for them are, in all probability, reversed, and any extra excitement useless. The management of these beds, therefore, independently of the risk of losing the plants, becomes a matter of difficulty, incompatible with economy, and renders a moderate dung heat, and the means of adding in cases of exigency by something producing immediate effect, most desirable; and the cost of materials requisite to form a single lining would purchase fuel enough to procure a crop of cucumbers during a whole season. But then the cost of an apparatus to effect this stands out as a bugbear, and to have a good one would no doubt cost a trifle; still, it is no such deadly affair, as I may prove by an expedient that I was forced to adopt in January, 1838.

It will be in the recollection of many, that 1837, up to its close, was unusually mild, the external thermometer at Christmas being about 50°, followed by an unexampled severity that sunk the temperature to zero in a few days. With an external temperature of 50°, my bed was in the best possible condition; but the sudden change produced a sad reverse, requiring an immediate remedy. In my search to find something to accomplish this, I fell in with an old circular sheet-iron stove, such as was formerly used in workshops, &c., having a piece of cast iron placed upon the grating to hold the fuel. As the case was desperate, I had this piece of cast iron taken out, and a tin boiler of the same form substituted; to this, as usual, a flue and return-pipe were attached, and a small cistern, as feeder, placed upon the top, as represented in the accompanying section. (*fig.* 27.) The pipes, that a small surface might be exposed to the open air, were only 1 in. in diameter, until they entered the frame, when they were joined to others 3 in. in diameter. The whole of this was constructed and at work within a few hours of the time that it was projected, at a cost of 15*s.*, the stove excluded; and, although made of such materials, to meet the exigencies of the moment, it lasted the rest of that, and the whole of the following season, performing its work admirably, and that at a cost for fuel not worth mentioning; indeed, there is more thrown upon the rubbish heap during a season, in any household, than would amply suffice for such a purpose. Coals, from their tendency to cake, burn hollow, and so go out, are not manageable. Cinders, with a mixture of coal-dust, chips of wood, and old tan to make up with, do best; and, as the water in the boiler is in no place more than from half to three quarters of an inch in thickness, incredibly little fire is required to make the water boil, which may be accomplished in a few minutes, and the fire then damped and left for twelve hours. So little fire being required, it is hardly possible to keep the water from boiling, and a frequent supply to keep the pipes full is requisite;

but this is the only inconvenience arising from the waste caused by boiling, and no accident can happen, as it will be seen that the water is in an open vessel. It would not be advisable for any person, save for a trial, to have an apparatus of such materials, as the same made of copper would last a lifetime.

In mentioning tin, I have merely related the facts as they occurred; and conclude by remarking that cucumbers so grown bear longer than such as have their roots more excited by the strong bottom-heat which is necessary; the roots also find their way to the extremities, where they are burned and injured by the continual addition of hot linings.

I need only mention a mistake that occurs (p. 217. line 32.) in the printing of my paper upon the vine, to insure its correction. "The temperature has occasionally, during sunshine, reached 100°, without any disposition in the plant to blow"; which ought to have been, "without any disposition to flag, or droop." To speak of growing vines, deemed and treated as "gross feeders," without roots, must appear sufficiently ridiculous; but the facts are as stated. Another month has elapsed without any perceptible difference between that and the other plants in the house; and the fact, or rather the enquiry, that so forcibly presses itself upon the attention is simply this: If the others are benefited at this stage of their growth by their roots, would not this feel the want of them?

Folkstone, April 9. 1842.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Foreign Notices.*

WEST INDIES.

Extracts from the Correspondence of Edward Otto, during his Voyage to Cuba, and his Abode there. (Continued from p. 236.) — My hopes of acquiring a richer booty on the southern coast of the island were but sparingly realised. The European winter is felt here, not indeed by cold (as we have more than 20° Reaum. during the day), but by the death-like sleep of vegetation occasioned by the long continued drought, which even kills or paralyses the lower order of animals, which only can exist among green leaves and blossoms. The botanist and zoologist console themselves in anticipating the month of May, the favourite month of the year in the Island of Cuba, as well as in Germany.

The road from the harbour to Trinidad de Cuba is bordered by hedges of bromelias enclosing fields and plantations; and among the bromelias are seen many plants of Erythrìna *Crísta gálli*, and a small fan-palm, which, for the present, I must call Thrìnax parviflòra, as I have unfortunately not a good *Species Plantarum* with me, and I can find none that comes nearer it in Swartz's *Flora Occidentalis*. I have seen this palm on both sides of the road, and even on the road itself, in immense numbers; they are from 6 in. to 5 ft. in height, and it was extraordinary that not a single one bore fruit. The natives could give me no information respecting them, or whether large tracts

of them, which had the appearance of having been burnt, had been destroyed by the heat of the sun or by fire. The circle of their ideas seems to be confined to coffee and sugar.

The hills near the city are rocky, and almost entirely covered with *O*púntia hórrida. My efforts in search of *C*ácti were not rewarded, and, indeed, I found, to my great sorrow, that this part of the island was more meagre in new and rare plants than the northern portion already explored. Tuberous and bulbous plants were nowhere to be found. My zeal was redoubled, but in vain ; and the burning heat of the sun was considered so injurious to health, that I was obliged to shut myself up in my abode from 11 o'clock in the morning till 4 in the afternoon, and my excursions, therefore, from Trinidad, could only extend to the environs of the city.

The only thing I found new here was dearly bought. The *Guaó* is a tree from 4 ft. to 8 ft. in height ; with beautiful dark green leaves, having a brownish tinge round the margin. The blossoms are small, of a bluish brown, and hang like loose bunches of grapes at the points of the shoots, or even on the stem itself, as it has seldom branches. This tree is frequently found near small rivers, particularly in barren and stony places, and in the savannas. Some, 8 ft. in height, may be seen in the immediate vicinity of Trinidad, and no one ventures to cut them down, as their bad properties are so well known. In the savanna near the city, I saw, on the 12th of March, a specimen of this tree 4 ft. in height in full flower. Quite delighted with the sight, I cut off the top, and also some shoots from another specimen, and laid them all with the other plants which my negro carried. A dark brownish green sap flowed from the wounds of the shoots and stained my hands. On returning home I arranged the collected blossoms, and found I could not remove the stains on my hands by means of soap and a brush, and when I made the natives understand my grievance, they told me I might be glad I had come off with my life, because, although some were only injured by touching the sap, others, again, by merely coming in contact with the tree, or by passing near it, have experienced fatal effects. About noon on the day I touched the sap I experienced a painful burning on my face and arms, and particularly about my eyes, and it became greater towards evening. My sleep was tolerably placid, but what was my horror on awakening to see my face most dreadfully swollen, my eyes projecting far out of their sockets, and I could only see a faint glimmer of light with the left ! A tormenting itching and burning came all over my body, and I found it was quite time to send for medical aid. Bleeding, washing with water from a decoction of the blossoms of the *M*álva, a bath, and 12 leeches on my eyes, were the expedients the doctor resorted to ; the swelling abated towards evening, and the following day I was able to see. The swelling was quite gone in the course of five days, and it was followed by a breaking out of a red colour all over the body, resembling that in the scarlet fever. I then had a bath in which there was put a proportion of brandy, and, as there are no wells in the town, the water was obliged to be fetched from a brook, about a mile off. When the redness and burning disappeared I might have been taken for a native, as I could hardly be distinguished from a mulatto. Experience is, indeed, of much value, but this one was outweighed by extreme pain, several days of idleness, and great loss of money. The medical man who attended me charged eight dollars for eight visits ; bleeding, half a dollar ; medicine, five ; and the twelve leeches, seven dollars four reals (about eleven Prussian rix-dollars.) The blossoms and twigs of the *Guaó*, which I sent among the other dried plants without a botanical name, are certainly of some value, and I recommend great prudence in examination.* I was told that this plant is used officinally in the cholera and yellow fever, but in this respect I did not wish to renew my acquaintance with it.

My stay in Trinidad was in every respect unpleasant, and as I could not

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* I ascertained, afterwards, that this tree is the Comoclàdia ilicifòlia of Swartz.

expect to be benefited by a longer visit, I set out by the steam-boat to Batabano, thence to St. Felipe on horseback, and to Havanna by the railroad. The steam-boat was the most miserable I was ever in. The food wretched, and hardly fit to be eaten on account of the rancid olive oil; and sleep at night, our only enjoyment, was disturbed by mice and rats, and insects an inch and a half long, of the beetle kind, which had a disagreeable smell, and bit us dreadfully. On the 23d of March, about three o'clock in the afternoon, we arrived in Havanna, but were obliged to wait till six for our luggage, as the Spaniards did not choose to exert themselves for the passengers, expecting to derive more profit from the next train.

My next excursion from Havanna was to Chimborazo, on the 26th of March, not, indeed, the lofty mountain of that name in the New World, but a plantation belonging to M. Vignier, the partner of our consul M. Sthamer. It is situated in a beautiful country, and from the adjoining hills you can see the sea beyond the southern coast of the island. The avenues in the plantation, and those leading to the dwelling-house, consist of oreodoxas, between which are oleanders in flower, *C*upréssus sempervìrens, *Cy*cas revolùta, Amarýllis rùtila in flower, and a very peculiar full-grown cereus; an assemblage, which, to us at least, is extremely rare. The plantation, I was told, consisted of about 80,000 coffee trees; on an average each tree bears about 2 lb. of coffee, and some of them produce 6 lb. Oranges and bananas are cultivated for the family, and tobacco and pine-apples principally as articles of sale. I did not find anything new in the neighbourhood, but I saw with delight an oncidium in flower, which is neither O. altíssimum nor O. lùridum, and I think I have seen it figured in some orchidaceous work, and, if I am not mistaken, it was called Cavendíshii. After a stay of six days, I returned on horseback to Milena, and from there to Havanna by the railroad; the latter is about nine French leagues from Chimborazo.

A letter of recommendation to M. Souchay and his lady, a native of Lübeck, brought me to the plantation of Cafetal Angerona, district of Catabajus, in the interior of the island. We arrived here on the 2d of April, after a very tiresome and tedious journey, on account of our ignorance of the roads that lead to the plantation, through Artemisa, a small district about a league from the end of our journey, where we were obliged to sleep the previous night. Angerona is the largest plantation in Cuba. It is three quarters of a league long, and is divided by an avenue of palms, from the centre of which an avenue with four rows of palms leads to the dwelling-house. This avenue measures 1,960 ft., and each row of palms consists of exactly 100 of the most beautiful of these plants, 30 ft. high, planted fifteen years ago by the uncle of the present proprietor. The dwelling, which has been lately erected, is situated on a small elevation, and resembles a palace. Not far distant are the abodes of the 400 negroes which belong to the plantation, houses for the manager, the overseer, the magazine, the smithy, the wheelwright's premises, two prisons, stables, and many other buildings; all of which form a considerable village, and, being protected by a fortification, make a considerable impression upon a stranger. It is also provided with an hospital and a laboratory, under the management of a German, Dr. Imm. I found vegetation here in a state of winter sleep, on account of the extraordinary drought; the ground had cracks in it a foot wide, the meadows were as yellow as our ripe corn fields, and most of the trees were stripped of their leaves.

On the 19th of April I went with the family of M. Souchay to Tabureta, their country seat, among the Cusco hills. It is about six miles from Angerona, and is situated on the river St. Juan, in a valley between two high hills. The country is beautiful; and, after four days' incessant rain, Nature seemed to recover herself, and several trees and shrubs began to show their blossom-buds. I find more plants for the herbarium; and I hope soon to be able to send some home alive, as, until now, bulbs and tubers were concealed in the ground. Amarýllis rùtila, bulbs of which I have already sent home, is seen all over this neighbourhood most splendidly in flower. I have eaten the

fruit, when cooked, of Sèchium edùle here, and thought it very good; it resembles our pumpkin, but is not quite so soft. Pisang is baked in the ashes, when in an unripe state, and is eaten with fresh butter; when ripe, it is cut in slices, and baked with butter. It is also used, when unripe, in broth, with meat; but I prefer it when ripe and sprinkled with sugar and eaten with a sweet sauce. Should I find any pisang on my return home, I should like to give a proof of my knowledge of cookery.

I have several times found a dark and light variety of Oncídium altíssimum in flower here, and I have seen the flower-stalk 8 ft. long, hanging down to the ground from the tree on which the plant grew. The eye is delighted with the aspect of the forests on the mountains, from 600 ft. to 800 ft. above the level of the sea, and which become gradually increased in height as they recede. A hill of a moderate height in the neighbourhood is entirely covered with pepper, the same species which Moritz and La Guayra sent to the garden, and which I have always considered to be the well known *P.* adúncum. *P.* umbellàtum *Jacq.* is also very abundant here. There is a palm here which very much resembles Oreodóxa règia, but seems to be different, from its seed being much larger. We shall probably be here some time, perhaps even to the middle of June, and I earnestly hope it may be the case, as there is less of the fever peculiar to the climate here; and about this time of the year it begins to rage in Havanna and on the adjacent sea-coast. (*Garten-Zeitung*, 1839, p. 218.)

Art. II. *Retrospective Criticism.*

Apparent Increase in Magnitude of the Sun when rising and setting. — The reason given by Mr. Torbron, in page 191., for the greater apparent magnitude of the rising and setting sun over that luminary when vertical, is equally unsatisfactory with the one given in page 100. When at school I recollect my teacher explaining the phenomenon thus. The denser the air through which an object is viewed, the greater is the apparent magnitude of that object; and, as all are aware, the nearer the earth's surface the denser is the air, the higher, the more rarefied: therefore, when that glorious orb, the sun, is rising or setting, it is viewed through the greatest extent of dense air, consequently, it is magnified; and, as it advances towards a vertical position, its apparent magnitude lessens in proportion to the increasing rarefaction of the air through which it is viewed. Again, when it passes its vertical position, its apparent magnitude increases in proportion as the density of the air through which it is viewed increases.

By the same rule, when distant objects appear larger (such as hills, trees, &c.) than usual, the increased density of the atmosphere is the cause, and certainly rain will shortly follow the phenomenon; and when they appear smaller than usual, fine weather may as certainly be expected. — *L. Stephenson, Gardener to D. Maclean, Esq., M.P. Witton Castle, Bishop Auckland, April* 13. 1842.

The Cemeteries of Edinburgh and Leith. (p. 199.) — Your valuable correspondent, Mr. Brown, has done justice to this interesting subject; but I could wish he had said something more on the Grey Friars' churchyard. There is no churchyard in Scotland that possesses half the interest of this hallowed area. It is surrounded by a belt, if I may so speak, of architectural tombs, that for singularity in some instances, gorgeous magnificence in others, and imposing magnitude in general, are not to be paralleled in the United Kingdom; and yet many of these tombs, especially those set against the backs of the houses which form Candlemaker Row, are in a state of dilapidation disgraceful to the city. Some of the finest of them are being rent asunder by the growth of young trees, which are springing up in the crevices of the stones. — *J. S. Edinburgh, April,* 1842.

THE

GARDENER'S MAGAZINE,

JUNE, 1842.

ORIGINAL COMMUNICATIONS.

ART. I. *The Monument in Memory of the Botanist Douglas: containing,* 1. *Report of the Committee;* 2. *Engraving and Description of the Monument, with a Copy of the Inscriptions; and* 3. *List of the Subscribers.*

I. REPORT OF THE DOUGLAS MONUMENT COMMITTEE.

Read on the 29th of April, 1842, before the General Committee.

THE labours of the Committee, which commenced on the 23d of Nov. 1835, being about to close, it may be proper to take a very brief view of its proceedings, with the result to which they have led.

In the outset, high expectations were entertained of the liberality of the public in conferring marked respect on departed genius, which had contributed so much to the advancement of botanical science, and to the flora of Europe, and which had perished in the undertaking; and, under these expectations, a plan or scheme was proposed for perpetuating the memory of Douglas, and for conferring a benefit on his relatives. To carry out this view, Subscription Papers were forwarded to the most influential botanists in Britain and Ireland, but the returns were much more limited in their lists of contribution, than was expected.

On the 6th of May, 1836, the Committee issued circulars calling in all Lists of Contributors' Names by the first of July following, when, at the earnest request of J. C. Loudon, Esq., of Bayswater, London, the period was lengthened, and through the exertions and influence of that gentleman from 80*l.* to 90*l.* were added to the funds. In August, 1836, a proposal was made by some subscribers in England, to confine the subscriptions chiefly to the benefit of the two sisters of the late Mr. Douglas, who were consulted on the subject; and at a meeting of Committee, held on the 19th of August, to take the proposal into consideration, their minute bears, that "they do not consider themselves authorised to sanction any separate contri-

bution, which, they have reason to believe, would not be agreeable to the Douglas family."

The extended range which Mr. Loudon gave the Subscription Lists, and the general notice called to the subject through France and Germany as well as Britain, induced the existing Committee to avail themselves of a previous regulation in adding to their numbers for forwarding the undertaking, and sharing the responsibility; and, at a meeting of the Committee on the 24th of February, 1837, several practical gardeners' names were added to the Committee. It was also thought advisable to solicit the countenance and cooperation of some of the higher classes; and the zeal and efficiency by which Colonel M. Belshes of Invermay had promoted the interests of the Perthshire Royal Horticultural Society pointed him out as one likely to forward the interests of the undertaking, and the result has amply justified the anticipation. Sir P. M. Thriepland, Bart., too, a warm friend of the Perthshire Royal Horticultural Society, with Lord Stormont, then member for the county, were also nominated as members of Committee, and, on being written to, they cordially agreed to become members.

After this every means was used to promote the subscription throughout Perthshire, and some influential agricultural bodies were memorialised on the subject, it will be seen with how little effect, when it is stated that the sums which reached the treasurer's hands amounted only to 161*l.* 12*s.* on the 12th of July, 1839, on the whole.

After some unsuccessful applications for ground on which to build the monument, it was resolved at a meeting of Committee held on the 22d November, "that the monument should be erected in the churchyard at Scone."

On the 10th of June, 1840, a Sub-Committee was appointed, Colonel M. Belshes of Invermay, convener, to negotiate with the heritors of Scone as to the site, and to take charge of the work as it proceeded. Great praise is due to the heritors for the liberal spirit in which they met the wishes of the Sub-Committee.

On the 29th of July, 1841, the Sub-Committee, having previously settled with the heritors as to the site, and with the Messrs. Cochrane as to the erection of the monument according to the design furnished by them, and approved of by members attending at a general meeting of subscribers, met at Scone churchyard "for the purpose of depositing, near the foundation, memoranda that may tell the men of far distant ages of the passing events of the present day." Colonel M. Belshes, whose chaste taste, untiring zeal, and sound judgment, have rendered the labours of the other members of Committee comparatively easy, deposited, in a cavity made in a stone for the purpose, a paper containing a portrait and biographical notice of the late Mr. David Douglas, furnished by J. C. Loudon, Esq., Bayswater, a copy

of the *Gardener's Gazette* of the 24th of July, the *Perth Constitutional* of the 28th of July, with other papers and memoranda; and, at the request of the colonel, Mr. Gorrie deposited in the same cavity the gold and silver coins of the present reign; an account of which, for the satisfaction of subscribers, appeared in the *Gardener's Gazette*, and *Gardener's Magazine* for 1841, p. 477.

After several visits the monument was completed to the satisfaction of the Committee, and favourably reported on by a document bearing date 14th of October, 1841, by Mr. Mackenzie, Perth town's architect. Mr. Cochrane was thereupon ordered payment of his account. The sum in the treasurer's hand, with interest thereon, was ascertained, and in terms of the original advertisement the Sub-Committee ordered a lithographic drawing of the monument, with copies of the inscription (one thousand of each), to be made out for distribution; 500 copies of which they ordered to be transmitted free to Mr. Loudon, for subscribers through him. They also ordered circulars to be sent to those who had forwarded Subscription Lists to the treasurer in Scotland, informing them that the drawing and inscription were ready at Perth for distribution. [See Advertisement on the cover of the *Gardener's Magazine* for the present month, and in the *Gardener's Gazette* and *Gardener's Chronicle* for May 28. 1842.]

Of the merits of the design of the monument, of its execution, or of the drawing and inscription, it is not for the Committee to say any thing; they trust, however, that they are such as may meet the approbation generally of the subscribers.

It was originally intended to publish a list of subscribers' names; but from the imperfect manner in which that list has been in some instances furnished, and also from the very limited state of the funds, that, as well as the original design of the monument, the Committee were obliged to dispense with.

The Committee have lodged in the Perth Bank 10*l.* at compound interest, as a fund for keeping the monument, with its surrounding iron rail and pavement, in proper repair in all time coming, under the management of the sheriff of Perthshire, the minister of the parish of Scone, and the proprietor of Murray's Hall for the time being, as a perpetual Committee for that purpose. The deposit receipt being in the mean time lodged in the hands of Robert Whigham, Esq., sheriff of the county of Perth.

The Committee have ordered a copy of the lithograph and inscription to be sent free to each of the brothers and sisters of the late David Douglas, of which they beg their kind acceptance.

By desire of the Committee,

J. Murray Belshes,

Chairman.

Fig. 30. *Portrait of David Douglas.*

[In the *Gardener's Magazine* for 1836, p. 602., there is a biographical notice of Mr. Douglas, in English, French, and German, with a portrait, which is considered, by those who knew Douglas, to be the best likeness of him which has yet been published. We here repeat this portrait (*fig.* 30.), for the sake of those subscribers who do not possess this Magazine for 1836. There is also attached to the biographical notice referred to, a list of the plants introduced by Douglas, and then in the country in a living state, amounting to 198 species: but as several species have since been raised from seeds taken from Douglas's collections of specimens, which were not known of at that time, he may be considered as having added in all above 200 species to the European flora. (See *Hort. Trans.*, 2d series, vol. ii. p. 373.) "The name of Douglas is associated with all the rare and beautiful plants lately [1836] introduced from North-west America; and which, by means of the Horticultural Society

of London, have been extensively distributed, not only in Britain, but over Europe, and those parts of North America where they are not indigenous. To him we are indebted, not only for many valuable timber trees, some beautiful ribeses, and other ornamental shrubs, but for the elegant clarkia, the different species of pentstemons, lupines, œnotheras, and a host of other ornamental ligneous and herbaceous plants, which now adorn our gardens; and which have formed, and still form, the great attraction of the several botanical publications wherein they have been figured and described. In short, if we only imagine the British gardens deprived of the plants introduced by Douglas, we shall find them but very little farther advanced, in point of ornamental productions, than they were a century ago. One great advantage of the introductions of Douglas, independently of their beauty, is, that they are, with but one or two exceptions, not only able to stand without protection, but very hardy; and, consequently, from ripening seeds in abundance, they are calculated for ornamenting the garden of the cottager equally with that of the prince, in Britain, and the central districts of Europe."]

II. ENGRAVING AND DESCRIPTION OF THE MONUMENT, WITH A COPY OF THE INSCRIPTIONS.

The lithograph (to a copy of which each subscriber of 1*s.* is entitled) is about 10 in. high, by 7½ in. broad, within the boundary lines, and is very superiorly executed in the line manner. The monument, of course, occupies the centre of the picture, and is exactly of the same height and breadth as *fig.* 31., which gives as accurate an idea of it as the lithograph.

The erection is in all 23 ft. high, placed on a rising ground to the north-east of the church, and nearly in the centre of the open ground between the east boundary wall and east end of the church, which, though built within the present century, is a plain Gothic building, without any of that superfluous gewgawry which disfigures many of our newly built places of worship. The simplicity of the style of building of the church, and the humble and monotonous appearance of the surrounding gravestones, lend a peculiar attraction to the monument, the summit of which, from the elevated nature of the ground on which it stands, rises about 3 ft. above the level of the roof of the church, and forms a striking object from the public road leading from Perth to Coupar Angus, which passes through the village of New Scone, and about 200 yards to the south of the churchyard, which is situated at the west end of that beautiful village.

The monument is built of the famous Kingoodie stone, a species of bluish grey sandstone, taking a fine polish, and which has been long known to be of great durability. The whole of

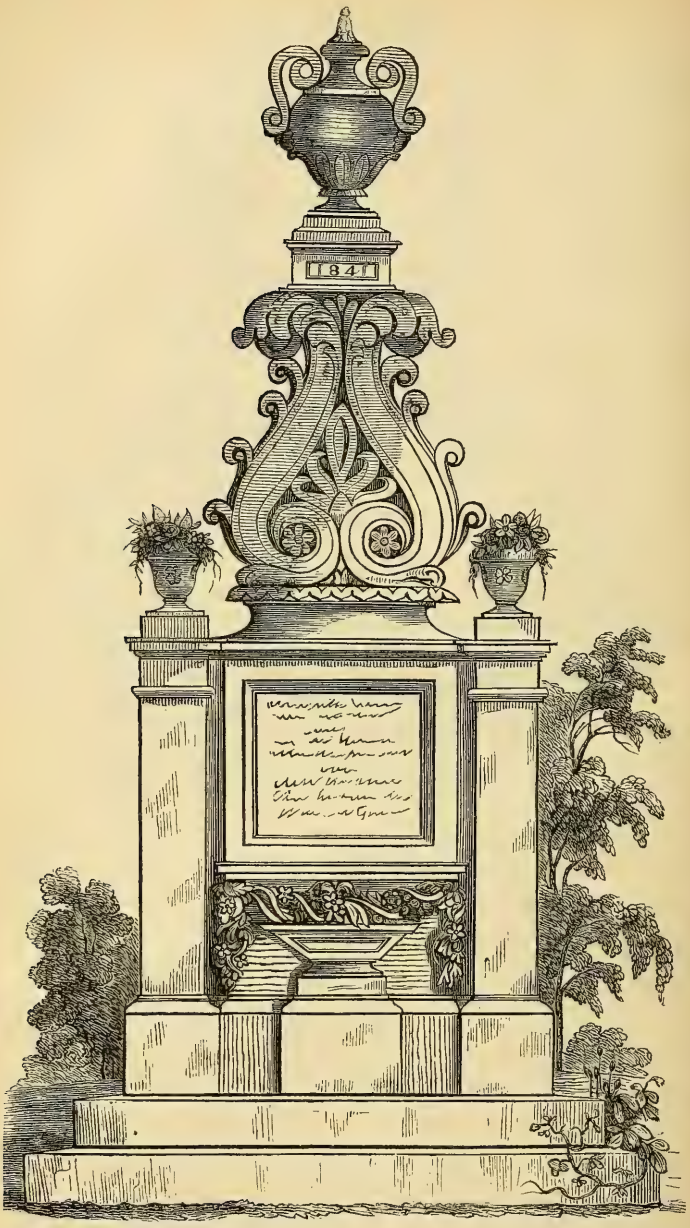

Fig. 31. *Monument to the Memory of David Douglas.*

the monument is composed of this beautiful stone, except the marble slabs containing the inscriptions, which are as follows:

(FRONT PLATE.)

ERECTED
BY THE LOVERS OF BOTANY IN EUROPE,
IN MEMORY OF
DAVID DOUGLAS,
A NATIVE OF THIS PARISH:
WHO, FROM AN ARDENT LOVE OF SCIENCE, AND A DESIRE TO PROMOTE
THE IMPROVEMENT OF BOTANY,
VISITED THE UNEXPLORED REGIONS ON
THE BANKS OF THE COLUMBIA, AND SOUTHWARD TO CALIFORNIA;
WHENCE
HE TRANSMITTED A GREAT VARIETY OF THE SEEDS OF
VALUABLE TREES AND FLOWERING PLANTS
ADAPTED TO THE CLIMATE OF GREAT BRITAIN:
AND
WHO, AFTER DEVOTING TEN YEARS OF THE PRIME OF HIS LIFE
IN ADDING TO
THE ARBORETUM AND FLORA OF EUROPE,
SUFFERED
AN ACCIDENTAL AND LAMENTED DEATH IN ONE OF THE SANDWICH ISLANDS,
ON THE 12TH JULY, 1834,
IN THE 35TH YEAR OF HIS AGE.

ENDOWED
WITH AN ACUTE AND VIGOROUS MIND,
WHICH HE IMPROVED BY DILIGENT STUDY,
THIS EMINENT BOTANIST
UNIFORMLY EXEMPLIFIED IN HIS CONDUCT
THOSE CHRISTIAN VIRTUES
WHICH INVESTED HIS CHARACTER
WITH A HIGHER AND MORE IMPERISHABLE DISTINCTION
THAN HE JUSTLY ACQUIRED
BY HIS WELL-EARNED REPUTATION FOR SCIENTIFIC KNOWLEDGE.
A DUTIFUL SON,
A KIND AND AFFECTIONATE BROTHER,
A SINCERE FRIEND;
HE SECURED BY
THE RECTITUDE OF HIS MORAL AND RELIGIOUS PRINCIPLES
NOT LESS THAN BY
THE BENEVOLENCE OF HIS DISPOSITION,
THE ESTEEM AND REGARD
OF ALL WHO KNEW HIS WORTH.

(REAR PLATE.)

THE FOLLOWING ARE A FEW OF THE NUMEROUS

TREES, SHRUBS, AND ORNAMENTAL PLANTS

INTRODUCED

BY DOUGLAS.

TREES.

ACER CIRCINATUM.
—— MACROPHYLLUM.
AMELANCHIER FLORIDA.
ARBUTUS PROCERA.
CRATÆGUS DOUGLASII.
PINUS LAMBERTIANA.
—— PONDEROSA.
—— NOBILIS.
PINUS AMABILIS.
—— MENZIESII.
—— DOUGLASII.

SHRUBS.

BERBERIS AQUIFOLIUM.
—— GLUMACEA.
GARRYA ELLIPTICA.
RIBES SANGUINEUM.
—— SPECIOSUM.
RUBUS SPECTABILIS.
GAULTHERIA SHALLON.

ANNUALS, BIENNIALS, AND PERENNIALS.

CLARKIA PULCHELLA.
CLINTONIA ELEGANS.
COLLINSIA GRANDIFLORA.
GILIA TRICOLOR.
NEMOPHILA INSIGNIS.
IPOMOPSIS ELEGANS.
LUPINUS POLYPHYLLUS.
ESCHSCHOLTZIA CALIFORNICA.
DOUGLASIA NIVALIS.
ETC. ETC.

III. LIST OF SUBSCRIBERS.

1. *Subscriptions sent direct to Perth to the Treasurer of the Committee, Archibald Turnbull, Esq.*

	£	s.	d.
John Ross, jun., Perth	0	5	0
Sergt. James Clark, 12th Royal Lancers	0	5	0
Wm. Moyes, Seggieden	0	5	0
Thomas Bishop, Methven Castle	0	5	0
J. Edward, Dunsinnane	0	2	0
William Beattie, Scone	0	5	0
James Young, Cairneymill	0	5	0
James M'Beath, Dunira	0	5	0
John Dick, Ballindean	0	5	0
John Maxton, Stormontfield	0	10	0
Archibald Turnbull of Bellwood	1	0	0
D. M'Lagan, Potterhill	0	2	6
Daniel Clark, Pitcullenbank	0	5	0
C. Sharpe, Pitfour	0	5	0
J. Robertson, Kinfauns	0	5	0
Arch. Gorrie, Rait	0	5	0
J. Lawrie, Inchmartin	0	5	0
Mr. Mareton, Scone	0	5	0
Mr. Will, Errol	0	2	6
Alexander Bisset, Methven Castle	0	5	0
Alexander M'Duff of Bonhard	0	10	0
Alexander Pirie, Freeland	0	5	0
Right Hon. Sir G. Murray, G.C.B.	1	1	0
John Chrystal, Scone	0	2	6
J. Paton, Kingswells	0	1	6
Mrs. Davidson, Collace	0	1	6
J. Smith, Hopetoun House	0	5	0
J. Smith, ditto	0	2	6
Collected by Mr. Hannan, Drumlanrig Castle.			
Edward Sang, Drumlanrig Castle	0	1	0
William Hastings, ditto	0	1	0
G. M'Ewan, ditto	0	1	0
G. Erskine, ditto	0	1	0
James Thorburn, ditto	0	1	0
J. Hiddleston, ditto	0	1	0
Alexander Lee, ditto	0	1	0
William M'Intyre, ditto	0	1	0
John Melrose, ditto	0	1	0
Malcolm Carmichael, ditto	0	1	0
James Singland, ditto	0	1	0
David Nicoll, ditto	0	1	0
James Hannan, ditto	0	5	0
Mr. Fergusson, Carron Hill House	0	2	6
Mr. Gibson, Enoch Mill	0	1	0
Mr. Baxter, Thornhill	0	1	0
Mr. Hunter, Thorton Mill	0	1	0
Mr. Shaw, Drumlanrig Castle	0	1	0
Peter M'Dougall, Thornhill	0	1	0

Collected by Mr. McNab, Botanic Garden, Edinburgh.

	£	s.	d.
His Grace the Duke of Devonshire	5	0	0
Joseph Paxton, Chatsworth	2	10	0
Professor Graham, Edinburgh	1	0	0
William M'Nab, Edinburgh Bot. Gard.	0	10	0
Charles Lawson, Edinburgh	1	1	0
Eagle and Henderson, ditto	2	0	0
Jonathan Hedley, Lancashire	0	5	0
George Geggie, ditto	0	5	0

Collected by Fould and Lymburn, Kilmarnock.

Fould and Lymburn	0	5	0
William Tillery, Fullerton House	0	1	0
John Morton, Kilmarnock	0	1	0
George Hay, Dunbeath House	0	1	0
James Young, Holm House	0	1	0
Hugh Loudon, Symington	0	1	0
Robert Flight, Alsop	0	1	0
H. C. Hart, Kilmarnock	0	1	0
A. Malcolm, Williamfield	0	1	0
J. Thomson, Kilmarnock	0	1	0
Gavin M'Ghie, Bellfield	0	1	0
A. Rose, Eglinton Castle	0	1	0
R. Fergusson, Elmbank	0	1	0
William Melville, Dunlop House	0	1	0

Collected by William Webster, St. Mary's Isle.

William Webster, St. Mary's Isle	0	5	0
J. Crosbie, ditto	0	1	0
David Landsborough, ditto	0	1	0
William Rellochan, ditto	0	1	0
James M'Connichie, ditto	0	1	0
John Smith, ditto	0	1	0

Collected by George Anderson, Millearne.

J. G. Home Drummond of Millearne	0	10	0
G. Anderson, ditto	0	5	0
William Anderson, ditto	0	1	0
Henry Allan, ditto	0	1	0
D. E. Robertson, ditto	0	2	0
J. M'Farlane, ditto	0	1	0

Collected by Messrs. Ballantyne and Son, Dalkeith.

Ballantyne and Son	0	10	0
George Elliot, Dalkeith	0	5	0
James M'Donald, Dalkeith Park	0	5	0
George Stirling, Melville Castle	0	5	0
William Richardson, ditto	0	1	0
William Stirling, ditto	0	1	0
James Kiddie, ditto	0	1	0
James Clark, ditto	0	1	0
Robert Greenfield, Dalkeith	0	1	0
Thomas Dirling, ditto	0	1	0
William Marshall, ditto	0	1	0
Walter Symington, ditto	0	1	0
R. Greig, ditto	0	1	0
James Wallace, ditto	0	1	0
Francis Binnie, Bowhill	0	5	0
John Matthieson, ditto	0	5	0
Thomas Noble, Lasswade	0	1	0
James Innes, ditto	0	1	0
Robert Hill, ditto	0	1	0
Mrs. Shepherd, ditto	0	1	0
Miss Steele, ditto	0	1	0
Robert Shaw, Dalkeith Park	0	2	0
Robert Watson, Moredun	0	5	6
James Frazer, Glenesk	0	2	6
Alexander Fowlis, Potting	0	1	0
James Robertson, Kirkhill	0	1	0
Peter Campbell, Dalhousie Castle	0	5	0
J. Boston, Drumhouse	0	2	6
Mr. M'Gregor, Lasswade	0	1	6
Alexander Cockburn, Dalkeith	0	1	0
Benjamin Taill, ditto	0	5	0
Walter Simpson, ditto	0	2	6
James M'Gill Rae, Newcastle Abbey	0	2	6
Thomas Robson, Dalkeith Park	0	1	0
John Robson ditto	0	1	0
James Cairncross, ditto	0	1	0
James M'Lean, ditto	0	1	0
William Ogilvie, ditto	0	1	0
James Smith, ditto	0	1	0

Collected by Mr. Dallachy, Haddo House.

John Dallachy, Haddo House	0	10	6
Alexander Gallow, ditto	0	10	6
Archibald Gorrie, ditto	0	2	6
A. Gordon, ditto	0	1	0
William Laurie, ditto	0	1	0
Charles Hutton, ditto	0	1	0
A. Munden, ditto	0	1	0
Peter Forbes, ditto	0	1	0
John Smith, ditto	0	1	0

Collected by Austen and M'Auslan, Glasgow.

Austin and M'Auslan	1	1	0
Moses Brown, Glasgow	0	5	0
James Brown, ditto	0	2	6
William Mill, Kenmure	0	2	6
William Scott, Sandyfaulds	0	2	6
James M'Intyre, Buchanan	0	2	6
Richard Watson, Hillend	0	2	6
William Stuart, Gilmore Hill	0	5	0
Robert Denholm, Woodhall	0	2	6
James M'Donald, Dalbeath	0	2	6
William Lambie, Aitkenhead	0	2	6
A. Wilson, Castlemilk	0	2	6
George Jeffrey, Nursery Cottage	0	2	6
A. M'Millan, Whitehill	0	2	6
Duncan Wright, Greenlaw	0	2	6
William Cowans, Cadder	0	2	6
James Hardie, Castle Temple	0	2	6
P. Donaldson, Finnart	0	2	6
William Rankine, North Park	0	1	6
A. M'Millan, Possil House	0	1	6
John Cramb, Golfhill	0	1	6
Thomas Ormiston, Germiston	0	1	0
Donald Lindsay, Rosedoe	0	1	0
J. Carr, Dowanhill	0	1	0
Robert Thomson, Glasgow	0	4	0
R. Thomson, jun., ditto	0	2	6
J. Cruickshank, Killermont	0	2	6
Thomas Carswell, Drumpelier	0	2	6
A. Glover, Newton Stewart	0	5	0
Thomas Smith, Pinfillan, Thornhill	0	5	0
John M'Leod, Eccles, Thornhill	0	1	0
John Davidson, Maxweltown	0	2	0

Glasgow Botanic Garden List.

Sir W. J. Hooker	1	1	0
Stewart Murray, Glasgow	0	10	6
Daniel Fergusson, ditto	0	4	0
D. M'Gregor, ditto	0	1	6
Archibald Fowler, ditto	0	1	0
Robert Davidson, ditto	0	1	0
Adam Robertson, ditto	0	1	0
Alexander Caie, ditto	0	1	0
James Dalgleish, ditto	0	1	0
David Orr, ditto	0	1	0
J. Niven, ditto	0	1	0
Andrew Turnbull, ditto	0	5	0
James M'Donald, ditto	0	5	0
Peter Lumsdain, Ireland	0	5	0
William Lumsdain, ditto	0	5	0
H. Colquhoun	0	10	6
J. Scoules, M.D., Dublin	0	10	6
J. J. Mackay, ditto	0	10	6
David Moore	0	5	0
James Gunning, Dublin	0	2	6
J. Gunning, ditto	0	2	6
J. Bain, ditto	0	2	6
William M'Indoe	0	5	0
Thomas Matthieson	0	5	0
George Reid	0	5	0
Christopher Reilley	0	1	0
Thomas Ahern	0	1	0
John Byrne	0	1	0

	£	s.	d.
Daniel Nelson	0	5	0
James Brady	0	2	6
Hugh Aitken	0	5	0
John Jack	0	5	0
Henry Boyle	0	2	0
John Langmuir	0	2	6
Peter Scott, Drumcondra	0	5	0
Hugh Bisset	0	2	6
J. Scott	0	2	0
Thomas Woods	0	1	0
N. Niven	0	10	6
Patrick M'Ardale	0	2	6
Patrick Campbell	0	2	6
James Arberry	0	1	0
George Cornuts	0	1	0
Philip Melmal	0	1	0
John Clastar	0	1	0
W. Simson	0	1	0
J. M'Cullogh	0	1	0
William Jones	0	1	0
John Young	0	1	0
J. Kirwan	0	1	0
Thomas Mahon	0	2	6
G. Roddin, Santry House	0	2	6
J. Keith, Phœnix Park	0	5	0
Thomas Bridgeford, Ball's Bridge	0	5	0
John M'Gregor	0	5	0
John Grant, Braghead	0	10	0
Alexander Allison	0	5	0
Edward Carrol, Raherry	0	2	6
Sent without names, upwards of	4	0	0

Collected by William Pearson, Cally.

	£	s.	d.
William Pearson, Cally, Gatehouse of Fleet	0	5	0
Francis Kinghorn, ditto	0	1	0
James Sinclair, ditto	0	1	0
Andrew Kyle, ditto	0	1	0
William M'Morrison, ditto	0	1	0
James Henry, ditto	0	1	0
Matthew Lithgow, ditto	0	1	0
John Maxwell, ditto	0	1	0
A. Cowan, ditto	0	0	6
Andrew Halford, ditto	0	0	6
James Hanney, Cairnmore	0	2	0
William Ross, Cardonness	0	1	6
Adam M'Marran, Kirbuchtree	0	1	6
Alexander M'Marran, ditto	0	1	0
Dr. Sinnott, P.P.	0	3	0
James Ewart, Newton Stewart	0	1	0
William Dill, ditto	0	1	0
George Campbell, ditto	0	1	0
Robert Spark, ditto	0	2	0
Thomas M'Adam, ditto	0	2	0
John Mitchell, ditto	0	2	0
Ewing Glover, ditto	0	1	0
James Stewart of Cairnsmore	0	10	0
William Maxwell of Cardon	0	5	0
David Credie, Gatehouse	0	2	6
James Kirkpatrick, ditto	0	1	0
George Dodds, Galloway House	0	5	0

Collected by Mr. Connelly, Lancaster.

	£	s.	d.
Mrs. Colonel Ponnington, Lancaster	0	10	0
Rev. T. M'Reath, ditto	0	5	0
Miss Robinson, ditto	0	5	0
T. Connelly	0	5	0

Collected by J. Adair, Dumfries.

	£	s.	d.
From Seventeen not named	3	10	0

Sent direct to the Treasurer.

	£	s.	d.
Mr. Cockburn, Caenwood	0	5	0
J. Maxton, Middlesex	0	2	0
James Carnegie, Blairgowrie	0	5	0
William Drummond, Balthayock	0	5	6
Robert Fish, London	0	5	0
John Campbell, Belfast	0	5	0
Lawrence Niven, Oakfield	0	2	6
Peter M'Raw, Rothiemurchus	0	5	0
John Caie, Campden Hill	0	5	0
Charles Stewart, Househill	0	2	6
Archibald Woodhouse, Esq., Crosslee Cottage	0	10	0
Charles Frazer, Ireland	0	10	0

Collected by Sir P. Murray Thriepland, Bart.

	£	s.	d.
Stuart M. Thriepland, Esq.	0	10	0
William Peddie, Perth	0	5	0
Lawrence Craig of Glendoick	0	10	0
Sir P. M. Thriepland	1	1	0
Robert Sutherland, Pitcairnfield	1	0	0
William Ross, Collace	0	5	0
Thomas Drummond, Perth	0	2	6
J. Dodds, Scone Palace	0	5	0
Earl of Mansfield, Scone Palace	5	0	0
Lord Gray, Kinfauns Castle	1	0	0
William Cleland, Perth	0	10	0

Collected by Mr. M'Culloch.

	£	s.	d.
Names not given in	9	0	0

Collected by Mr. Gorrie.

	£	s.	d.
Miss Catherine M. Thriepland of Fingask	0	5	0
Peter Clark, Perth	0	5	0
John Brough, Kinross	0	5	0
James Ballingall, Perth	0	10	0
G. P. Buist, Edinburgh	0	5	0
Thomas Williams, Belfast	0	10	0
G. Gibson, Perth	0	5	0
Col. Murray Belshes of Invermay	1	0	0
Lady Gray	1	0	0
James Graham of Garvock	0	5	0
Dr. MacFarlane, Perth	0	5	0
Mr. Stewart, County of Meath	0	5	0

Collected by Drummond and Sons, Stirling.

	£	s.	d.
Drummond and Sons	0	10	0
Peter M'Kenzie, Plean	0	1	0
James Drummond, Blair Drummond	0	1	0
James Campbell, Ardoch House	0	1	0
James Thomson, Ochtertyre	0	1	0
J. M'Kenzie, Sauchie	0	1	0
D. Montgomery, Buchannan	0	2	0
J. M'Lellan, Keir	0	1	0
James Cowie, Stirling	0	1	0
James Smith, Powis	0	1	0

Collected by William Laird, Dundee.

	£	s.	d.
William Angus, Dundee	0	2	6
William Laird, ditto	0	5	0
David Easson, Camperdown	0	2	6
James Jamieson, Arbroath	0	2	6
William Jackson	0	1	0
G. Barry, Invergowrie	0	2	6
James Laird	0	1	0
Thomas Taylor, Browhead	0	1	0
Charles Clark	0	2	6
P. Brown	0	2	6
A Friend	0	1	0
A Florist	0	1	0
A. R.	0	1	0
W. M.	0	1	0
Johann Gutz	0	1	0
J. M'K.	0	2	6
A Friend	0	1	0
A. Paterson	0	1	0
James Tait	0	2	0
	£79	18	6

Omissions, if any, will be corrected in a future Number.

2. Subscriptions sent to London to J. C. Loudon, Esq., and by him transmitted to the Treasurer at Perth.

	£	s.	d.
M. Patterson, Heligan, St. Austin's Cornwall	0	5	0
R. Glendining, Bicton Gardens, near Exeter	0	5	0
James Duncan, Basing Park, Hampshire	0	5	0
J. Denson, sen.	0	1	0
James Cuthill, gardener at Dyrham Park	0	5	0
John Warter, under-gardener at Dyrham Park	0	1	0
Daun Ingram, journeyman at Dyrham Park	0	1	0
Benjamin Kingshot, journeyman at Dyrham Park	0	1	0
John Coltart, Rotham Park, flower-gardener	0	1	0
Thomas M'Dougal, under-gardener, Rotham Park	0	1	0
Capt. John Minors, Exeter	0	5	0
William Turner, Bury St. Edmund's Botanic Garden	0	5	0
Mr. Main, Chelsea	0	2	6
N. J. Baron, Esq., Drewton	1	0	0
T. Rutger, Park House, Teddington, Middlesex	0	5	0
James Carton, Syon Gardens	0	5	0
James Taylor, ditto, foreman	0	2	6
Thomas Mote, ditto	0	2	6
Alexander Forsyth, ditto	0	1	0
William Loader, ditto	0	1	0
Lawrence Seher, ditto	0	1	0
James Stone, ditto	0	1	0
Thomas Chapman, ditto	0	1	0
James Richardson, ditto	0	1	0
William Wesley, ditto	0	1	0
John Custon, ditto	0	1	0
John Wallace, ditto	0	1	0
Charles Simmons, ditto	0	1	0
James Taylor, ditto	0	1	0
James Templeton, ditto	0	1	0
John Kirk, ditto	0	1	0
Richard Pearce, ditto	0	1	0
Robert Kemp, ditto	0	1	0
Mr. Carter, Budleigh, Salterton	0	5	0
Mrs. Durant, Bicton	0	5	0
Lady Rolle	1	0	0
T. Hunter, Esq., Budleigh Salterton, Devonshire, by Mr. Glendining	0	5	0
Mr. Cornish, Bicton, near Exeter, by ditto	0	5	0
Andrew Stewart, Chatsworth	0	2	6
Charles Edmonds, ditto	0	5	0
Peter Marnock, ditto	0	2	6
Edward Kemp, ditto	0	2	6
William Wilson, ditto	0	2	0
Peter Bark	0	2	0
Eugene Melinon, from the Paris Bot. Gard.	0	5	0
Octavius Barton, apprentice	0	1	0
James Baily, ditto	0	1	0
J B. Whiting, Kiplin, near Catterick	0	2	6
William Wilkins, nurseryman, Isle of Wight	0	5	0
Andrew Toward, head-gardener at Bagshot Park	0	5	0
John Standish, journeyman, ditto	0	1	0
William Smith, ditto, ditto	0	1	0
Frederick Cherryman, ditto, ditto	0	1	0
Henry Godfrey, ditto, ditto	0	1	0
George Mechie, apprentice, ditto	0	1	0
T. Lamb, gardener, Hurstbourne Park, Hants	0	5	0
Mrs. Plimsole, Bicton	0	2	6
Mr. Hamley, ditto	0	5	0
Mr. Park, Paris Street, Exeter	0	5	0
Mr. Craggs, gardener to Sir T. D. Ackland, Killerton	0	5	0
John Ford, gardener to —— Whitebread, Esq., Fonthill, Bedfordshire	0	5	0
John M'Donald, gardener to Lord Cartwright, Hawns, Bedfordshire	0	5	0
Thomas Parkins, Cannon Hall	0	1	0
Mr. Webster, gardener, Sandy Place, near Biggleswade, Bedfordshire	0	5	0
John Fox, under-gardener, Normanton Park, Rutland	0	1	0
W. A. Rowland, metallic-wire manufacturer, Chester	0	10	0
Collected at the Horticultural Dinner at Truro by William Tweedy, Esq., and Lieut. George Pooley, R.N.	2	12	6
At the Horticultural Dinner, Falmouth, by ditto	1	8	0
W. B. Booth	0	7	6
J. Mitchinson, gardener at Pendarves	0	5	0
J. Grills, under-gardener at ditto	0	1	0
A Lady at Carnborne	0	2	6
F. Welsh, under-gardener at ditto, in a letter from J. Mitchinson	0	1	0
C. Cobbold, Esq., Pres. of Ips. H. S.	0	10	0
J. Hind, treasurer, ditto	0	10	0
T. Savage, Ackenham	0	2	6
C. M'Pherson Roy, gardener to the Rev. Mr. Edgar	0	2	6
W. Woollard, Sec. I. H. S	0	2	6
R. Paterson, seedsman and gardener	0	2	6
H. Laundy, Journ. Gard.	0	2	6
In a Letter from R. Paterson, seedsman, Ipswich	1	12	6
James Clark, gardener, Whitehaven Castle	0	5	0
James Bell, Lowther Street, Whitehaven	0	5	0
John Thompson, Relswick House	0	5	0
William Sawers, Pres. of the Whitehaven H. S.	0	5	0
William Rundleson, Croft Hill	0	5	0
R. F. King, surgeon	0	5	0
James Dare, draper, Workington	0	5	0
Robertson Cropthwaite, ironmonger, ditto	0	5	0
W. Grisdale, Flora Villa	0	5	0
Joseph Walker, High Street, St. James's	0	5	0
William Miller, ditto, ditto	0	5	0
Jos. Miller, ditto, ditto	0	5	0
Rev. Henry Lowther, Dislington Rectory	0	5	0
John Pennyfeather, gardener, Whitehaven Castle. (In the Lowther family for 70 years)	0	5	0
George Buckham, Flora Villa	0	5	0
John Walker, yeoman, Rollington	0	5	0
James Steel, mason, Whitehaven	0	1	0
John Gibson, tea-dealer, Roper Street	0	1	0
R. Armistead, solicitor. (In a letter from James Clark, gardener, Whitehaven Castle)	0	5	0
List, &c., received by C. Pullar, gardener to J. L. Goldsmid, Esq., Champion Hill, Surrey, (sent to Longman's)	1	6	0
C. Pullar, gardener, Champion Hill, Camberwell, Surrey	0	5	0
James Jones, journeyman, ditto	0	1	0
T. Smith, gardener to J. Richardson, Esq., Camberwell	0	1	0
George Fleming, gardener to J. Ranking, Esq., Dulwich	0	5	0
J. Scott, journeyman, ditto	0	1	0
T. Mossman, ditto, ditto	0	1	0
J. Sadler, gardener to J. Fisher, Esq., Denmark Hill House	0	5	0
D. Milns, journeyman, ditto	0	1	0
J. Coutts, gardener to N. F. Hebbert, Esq., Dulwich Hill House	0	5	0
W. Mutton, gardener to S. Phillips, Esq., Champion Lodge, Denmark Hill	0	1	0
The Duke of Bedford	1	0	0
G. Gordon, foreman of the Hort. Soc. Arboretum	0	5	0

Collected by J. Pope and Sons, Nurserymen, near Birmingham.

	£	s.	d.
J. Pope and Sons - -	0	10	6
J. Green, W. Goodall, Secretaries to the Birmingham Botanic and Warwickshire Fl. S.	1	0	0
D. Cameron, Cur. Birmingham Botanical Garden - - - -	0	10	0
T. Williams, gardener, Holford -	0	10	0
J. Mowbray, Lower Nursery, Wolverhampton - - - -	0	10	0
T. Aston, Moxley, Bilston - -	0	5	0
Mr. Prinsep, gardener, Hilton Park -	0	5	6
J. Allen, ditto, Wolverhampton -	0	1	0
Mr. Jackson, ditto, ditto - -	0	1	0
Mr. Wright, ditto, ditto - -	0	1	0
W. Ratcliffe, ditto, ditto - -	0	1	0
T. Smith, florist, Wolverhampton -	0	1	0
Mr. Massey, ditto - - - -	0	1	0
Mr. Gardner, gardener, Ellows, near ditto - - - - -	0	1	0
Mr. Walford, Wimborne - -	0	1	0
Mr. Pullen, gardener, Park Grove, Birmingham - - - -	0	1	0
Mr. Dudley, Wolverhampton - -	0	1	0
Mr. Fairchild, gardener, ditto - -	0	1	0
Mr. Horton, gardener, ditto - -	0	1	0
P. Law, innkeeper, ditto - -	0	1	0
Mr. Diggery, constable, ditto - -	0	1	0
Mr. Henney, ditto - - -	0	2	6
Collected at the Tamworth Floricultural Exhibition, Aug. 3. - -	0	13	0
Mr. Beddard, gardener, Enville -	0	5	0
W. Mussell, gardener, Moseley, near Birmingham - - - - -	0	1	0
C. Ebdral, gardener, Birmingham -	0	1	0
Mr. Britten, ditto - - -	0	1	0
E. Hill, ditto - - - -	0	5	0
J. Moone, nurseryman, Perry Barr. -	0	5	0
T. Beech, ditto, Birmingham - -	0	5	0
J. Webster, gardener, Moseley Hall -	0	2	6
E. Ricketts, gardener, Horseley House - - - - - -	0	1	0
Mr. Carpenter, gardener, Moor Green -	0	2	6
S. Wyatt, Handsworth Nursery -	0	2	6

Collected by Mr. D. Cameron.

W. Adderley, journeyman, Birmingham Botanical Garden - -	0	1	0
T. Bird, ditto, ditto - - -	0	1	0
R. Thomas, ditto, ditto - - -	0	1	0
T. Jones, ditto, ditto - - -	0	1	0
R. Phipps, ditto, ditto - - -	0	1	0
J. Goodall, ditto, ditto - - -	0	1	0
R. Leigh, ditto, ditto - - -	0	1	0
T. Hetherington, gardener, Edgbaston - - - - - -	0	2	6
G. Anderson, gardener, Sandwell -	0	5	0
A. K. - - - - - -	0	4	0

Collected by John Cree, Nursery and Seedsman, Addlestone, Surrey.

Various - - - - - -	0	5	0
J. M'Farlan, foreman, ditto - -	0	2	6
J. Bisset, gardener, Burwood - -	0	2	6
A. Gray, gardener, Botleys - -	0	1	0
J. Brunton, gardener, Ottershaw -	0	1	0
George Murray, gardener, Silvermere -	0	1	6

Collected in the London Hort. Soc. Gard. 2 8 0

Collected by James Atkins, Nurseryman, Northampton.

Earl of Euston, Salcey Forest - -	0	5	0
J. Funnel, gardener, Overstom Park -	0	5	0
W. Logan, gardener, Althorp Park -	0	5	0
J. Challis, gardener, Barton Seagrave -	0	5	0
J. Atkins, nurseryman, Northampton -	0	5	0

Collected by Messrs. Dickson, Chester.

	£	s.	d.
F. Dickson, nurseryman, Chester -	0	10	0
H. Turnbull, foreman, ditto - -	0	2	6
J. Princes, gardener at ditto - -	0	1	0
G. Walker, shopman, ditto - -	0	2	6
W. Hugh, journeyman, ditto - -	0	1	0
P. Hurd, gardener, Back Hall, ditto -	0	2	6
T. Meredith, journeyman, at Meund's	0	2	6
J. Pass, gardener to R. Baxter, Esq., Chester - - - -	0	2	6
J. Dickson, seedsman, ditto - -	0	10	0

Through various Persons.

J. Taylor, gardener to the Right Hon. Earl of Wilton - - - -	0	5	0
W. Miller, gardener to the Earl of Shrewsbury - - - - -	0	5	0
J. Veitch, jun., Killerton Nursery -	0	5	0
W. Moor, jun., Leicester - -	0	5	0
W. W. Wake, apprentice at Woburn Abbey - - - - - -	0	3	0
C. Sutherland, journeyman, ditto -	0	3	6
C. Kennedy, gardener, ditto - -	0	3	0
A. Killerman, ditto - - -	0	2	6
R. Pitkethley, ditto - - -	0	3	0
Collected by J. D. Hextall, bookseller, Ashby-de-la-Zouche, Leicestershire -	1	10	0
W. Cruickshank, gardener, Cole Orton Hall - - - - - -	0	5	0
George Handley, journeyman, ditto, ditto - - - - - -	0	1	0
J. Bowman, gardener, Melbourne Hall - - - - - -	0	2	0
J. Vernon, gardener, Calke Abbey -	0	2	0
J. Hextall, bookseller, Ashby-de-la-Zouche - - - - -	0	2	6
J. Hood, nurseryman, ditto - -	0	2	6
H. C. Daves, grocer and druggist, ditto - - - - - -	0	2	6
Mr. Mammatt, ditto - - -	0	5	0
W. Daves, solicitor, ditto - -	0	2	6
Mr. J. Usherwood, ditto - -	0	2	6
Mr. Peddocke, solicitor, ditto - -	0	2	6
Collected by J. Mearns, gardener, Welbeck, Nottingham - -	1	16	6
James Loudon, Gurney Cottage - -	0	5	0
Mr. W. M'Murtrie, Shugborough -	0	5	0
J. Jackson, ditto - - - -	0	1	0
John Watt, ditto - - - -	0	1	0
J. Lamb, gardener, Markeaton, Derby	0	5	0
Joseph Allen, under-gardener, ditto -	0	1	0
Collected by John Wilson, gardener at Worksop Manor - - - -	3	0	0
By Messrs. Longman, from W. Barron, gardener, Elvaston Castle - -	0	5	0
W. Baxter, under-gardener, ditto -	0	1	6
D. Smith, Bot. Gard., Hull - -	0	5	0
A. Smith, nurseryman, Gainsborough -	0	2	6
Mr. Hedges, gardener, Brocklesby -	0	5	0
Mr. Burrell, Beverly - - -	0	1	0
Mr. Usher, gardener, South Dalton -	0	1	0
Mr. Usher, gardener, Appleby - -	0	1	0
Mr. Reid, gardener, Rise Park - -	0	2	6
Mr. Usher, gardener, Beverly - -	0	1	0
Mr. Spearing, gardener, Sunderlandwick - - - - - -	0	1	0
Mr. Croskill, Beverly - - -	0	2	6
Mr. Press, nurseryman, ditto - -	0	2	6
Mr. Patrick, gardener, Kirkilla -	0	1	0
Mr. Linnan, gardener, Bishop Burton	0	1	0
Mr. Ramsay, gardener, West Ella -	0	1	0
Mr. Parker, Florist, York - -	0	1	0
J. Wild, fruiterer, Ipswich - -	0	2	0
T. Latter, gardener at Priory Gardens, ditto - - - -	0	2	0
W. Hoodard, under-gardener at ditto - - - - -	0	1	0
Miss Watson - - - -	0	1	0
Miss Hodson - - - -	0	1	0
W. Archer - - - -	0	1	0
A. B. - - - - -	0	1	0
T. H. and G. Gibson - - -	0	11	0
Mr. Smith, in a Letter from Worcester	6	6	0

	£	s.	d.
T. Birchmore	0	2	0
A. Begbie, Beaumont Lodge	0	5	0
M. Macqueen, ditto	0	1	0
T. Ansell, ditto	0	1	0
J. Gaul, gardener, Eton	0	1	0
J. Reid	0	5	0
J. Arkle	0	2	6
G. Patrick	0	2	6
From Messrs. Law and Co.	4	10	6
Received by Mr. William Godsall, nurseryman, Hereford	2	11	6
Mr. Burn, Tottenham Park	0	5	0
Mr. Perry, Sandford Priory	0	5	0
Mr. Lindsay, Highclere	0	5	0
Mr. Thomas, gardener to Sir J. Hollycomb	0	5	0
Mr. Clark, gardener, Compton Garden	0	5	0
A. Holland, under-gardener	0	1	0
J. Mitchell, gardener, Trimmington House, Barnstable	0	5	0
J. Griffin, under-gardener, ditto	0	2	6
J. Mallet, gardener, Rickington, ditto	0	2	6
J. Mark, gardener, Arlington Court	0	5	0
In a letter from R. Glendinning	1	2	6
Collected by W. Taylor, Thainston, Aberdeenshire	0	9	0

FOREIGN SUBSCRIPTIONS.

Collected by M. C. Rauch of Vienna.

	£	s.	d.
Freiherr Sigmund von Proney, K.K. Kämmerer, Corr. Mem. of the Lond. Hort. Soc. 5fcm.	0	10	0
Johan Georg Heller, gardener to Baron Carl von Hügel, 2f.	0	4	0
Christian Cester, gardener to Prince Dietrichstein, 2f.	0	4	0
John K. Rosenthal, nurseryman, 3f.	0	6	6
Joseph Held, nurseryman, 5f.	0	10	0
Friedrick Jos. Müllbek, K.K. Militair Comissair, 5f.	0	10	0
M. Kleyle, 1f.	0	2	0
Zahlbruckner, 1f.	0	2	0
Joseph Stiegler, gardener to Count Mailathsike, Hungary	0	9	0
Baron Jacquin, 5f.	0	10	0
Charles Rauch, 5f.	0	10	0
Count F. Harrach	20fn.		
J. B. Rupprecht	1f.		
Kher	1f.		
F. Wauk	2fn.		
J. Krammer	1fn.		
C. Riegler	2f.		
H. W. Scholt	2f.		
P. Welle	2f.		
J. Boos	2f.		
J. Haker	2f.		
J. Schröder	2f.		
F. Schenerman	1f.		
Peinter	1f.		
	73f.	7	6 0

By M. J. Rinz, nurseryman, Frankfort.

	£	s.	d.
Collected there	15	0	0

By P. D. Falberg, Copenhagen.

	£	s.	d.
Hornemann, Prof. of Bot.	0	5	0
Schouw, ditto	0	5	0
Lady Georgia Schouw	0	5	0
P. D. Falberg, Ass. of the Bank	0	5	0
Wibster	0	2	0
Moerch, botanical gardener	0	5	0
Petersen, court gardener	0	5	0
Ohlsen, seedsman	0	2	0
Hintze, ditto	0	2	0
Dannekert, ditto	2	0	0
Mols, seedsman	0	2	0
Rhée, ditto	0	2	0
Grimmenstein, ditto	0	2	0
Asmussar, gardener	0	4	0
Koch, ditto	0	2	0
Ohlsen, ditto	0	1	0
Eltzholtz, ditto	0	2	0
M. Schiderdt, Copenhagen	0	5	0

France.

	£	s.	d.
Mr. Thos. Blackie, (native of Scotland) 8. Rue des Vignes, Paris, 7f.	0	5	10
	101	7	4
	79	18	6
Total	£181	5	10

The names of a number of subscribers which ought to have appeared along with the others in the above list are not given; either because they have never been sent to us, or because we have lost or mislaid them. Should they, or any corrections to the names of persons or places given, be sent in the course of a month, we will print them in a supplementary list.

Art. II. *The Civetta, or Little Italian Owl.** By Charles Waterton, Esq.

This diminutive rover of the night is much prized by the gardeners of Italy for its uncommon ability in destroying insects, snails, slugs, reptiles, and mice. There is scarcely an out-house in the gardens and vineyards of that country which is not tenanted by the civetta. It is often brought up tame from the nest; and in the month of September is sold for a dollar to sportsmen, who take it with them in their excursions through the country, to look for larks and other small birds. Perched on the top of a pole, it attracts their notice and draws them within the fatal range of gunshot by its most singular gestures;

* See a correct description of this bird in the *Ornitologia Toscana*, vol. i. p. 76., by Professor Paolo Savi.

for, standing bolt upright, it curtsies incessantly, with its head somewhat inclined forwards, whilst it keeps its eyes fixed on the approaching object. This odd movement is peculiar to the civetta alone. By it, the birds of the neighbourhood are decoyed to their destruction. Hence its value to the ranging sportsman. Often and anon, as the inhabitants of Rome pass through the bird-market at the Pantheon, they stop, and look, and laugh at this pretty little captive owl, whilst it is performing its ridiculous gesticulations.

Its flesh is relished by the natives of Italy. You may see the civetta, plucked and ready trussed for the spit, on the same stall at which hawks, crows, jackdaws, jays, magpies, hedgehogs, frogs, snails, and buzzards are offered for sale to the passing conoscenti, who frequent the bird-market in quest of carnal delicacies. The inhabitants of this country are apparently blessed with stomachs as keen and strong as that of my old black friend Daddy Quasshi, who could fatten on the grubs of hornets, and on stinking fish. Indeed, it would appear from what I have seen, that scarcely any thing which has had life in it comes amiss to the Italians in the way of food, except the Hanoverian rat, for I could often see this voracious and needy intruder lying dead in the streets, and trodden under foot.

Thinking that the civetta would be peculiarly useful to the British horticulturist, not, by the way, in his kitchen, but in his kitchen-garden, I determined to import a dozen of these birds into our own country. And still, said I to myself, the world will say it was a strange whim in me, to have brought owls all the way from Italy to England; seeing that owls, ay and hawks too, are by no means scarce in our palaces, and in parliament, and on the magisterial benches. Be this as it may, I agreed with a bird-vender in the market at the Pantheon for a dozen young civettas; and, having provided a commodious cage for the journey, we left the Eternal City on the 20th of July, 1842, for the land that gave me birth.

At Genoa, the custom-house officers appeared inclined to make me pay duty for my owls. "Gentlemen," said I, "these birds are not for traffic; neither are they foreigners: they are from your own dear country, *la bellissima Italia*, and I have already strong reason to believe that they are common in Genoa, so that they can well be spared." The custom-house officers smiled as I said this, and then they graciously allowed me and my owls to proceed to the hôtel, without abstracting a single farthing from my pocket.

We passed through the sunny regions of Piedmont with delight, and over the snowy summit of Mount St. Gothard without any loss, and thence we proceeded northward, through Lucerne to Basle. Here, Monsieur Passavant, the banker,

a wormwood-looking money-monger, seemed determined that myself and my owls, and the rest of my family, should advance no farther. Having lost my letter of credit in the late shipwreck, and there not having been time, after my return to Rome and my short stay there, to receive another from London, I was furnished, by the bank of Prince Torlonia, with a very warm and complimentary letter of introduction to Passavant of Basle, in case I might fall short of money on my way home; and Prince Canino (Charles Bonaparte), whom I accidentally met in Genoa, gave me another of the same tenour. But all would not do. I only wanted 12*l.*, which, with what I had by me, would have enabled me to reach Cologne, where I could have got any supply of money from the good landlord of the hôtel du Rhin. Passavant, to whom I had presented the two letters, and to whom I had given a full account of the unfortunate shipwreck, could not possibly comprehend how I could have the temerity to travel without a regular letter of credit. I offered him my draught on Denison of London. He refused to take it. Would he accept my watch worth forty guineas, in pledge, till my bill should be honoured? No. He looked at me, and then at the letters, and then at me again; and said there was something equivocal in the one from Prince Torlonia's bank. He would not advance me a single sous. On making my retiring bow, I told him that, as I was in the habit of writing occasionally on natural history, I would make honourable mention of his great liberality in my next publication, and that, in the meantime, I would send Torlonia a full account of our interview.*

I should have stuck fast for money in Basle, had not Lord Brougham's brother (William Brougham, Esq.) luckily arrived in the town that very day. He immediately advanced me an ample supply.

All went well after this, until we reached Aix-la-Chapelle. Here, an act of rashness on my part caused a serious diminution in the family. A long journey, and wet weather, had tended to soil the plumage of the little owls; and I deemed it necessary, that they, as well as their master, should have the benefit of a warm bath. Five of them died of cold the same night. A sixth got its thigh broke, I don't know how; and a seventh breathed its last, without any previous symptoms of indisposition, about a fortnight after we had arrived at Walton Hall.

The remaining five have surmounted all casualties, having been well taken care of for eight months. On the 10th of May,

* Prince Torlonia, on receiving my letter, made Passavant smart severely for his conduct.

in the year of our Lord 1842, there being abundance of snails, slugs, and beetles on the ground, I released them from their long confinement.

Just opposite to the flower-garden, there is a dense plantation of spruce fir trees. Under these, at intervals, by way of greater security, I placed the separated parts of two dozen newly killed rabbits, as a temporary supply of food; and at 7 o'clock in the evening, the weather being serene and warm, I opened the door of the cage. The five owls stepped out to try their fortunes in this wicked world. As they retired into the adjacent thicket, I bade them be of good heart; and although the whole world was now open to them, "where to choose their place of residence," I said, if they would stop in my park, I would be glad of their company; and would always be a friend and benefactor to them.

Walton Hall, May 11. 1842.

ART. III. *The Principles of Gardening physiologically considered.* By G. REGEL, Gardener in the Royal Botanic Garden at Berlin.

(Translated from the *Garten Zeitung.*)

(*Continued from* p. 264.)

I. ON THE PROPAGATION OF PLANTS — *continued.*

C. *Sorts of Soil.*

CUTTINGS grow in general in the mixture of soil which is best suited to the mother plant; but a lighter sort of soil suits them much better, and in a light heath mould they root quicker and better than in a heavier soil, or one mixed with leaf mould or rotten dung and animal manure. The reason of this is partly owing to their drawing from the heath soil a less condensed nutritive sap, impregnated with scarcely any thing but extract of decayed vegetable matter, which, being more suitable to the plants that absorb it through the healthy spongioles of their roots, accords better with the natural wants of the cutting, and not only prevents it from becoming sickly, but in general increases its vital energy. It is also well known, that in light soils the roots become more luxuriant, and form more spongioles, the less nourishment they find in their immediate neighbourhood; such, for example, as those roots which are developed in a moist atmosphere, in light dry earth, sand, &c. Strewing sand on the surface of pots prepared for cuttings is done chiefly to prevent the growth of moss, it also adheres better to the cuttings than earth does. Many cuttings root better in coarse or gravelly sand than in earth, and the cuttings, more particularly those thickly beset with leaves are stuck in so that the lower end of the cutting is barely covered with soil. In filling the pots care must be

taken to form a sufficient drainage at the bottom, and that the earth is not too closely pressed down. It should also be borne in mind that shallow pots are preferable to deep ones.

In the first number of the *Garten Zeitung* for 1840, charcoal ashes were recommended as the best medium for striking cuttings. We do not wish to deny the beneficial influence of this substance on the vegetation of many plants; and we think that the charcoal ashes impregnated with humus, or as M. Lucas says, ashes dissolved by the air, in many cases operate favourably on the developement of cuttings, and that charcoal will act an important part in propagation, particularly when experiments have been more generally made. The theory grounded upon these experiments by Dr. H. Buchner, sen., on which he proposes to found a system of curing sickly plants, we can, however, in many particulars, by no means support. It is not our intention to refute this treatise in detail, we leave that to chemists: for we can only admit that charcoal has an indirect influence on the vegetation of plants; for the dissolution of charcoal itself, and the formation of nourishment for plants, verge on impossibility, as it is well known that charcoal is not dissolvable in water, spirits of wine, oils, or alkalies, nor does it undergo a change in the usual temperature of the air and water. The opposite results of chemical annalyses may be explained by supposing that the charcoal ashes, which had been previously used, had imbibed much extraneous matter from the water poured upon them, and from the atmospheric air. The absorption of the atmospheric air, as oxygen gas, nitrogen gas, carbonic acid, hydrogen, &c., is certainly one of the properties of charcoal, but the dissolution of these gases only takes place at + 80° Reaum., so that it does not appear that they can be transmitted to the plant by the charcoal. We are the more strengthened in this opinion, when we observe in other cases how charcoal mixed with earth for hydrangeas produces the very contrary effect, and changes the red colour of these flowers into blue, by withdrawing the acid.

When used for cuttings according to M. Lucas's directions, it operates first conservatively, as by its antiseptic powers it prevents decay, and consequently may be employed with great advantage with *Cácti*, and other plants subject to damp off. Besides, the water given to the cuttings in charcoal ashes is as chemically pure as possible, as the charcoal partly withdraws the particles of humus from them; or it contains but very few of these particles, when the ashes have been sufficiently saturated with resolvable gases. The cutting is hereby forced to make use of the reserved nourishment laid up in its interior, and the process of assimilation in many cases takes place sooner, and consequently the formation of roots also. The greater luxuriance and stronger growth of the roots which M. Lucas observed may be connected

with the property already mentioned of plants, viz. that of forming their roots more perfectly in light mould, which contains little nourishment. As soon, however, as the nourishment in the plant is consumed, if it is not taken out of the charcoal ashes and planted in the earth, it becomes sickly, as M. Lucas himself declares, which is the surest proof that charcoal yields no direct nourishment to plants. The comparative experiments made in this garden entirely accord with this; the cuttings of quick-growing plants forming roots sooner and more numerously in earth than in charcoal, whereas the latter may be preferable for those of slower growth and of a harder woody texture. Leaves, also, of different sorts of plants, developed roots from their secreted nutritive sap, for the same reason, much more easily in charcoal. We have as yet observed no influence on the formation of a shoot, when the leaves are not taken off with the axillary bud. The results of the experiments are all carefully noted down, and, when they have been sufficiently carried on, they will be put together and lai before the reader.

(*To be continued.*)

Art. IV. *Description of a convenient Carrier for Seeds and for other Garden Purposes.* By B. H. A.

Not having observed in your numerous works any mention of a very convenient utensil, which is in general use in some parts of the country only, I have forwarded you two of different sizes; which, if they meet your approval, you can figure and describe in the Magazine. *Fig.* 32. is a view of one of these baskets. They

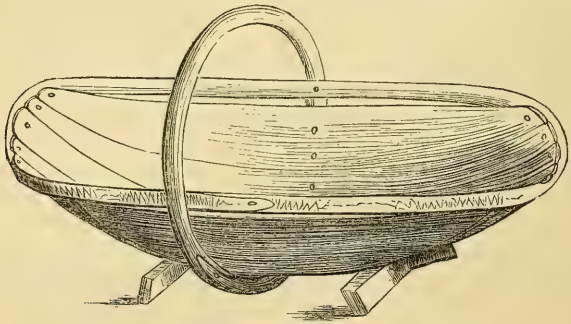

Fig. 32. *Seed-Carrier.*

are made like a shallow cross-handled basket, and are very light: the small ones are made of willow, and are exceedingly useful for carrying seeds at the time of sowing; they have two brackets, for the convenience of standing upon the ground. The larger ones, which are sometimes made to contain a bushel, are

made of ash, and have no brackets: these are useful for a variety of purposes, such as picking up litter in the flower-garden, or carrying soil; and, in fact, for every purpose for which the common basket is generally used.

London, April, 1842.

ART. V. *On the Use of Quassia as a Substitute for Tobacco, in destroying Aphides.* By E. O.

THE season of the year having arrived when the green fly is often very troublesome to the lovers of plants, and the usual remedy for their destruction very unpleasant (especially for ladies), perhaps some of your fair readers will be glad to learn that they may effectually destroy them without offensive smell or dirty appearance.

I have long wished to discover something of the sort, but have never been fortunate enough to meet with it till this season, and having given it what I consider a fair trial, I venture to send it forth to the public that others may benefit by it; and if, in using it, they should in any way improve it, I hope they will make it known through the same channel as I have. The remedy is this: take 1 oz. of quassia chips to every quart of water you require, and boil it for a few minutes; when cold enough, dip the plants in it, or syringe them with it. They may want, in some instances, a second dipping, but those who wish to see clean plants will not mind that.

I purposely reserved some foul plants to try it on, and I have completely cleaned them; and, as far as my experience has gone, it appears to leave a taste on the leaves which the fly does not like, as they seldom attack the same plant after being properly cleaned. Your readers will please to bear in mind, that I am not recommending this where all the plants in a house are attacked; but it frequently happens that, for want of timely cleaning a few plants in pots, a whole conservatory soon becomes infested with the insects. Perhaps you will allow me to trespass so far on your valuable pages as to relate the manner in which I have used it. Some one else may adopt a better plan. I have a house about 60 ft. long; in it I force a variety of plants, a considerable portion of which consists of moss and other roses. You are aware that few plants are more liable to the attacks of aphis than roses. Chiefly, but not wholly, I directed the application of the quassia to them, and the way I proceeded was as follows: — Having procured a vessel to hold a gallon, I had the plants brought, and dipped them one at a time deep enough to reach the parts infected, taking care not to shake them unnecessarily, but to return them to their places steadily,

that the liquor might remain on them. Others, too large to dip, were laid sideways over the vessel and syringed, taking care to waste as little of the liquor as possible. A great many plants may thus be done in a little time, and for a trifling expense, not more than one shilling per gallon. Perhaps some people would make it stronger than I have done.

I have not done all I intend with it yet; but the best thing I can at present suggest is, to have an upright vessel made of zinc, about 9 in. in diameter, and as high as persons may be disposed to fill; and if kept covered it may stand in a forcing-house always ready, and will not waste much. In addition to this, I recommend a zinc tray for it to stand in, about 3 ft. square, to catch the mixture when large plants are syringed with it, laying the plant on its side in the tray. I do not wish to lead any one to suppose that this will entirely render smoking with tobacco unnecessary, because where plants grow in the borders it could not be applied, and in many instances tobacco is not objectionable: but I am quite sure that, where it is used, tobacco will not be wanted so often; and, for lack of something of the kind, a few plants are frequently spoiled, because smoking is either thought disagreeable or expensive. While I am on the subject, I would just hint to those who are apt to murmur that the gardener uses too much tobacco, that they never ought to expect good plants; for, as the gardener does not like to be thought extravagant, he forbears using the remedy till the plant is past recovery: but rather let employers press on their gardener the necessity of frequently using it.

Hertfordshire, May, 1842.

Art. VI. *Carbonisation of Peat.* By H. L. L.

At the foot of the height upon which stands the Tour de Gourge, in the Pays de Vaud, and adjoining the road from Cuilly to Mondon, are the peat delfs of M. Weobel, who resides there. When he first bought the marsh, it was full of water; this he drained off, and then set himself to work to learn all he could about the art of peat-cutting, sending for information even to Scotland and Ireland. He showed me a Highland instrument with the name of Mackintosh upon it; nevertheless, he objects to our perpendicular way of cutting peat, and, as it is deposited horizontally, so he cuts it, asserting that it holds together better when cut in accordance with the grain. He has found, besides other trees, an oak 6 ft. in diameter in this moss, and a vase of some sort, but no bones or horns. The most interesting point is his manufacture of charcoal from peat. This art he learned from a French gentleman at Sunsale, M. Brevant. A sort of kiln is

constructed like a small cone-shaped limekiln, with perforations all round, to be opened or closed as the process may require, and he assures me that carbonised peat, when well done, is equal to the best wood charcoal. He sells his peat at 12 francs (Swiss) the char-load, equal to 90 square ft. There are about 9 logs of peat to the square foot. I brought away some specimens of his charcoal; but, as it was the production of his early essays, he was unwilling to have it considered a proper sample of the art, but merely the result of a first experiment. He is now building a proper kiln, and in a month will have peat charcoal for sale. The details of this mode of carbonising peat are to be met with, I believe, in the *Annales de la Chimie*, but I have unfortunately lost the reference to the exact number. After viewing M. Weobel's enterprising operations, I called to mind the endeavours of a friend of mine in Argyleshire to float away into the sea, as mere waste matter, a moss of a thousand acres, containing peat of a superior quality to a depth of 16 ft. Were it possible to convert it into charcoal, so as to become portable and vendible, what a reservoir of fuel is in store for future ages!

I have given away my best specimens of M. Weobel's charcoal; the last, and I fear the worst, accompanies this note. Such as it is I will beg your acceptance of it, as offering an example of the experiment.—*Surrey, April*, 1842.

Art. VII. *On Root-Pruning and Canker in Fruit Trees.* By N.M.T.

Root-pruning of, and canker in, fruit trees have lately engrossed a good deal of attention in contemporary publications, and it is because I think the former the most likely cure for the latter, that I mention them in the same sentence; and that mention is not made with the intention of reviewing any thing that has been said upon these subjects, but simply to state a few remarks that the reading of what has been urged, and my own observations, have suggested. A tree properly sown or planted, and left to its own resources, is as truly a natural object as can be imagined, and in such a state sets in earnest about finding the means of supporting itself, and prolonging, if possible, a healthy existence; and it generally succeeds in so desirable an object, in proportion as these efforts are unassisted, uncontrolled, and untampered with.

When all is left to nature and her proceedings unmolested by the intermeddling hand of artifice, when every fibre remains undisturbed, every leaf allowed to develope itself, and add by its caterings to the general stock, we may conclude that the justest proportion is naturally maintained between these organs; and in proportion as this equilibrium is deranged, so the ten-

dency to disease would increase: and such is the fact; to be convinced of which, we need only look at the abortions that confessedly degrade many of the finest portions of the walls of our gardens. Trees so situated bear not the remotest claim to be what the others are, *natural objects;* they are the merest creatures of art, every natural impulse fettered, their roots and branches rendered beyond measure discrepant.

One great use of roots to the object naturally situated is to enable it to retain a perpendicular position in the soil, as may be witnessed by the extraordinary efforts to do so, when circumstances of unusual peril demand it; which is also exemplified by trees in exposed situations, where the roots preponderate over the branches. Even single trees are isolated examples of the same precaution, by sending a greater quantity of retainers to windward. But the tree suspended by shreds against a wall has no call for roots for such a purpose, nor can they be exercised in such a manner: the hurricane that strains the roots of the exposed standard almost to snapping, that even uproots the gnarled denizen of the forest, affects not them; they are compelled root and branch to remain inert, instead of bending before every blast: the leaves, it is true, may flutter in the breeze; but even the slightest sprout must not attempt such a gambol, without the certainty of being called to order by knocking its head against its cast-iron keepers.

To a tree trained to a wall or espalier, then, roots are less essential than to an exposed one, as their services are confined to supplying food; therefore fewer would appear to be requisite, and a tendency to over-root to exist. It will be seen, by referring to exposed trees and sheltered ones, that in the general economy, where nothing is unprovided for, this has in some measure been provided for by the preponderance of roots in the former over the latter case; and on walls, where they may be still farther discarded, it is probable that nature makes strenuous efforts to maintain an equilibrium. But, I would ask, what has been done by those who profess to assist her, to counteract this tendency? Have they not done every thing possible to aggravate it? Have they not placed the roots in a depth, breadth, and length of materials capable of supporting the proudest monarch of the wood for coming centuries? allowed the roots to run riot, and reduced the top to a thing of shreds and patches, from which greater part of the leaves are ruthlessly, unthinkingly, and often needlessly removed: but, be this as it may, the portion left is insufficient to maintain either roots or branches in a healthy state. It may be urged that old wall trees are often destitute of available roots, instead of being overpowered by them; granted: still the want of roots is only the effect, previous excess the probable cause; they were allowed to preponderate until they

rendered the juices of the plant crude and indigestible, and ultimately, as a matter of course, are included in the wreck they have made.

Should any of these surmises prove correct, how injudicious the remedy generally applied! The already gorged roots are sure to be deemed in fault, the already teeming border plied with fresh stimulants to complete with less delay the work of destruction. I think the utter absurdity of so much border work, its nature, and above all its extent, ought to be apparent to every person conversant with the growth of plants in pots. Examine the quantity of spongioles generally found with a moderately sized even healthy wall tree, and say whether a bushel of good mould in a pot would not for twelve months amply supply them with food. I maintain that it would. Then why this apparatus? why this cost? why this waste of uncropped border of 2, 3, or it may be 6 feet deep, with a surface, in all probability, of 16 ft. by 24 ft.? A greater absurdity cannot possibly exist, as the bloated results amply demonstrate.

Roots and branches are indispensable to the well-being of plants, but, in my opinion, the great error is, to consider roots most so. Every person who has rooted a cutting and paid attention to the process, who has planted a tree and observed what takes place, must be convinced of the contrary. The cutting may be rooted, the roots removed, and again rooted, almost at pleasure: strip it of leaves, and it ceases to exist. The newly planted tree is in nine cases out of ten as destitute of spongioles, consequently of available roots, and as much a cutting as if it were cut over half-way up its stem; with this (the only) difference, that those underground stems are less consolidated and more ready to make fibres than such as have been dried and hardened by exposure to light and air: but even these produce no roots unless the leaves are allowed to develope themselves, set the vital current in motion, and return sap to form roots; hence the often irreparable injury frequently inflicted upon newly planted trees, by what is aptly termed "heading back." Having adverted to uncropped borders, I may here mention my conviction that borders are better cropped than otherwise. Such an opinion I am aware is directly opposed to the best authorities, and, amongst others, to yours, Mr. Editor; and I have nothing to place against such overpowering evidence, save the fact, that I have never, after repeated and lengthened trials, had a healthy tree diseased through cropping the border, nor a diseased one rendered healthy by allowing it to remain dormant.

Should there be anything correct in the view I have taken, the only evil that can arise from cropping the border must proceed from a cause the very antipodes of that generally assumed to be correct; the supposed injury must be inflicted while digging

or stirring the border preparatory to cropping. These operations necessarily disturb and lacerate the rootlets, thereby acting as a most injudicious pruning, whereby the already too numerous spongioles are incalculably increased, and drawn into a position, and amongst materials, certain of aggravating this tendency to excess. The only benefit, then, conferred by non-cropping proceeds from the mass containing the roots being less available, the supply of food consequently limited; the benefit, if any, proceeding from starvation, an end that may be gained by far preferable means: but, until we know a little more of the matter, crop, in mercy to the fettered trees, crop the borders, in order that a few, at least, of the crudities that abound in the otherwise stagnant mass may happily escape without being filtered through them.

If a plant, in order to remain healthy, requires a nice proportion between its roots and branches, this will be best maintained when left to nature, when it may be supposed that they progress in exact ratio; but when so placed that a greater part of the leaves and branches are of necessity removed, the equilibrium is evidently destroyed, and disease ensues; to prevent which the very obvious remedy is to maintain, or rather restore, artificially what has been destroyed by art, to reduce the roots as systematically as the branches, in fact, to set in earnest about "root-pruning." This said root-pruning has (as already stated) made considerable stir lately, and made an effort to assume a position adequate to its deserts, while the only anxiety gardeners may be expected to feel in its progress seems confined to ascertaining the exact time of its birth; as they have spared no pains to assure the world that it is as old as the hills, and that gardeners knew all about the matter a century ago. Now, with all due deference, I think this had better rested in the background, upon the principle that ignorance is less culpable than to know and not practise. But no matter when or by whom introduced, it never till now assumed a properly defined form, and if occasionally practised, it was without any specific aim; a sort of random mutilation, applied hap-hazard. To correct this, and give it an importance that cannot now be lost sight of, is at least due to those that have recently brought it so prominently forward. The cause of canker in trees is involved in an obscurity that has hitherto defied all means of penetration; and the surmise of its proceeding from over-rooting, by the roots being left untouched and encouraged, while the top is so mercilessly mutilated, may not even be one of the remotest causes producing so disastrous an effect. But, whatever the cause, it is surely something, until that may be ascertained, to provide a remedy; and that root-pruning is such is more than mere surmise, as it is demonstrated by the history of almost every tree that has been moved or had its roots interfered with, with a view to render it

healthy. The effects of such removals or root operations, if properly performed, may generally be narrated thus:—After the removal, all or greater part of the disease disappears; the tree for a year or two progresses in health and luxuriance, and it is only after all gets established, and a prospect of golden harvests at hand, that disease again exhibits itself, to dispel our dreams and canker all. Now, the mere lifting and again planting a tree in the same materials and position cannot possibly benefit but by the reduction that necessarily takes place in the roots; a supposition confirmed by the certain reappearance of the evil as soon as those roots are replaced and gain an ascendant, by which the requisite equilibrium is destroyed.

Removing, or subjecting a tree to any severe operation (unless the subject has been accustomed to such treatment), generally causes the loss of a season or two, while the good done by such a sacrifice is of short duration; therefore, such a mode of restoring health is not to be thought of, as all the effects may be obtained by annually shortening roots and branches as the case may demand, by following a system that may induce permanent fruitfulness, without so seriously dealing with the subject at one time as to produce the loss of a crop, too meagre a habit, or the endangering of its life. How so desirable an end is to be gained, what is the best mode to pursue, how far we may and ought to go, and when to perform most advantageously the operation, can only be ascertained by time and patient investigation. There can be no doubt that many ways, and endless modifications of shortening the supply of matter at the roots, either by devising means to prevent their undue increase, or by removing any superabundance, must lead to the same end.

There being so much room for investigation, the investigator so certain of being repaid for his trouble, with the certainty that in many cases he cannot make bad worse, it cannot be doubted that the thing will be set about in earnest, and the results communicated for the common benefit. To succeed, it only requires that we bring to the work minds willing to be disabused, freed, if possible, of all prepossessions and prejudices, most especially that so prevalent of setting greater store upon the preservation of roots than leaves. To be convinced of the absurdity of this before starting, let all recollect the symptoms of improvement manifested by trees recently removed, or with a scarcity of roots; and recollect also the practice of the Dutch (sufficient of itself to carry conviction): they take their trees full sized from the open walls into their hothouses, force them instantly, and by fostering and guarding the leaves they obtain abundant and excellent crops; and, this accomplished, the trees are again placed upon the walls to stand until, in course of rotation, they are subjected to the same treatment. With such a state of things, canker, even

in their humid climate, cannot exist. Trees subjected to root-pruning from infancy are most likely to prove eminently successful; and it is not to be supposed that such as are old, and infirm in habit, can be rendered all that could be wished without much precaution. But I have already so far exceeded all reasonable bounds, that the remainder (should it prove sufficiently interesting), must be reserved till next Number.

Folkstone, May 14. 1842.

Art. VIII. *On forcing Mushrooms.* By J. Wighton.

In the gardens of the wealthy there are houses heated by flues for the growth of mushrooms: but this can be accomplished in any dry shed or cellar, where the temperature does not fall below 45°, nor rise above 70°, of Fahrenheit. Various kinds of materials are recommended for making mushroom beds; but the best is fresh manure from horses that are highly fed, mixed with light soil in a small quantity.

How to make the Bed. — Take a quantity of the manure and spread it so as to lie about 4 in. deep; beat it firmly down with a mallet. After a few days repeat the same, and again at intervals, till the bed becomes about 14 in. deep. To ascertain the degree of heat, put two or three sharp-pointed sticks into the bed, and when, upon being drawn out, they feel about milk warm, it is time to put in the mushroom spawn; but the heat must be rather on the decline than otherwise.

How to use the Mushroom Spawn. — Break the spawn into pieces about the size of a hen's egg; place them all about the bed about 1 ft. apart, and 2 in. below the surface; beat the whole down hard. Be careful not to let the heat increase above the degree mentioned above, otherwise the spawn will be destroyed, and the bed must be stocked again with fresh spawn. Indeed, for security's sake, it is always best to repeat this, when the heat is on the decline. After all danger of increased heat is past, cover the bed with light soil about 2 in. deep, then beat it down hard. Mushrooms always do best in a firm hard soil; however hard, they will find their way through it; they have even been known to raise the pavement of a cellar floor.

Management of the Bed. — Examine the sticks which were originally placed in the bed; if they are lukewarm, all is right. A few days afterwards, cover the bed with hay or straw; but if it increase the heat, remove it for a time. If the place is warm and dark, this covering may be dispensed with. In five or six weeks, the mushrooms ought to appear. A gentle watering now and then will hasten their growth; but too much will cause the spawn to rot, and then, of course, the bed will be unproductive, whereas it ought to produce for five or six weeks. The

covering keeps the soil moist, especially when much exposed to the air. These observations may appear at variance with the fact, that mushrooms spring up in the fields in showery weather; but there is a difference between spawn in a bed of manure which retains water, and spawn in the open soil.

It is doubtful in what mushroom spawn originates. I do not mean such as we employ for mushroom beds, for this appears to be merely the roots of mushrooms, resembling fine white threads with small knots. It is the common notion that this spawn proceeds from animal deposits; but mushrooms, like more perfect plants, do in reality produce seed. This is said to be ascertained by placing a sheet of white paper under a of the mushroohroom; the seed will fall upon it from the gills ull-grown musm like fine dust. This seed is carried about by the wind, and eaten by animals with their food. Some may be unwilling to believe this, because the manure from horses fed on grass where mushrooms abound does not produce mushrooms equal to that from horses fed on hay and corn. To this I reply, that the greater fermentation in the stomachs of horses eating green food is more likely to destroy the mushroom seed. The same may be said of beds made of their manure, which often destroy the spawn. What is here advanced is no way contradicted by the fact of mushrooms springing from decayed vegetables, for the seed may easily have been mixed with them, and the growth accelerated by the slight fermentation which produced the decay of the vegetables. Some imagine that animal manure will produce mushrooms independently of any admixture of their seed; but this is as unreasonable as to believe that soil will produce weeds without seed, or that putrid animal matter will engender maggots without eggs having been previously therein deposited. — *Cossey Gardens, May* 12. 1842.

P.S. To the experienced mushroom-grower I have here mentioned nothing new, but to the inexperienced something which may perhaps be of use to him.

Art. IX. *Cottage-Gardening adapted to Scotland.* By Peter Mackenzie.

[The following article was written at our request for the *Supplement to the Encyclopædia of Cottage, Farm, and Villa Architecture*, &c., in which we originally intended to give a chapter on *Cottage-Gardening;* but, on more mature consideration, we thought it would be unsuitable for that work. The publication of Mr. Mackenzie's excellent paper will enable gentlemen's gardeners to give instructions to the cottagers on the estates of their employers, with less trouble than they would have had without such a comprehensive remembrancer.]

It is full time that the rural population of this country were made aware of the many enjoyments they might possess if they would only bestir themselves

a little; even this evil world would lose much of its sorrow if man would but shake off his indolence, and pluck the berries from among the thorns, when, instead of living discontented among weeds and wildings, he might, in a great measure, have "Paradise restored." When a man has a comfortable house, and a garden to cultivate, and takes delight in both, we generally find that man showing himself a progressive being, with a mind capable of higher attainments, and ready to make himself useful in the sphere of life in which Providence has placed him. There are some minds that will raise themselves, in spite of every opposition, from a state of poverty to a more comfortable station in society; and these, though few, serve to show what can be done by unwearied perseverance. In general, the majority of mankind require to be helped, or, not only do they require the course to be pointed out for them, but also a pilot to guide them; and it is well for those of the present and future generations that these helps are not wanting. The comfort that has already been bestowed upon thousands through the instrumentality of the *Encyclopædia of Cottage Architecture*, in the shape of commodious dwellings, is but a foretaste of what our country may expect, when once the full influence of the Highland and Agricultural Society of Scotland, the Royal Agricultural Society of England, and other societies of a kindred nature, is made to bear upon the welfare of the rural population. Then may we expect a race of rational and intelligent beings, instead of many who reckon themselves men, yet are little better than creatures of instinct. The time may yet come when the labourer will be giving his children lessons in architecture from the various parts of his cottage; making them acquainted with the arch and its properties; pointing out the various members of the base, the shaft, the architrave, the frieze, and the cornice, of the different orders of architecture; making known to them what is Grecian, what Roman, what Norman or Gothic; and be able to read the history of his country in the progress of its buildings.

But the cottager must have more than his comfortable house to occupy his attention; in order to supply his wants and increase his pleasure, he would feel unhappy without his garden, which will yield him comfort all the days of his life, and afford him in its cultivation a salutary preparation for a higher state of enjoyment beyond the grave. How much ground ought a cottager to have for a garden? this is a question to which varying circumstances would suggest varying answers. When cottages are joined together, the gardens are commonly at the back or front of their dwellings, and the breadth of the garden corresponds with the length of the house. Sometimes the garden extends a considerable length, but in general it is by far too little. I would plead for a large garden. Let it be 1000 square yards at least, and from that to an acre. This may be thought extravagant by some, but I think sufficient reason can be shown why the cottager should have plenty of garden ground. When I see a cottage with a small garden attached to it, when there was nothing to prevent the possessor from having a large one, I imagine that he is only a few steps removed from barbarism; it shows the possessor ignorant of what would increase his own and his family's comfort, ignorant of what would multiply their animal and mental enjoyment. I look upon it as a blot in the landscape, and a mark of stationary ignorance. What a difference in appearance do we often meet with, when the cottage has a large garden belonging to it. Instead of a few unprotected common vegetables, we behold a well enclosed garden abounding in vegetables, fruits, and flowers, producing more than the family can consume, and, besides, abundant feed for the pig. A few pounds sterling, the produce of the surplus stock, often find their way into the pocket of the possessor of such a garden. I have seldom known its owner come to want, or require aid from the parish.

Before I say any thing about the laying out of the garden, I would wish to say a little about draining. It is somewhat surprising that so little is said about that most important operation; the bulk of the writers on gardening pass it over with a carelessness which it does not merit. Nicol, in his *Forcing, Fruit, and Kitchen Gardener* (sect. 2., "On the Soil for Orchards"), admits

the necessity of draining, and yet he says the discussion of a systematic mode of draining would be foreign to the subject; but he refers the reader to Mr. Elkington's method: and a writer on cottage-gardening, at the close of 1841, when giving directions how to lay out and plant such gardens as would suit the labouring man, never says one word on the subject; yet many a cottager and gardener suffers a yearly loss from the want of it. It is a melancholy thing to see a poor man spending his strength, and his time and manure, upon a piece of ground that seldom repays his labour; when a few drains, properly executed, would render his work more easy, and double the production of his ground. I can speak from experience and observation, when I say that many gentlemen's gardens in Scotland are but partially drained, and I could point out many evils which, in my opinion, have their origin in no other cause.

When the piece of ground intended for the garden is fixed upon, let any hollows be filled up, and the surface brought to the required slope. If the soil or subsoil be of a stiff nature, let it be properly drained. Very little extra expense will do it, and in a year or two it will be repaid; when the possessor of the garden will have satisfaction for life. There are some light soils, placed upon a gravelly subsoil, which will require no draining; but such situations are not very numerous in Scotland, in comparison with stiff soils and tilly bottoms. It does not often occur that a bit of ground is what, in common language, is called a dead level; the eye will soon discover in what direction the water will run. When that is ascertained, let a main drain be thrown out a few feet from the fence at the lowest part of the ground; a number of parallel drains should then be brought into it according to the nature of the soil; if very stiff, they should not be more than 10 or 12 feet apart; where the soil is peaty, 15 or 20 feet apart will do; but there is scarcely any fear of overdoing the thing. The drains should be 2½ ft. deep, if possible, and as narrow as they can be made; this will save materials in filling them. They are generally filled to within 18 in. of the top, and found to answer very well. Turf will probably be got near at hand to cover the stones of the drains, and prevent the earth from getting between them.

In trenching, care should be taken not to bury the soil too deep; if the subsoil be of a retentive nature, none of it should come to the surface at first, but it should be well loosened in the trench. This will help it greatly, and prepare it for coming to the surface at some future period.

How the garden ought to be laid out will depend much upon the shape of the ground. It is no uncommon thing for road-side cottages to be built in the corner of a field, forming an acute angle; at other times we find them on gentle eminences, with the ground sloping to the margin of a small stream. Many a plan could be given for cottage gardens; but, if we are to bear in mind that "ground should first be considered with an eye to its peculiar character," then, we think, the square or the parallelogram, where they can be obtained, will do very well, and answer the purpose for which it is intended. I will confine myself chiefly to the kitchen-garden, believing that you will recommend the site of the cottage to be far enough from the road side to allow room for the planting of trees and shrubs for shelter and ornament. In a garden somewhat less than an acre, I would have on the south side of the north wall, a short distance from the trees, a number of bee-hives; in some seasons they yield a considerable profit to those who understand the management of them. In front of the bee-hives I would place a flower-border, which might be made very ornamental, and also useful. Abundance of early-flowering plants could be planted in it, of which the bees would profit. They might also be arranged in such a manner that the outlines of some system of botany might be imparted to the cottager and his family; for it is but right that they should be made acquainted with that delightful science. It is not from inability to understand it, but from a deficient system of education, that so much knowledge is kept back from the working classes of the community. In front of the flower-border I would have a piece of turfed ground, the grass intended to be kept

short. This may be made useful in various ways ; it will be very convenient for bleaching the household linen, and can be used also as a place of recreation. Perhaps you will find fault with it as a bleaching-green ; but, in the present state of society, and with all the vigilance of the rural police, the cottager's wife has often to carry back less linen at night than what she laid out in the morning. To prevent such an occurrence from taking place as much as possible, I have recommended the green in the garden. For the edgings of the walks of small gardens, strawberry plants are commonly recommended. This plan I cannot agree with altogether. Edgings ought to undergo a rotation of cropping, like other parts of the garden. When they are all planted with strawberry plants, there will be an abundant supply for a time ; but, if no other plantation is made, there will soon be but a scanty gathering. Now, if part of the edging consisted of chamomile or hyssop, the sale of which, in a dried state, to the apothecary, or other dealers in herbs, would also yield a profit, the cottager would, by shifting the crops every other year, be enabled to keep up a constant supply of fruit-bearing plants, and to introduce new kinds as they appear in the market. The bottoms of the walks can be filled with the small stones turned up in trenching. Fine gravel is thought by many to be the best for the top ; but, where that cannot be had, engine ashes form a very good substitute : those twice burnt are the best.

If the garden be walled, it is not likely that the walls will be the height recommended for a gentleman's garden, and, probably, many of them will be built without mortar ; but, even against such walls, much good fruit may be grown, by training the trees upon wooden trellises : espaliers may also be trained along the sides of the walks facing the south. Raspberries, gooseberries, and currants may be planted in breaks, or in lines parallel with the walks, 2½ ft. from the edging, and 5 or 6 feet distant from each other. I find that they will bear good crops either way. In the vegetable department, the kale, cabbage, onions, leeks, and potatoes, are reckoned the mainstay of the cottager ; but, where horticultural societies exist, the introduction of finer vegetables is taking place, such as peas, cauliflowers, kidneybeans, turnips, carrots, lettuce, parsley, &c.

I do not know whether it belongs to the gardener or the architect to fix where the site of the dunghill ought to be, but I should recommend two places, one for the solid manure, and the other for the liquid ; and it would be an essential point gained in cottage economy, if the cottager could be made to understand the full value of liquid manure. Many a cottage garden suffers from its possessor not knowing the benefit that would result from the application of such manure. It is a common practice, with a great number of the rural population of Scotland, to have their crop of late potatoes planted on the ground of some neighbouring farmer, and it is their endeavour to have as much dung as possible to cart away at the planting season, in consequence of which the garden is often in part neglected ; but, by preserving the drainings from the house, the pigsty, and the cow-house, in a pit properly prepared for the purpose, as much manure might be had as would supply the demand of the garden. It is a difficult matter to make them believe in this doctrine, and more difficult still to get them to practise it ; but the period will soon come when they will wonder at their unbelief, and endeavour to redeem the time they had lost in the days of their ignorance.

I shall not frighten the cottager with a long list of fruit trees, small fruit, and vegetables, that might be planted by him, but select a few of those that have been long known to deserve a place in every garden. There is one apple tree that would do well in a cottager's garden, or any other where fruit is grown ; that is, the Stirling Castle apple. It was raised from seed by a gentleman belonging to Stirling. Its properties are : very early bearing ; vigorous healthy growth of plant ; fruitfulness, seldom missing a crop ; fruit large and finely shaped, fit either for dessert or baking ; it produces fruit the

third year after grafting, and a single apple weighs sometimes 14 or 15 ounces. Perhaps the following list will do to begin with: —

Apples. Doonside, Brandy apple, Hawthornden, Yorkshire greening, Ribston pippin, Downton pippin, Stirling Castle, French crab, Hubbard's pearmain, Paradise pippin, Gogar pippin, and Keswick codlin.

Pears. Green chisel, Jargonelle, Green pear of Yair, Autumn bergamot, Galston, Muirfowl egg, Swiss bergamot, and Elton.

Plums. Green gage, Red magnum bonum, Washington, Caledonia, White magnum bonum, Wine sour.

Cherries. May duke, Morello.

Currants. Red and white: Common red, Champagne white, Knight's sweet red. Black: Common, Black Naples.

Gooseberries. Many varieties of red, white, yellow, and green.

Raspberries. Red and yellow Antwerp.

Strawberries. Grove End scarlet, Keen's seedling, Roseberry, and Elton.

Vegetables. Peas: Early Charlton, Dwarf marrowfat, Blue Prussian, Early fawn. Beans: Early mazagan, Longpod, Broad Windsor. Cabbages: Early May, Early York, Drumhead, Sugarloaf, Savoy, Early green, Yellow, and the Winter; Brussels sprouts; Kale, German greens, Purple or brown kale. Cauliflowers. Broccoli: Grange's early, Sulphur-coloured. Kidney-beans: Scarlet runners, White Canterbury. Potatoes: many varieties, early and late. Carrots: Early horn, and Altringham. Turnips: Early white Dutch, Stone, Dutch yellow, and Aberdeen yellow. Parsneps, Red beet, varieties of Radishes, Onions.

The cottager ought to sow plenty of onions. What he does not require for his family will meet with a ready market. He should also plant as much as he can spare of his ground in early potatoes; they generally sell well, and the crop is soon off the ground, which enables him to prepare it for winter cropping, leeks and chard, white beet and spinach. The cottager may not be without his salads; if he chooses, he may have his varieties of lettuce, endive, parsley, cress, &c. He should not be without his plot of rhubarb; it is useful in the family, and in the spring a considerable quantity may be sold to innkeepers, confectioners, and others. He should also have his border for herbs, such as spearmint, peppermint, pennyroyal, balm, tansy, rue, hyssop, rosemary, sage, and thyme. I think the list of bulbs and fibrous-rooted perennials given in the *Suburban Gardener and Villa Companion* might do also for some cottage gardens.

The *Cottager's Calendar*, like others of a similar nature, must be somewhat general; for I find places within three or four miles of one another vary considerably, when the altitude varies; and, as Scotland is a country of hills and valleys, the intelligent and observant cottager will soon learn the proper time of sowing and planting.

January. Trench and manure ground for early crops. Fruit trees may still be planted and pruned.

February. Sow peas and beans; also a small quantity of early horn carrot and Dutch turnip. Onions, in light soils, may be sown. Plant strawberries about the end of the month; gooseberries, currants, and raspberries may also be planted.

March. Sow the main crops of onions, leeks, peas, cabbages, carrots, parsneps, beans, Brussels sprouts, German greens, lettuce, spinach, and parsley. Plant early potatoes in warm situations, and full crops of cabbages. The cottager may now try his hand on grafting.

April. Sow peas and beans, turnips. Plant full crops of early and late potatoes. Hoe and thin carrots, turnips, onions, spinach. Earth up cabbages, potatoes, peas, and beans.

May. Sow kidneybeans, cabbages, and German greens, for late crops. Sow also a small quantity of cauliflower seed, also white and yellow turnip. Hoe and earth up the various crops that require it.

June. Plant cauliflowers, savoys, German greens, leeks. Train and nail wall and espalier trees.

July. Sow yellow turnips for a winter crop; plant cauliflower and coleworts. Towards the end of the month attention must be paid to keeping down weeds.

August. Sow winter onions, cabbages, savoys, and German greens, about the middle of the month. For planting out in spring, coleworts may still be planted.

September. Lift onions and lay them on the border to dry. Strawberries may be planted for a crop next season.

October. Plant early cabbages for use in the spring.

November. Plant trees and bushes where they are required. Turn up vacant ground to the frost. Make compost for the garden where it can be done.

December. Continue trenching and digging where it can be done. Plant in mild weather, if it was omitted last month.

More might have been said had time and the nature of the article permitted it, but I cannot conclude without adding a word or two respecting the keeping of cottage gardens. In general they are but indifferently kept. Weeds are often allowed to shed their seeds, which prove a lasting scourge to the garden, and a great loss to the cottager. Timely hoeing, and weeding and cleansing, would prevent a great number of excuses being made, when visitors come; and it adds greatly to the pleasure of a garden, to be enabled to look at it when it is neat and clean. There is as much difference between the two, as there is between a trollop and a tidy country lass. But where much competition is among cottagers for neat gardens, I am convinced, from the opportunities I have had in visiting these gardens, that it may be carried to an injurious extent. One thing I have observed for several years: those who had prizes awarded for neat gardens seldom received a prize for the best vegetables. I can account for it in no other way than that there was too much raking and too little hoeing. When the rake is much used, a crust is ready to form upon the surface of the ground; but when hoeing is practised, the roots receive the benefit of atmospheric influence, which the modern discoveries in chemistry assert to be of great importance to vegetation.

West Plean, January 6. 1842.

Art. X. *Notes on the Bokhara Clover.* By H. I. C. Blake.

Having derived many little improvements in gardening through the channel of your *Magazine*, I have taken the liberty of informing your readers of the manner in which the Bokhara clover grew with me last year. Mr. Gorrie of Annat Cottage was so kind as to send me some seeds last year, and I planted a few in my garden, and a few in a pot: those in a pot I forwarded a little by placing it in a small greenhouse, and, when of a sufficient size, turned out one in my garden, throwing away the remainder. It grew luxuriantly during the summer, and attained the height of 6 ft., branching out all around it full 3 ft. each way. The scent of it is very sweet after a shower. I tried it with a pony of mine, who would not touch it; also a donkey; but I have seen cart-horses eat it. I think April is the best time to sow it; and it should be cut when about 2 ft. high, other-

wise it gets too stalky and sticky. I transplanted the other plants out of the garden into my field in the autumn at 2 ft. distance, and they give every promise of being prodigiously fine plants this year. Their crowns are crowded with young shoots; but it is a singular thing that the fine plant which was not transplanted has not as yet put forth any shoots. It lays hold of the ground like an elm tree, the roots being very large, and branching out in the same way as the green shoots or branches. In short, it takes such hold that even in the first year a strong man will find it a difficult thing to pull it up.

Bendham Parsonage, Chichester, March 15. 1842.

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

THE Encyclopædia of Trees and Shrubs; being the Arboretum et Fruticetum Britannicum abridged: containing the hardy Trees and Shrubs of Britain, Native and Foreign, scientifically and popularly described; with their Propagation, Culture, and Uses in the Arts; and with Engravings of nearly all the Species. Abridged from the large Edition in 8 *Volumes, and adapted for the Use of Nurserymen, Gardeners, and Foresters.* By J. C. Loudon, F.L.S. H.S., &c. London, Longman and Co., 1842.

The first, or large, edition of the *Arboretum Britannicum*, in eight volumes, being unfortunately at too high a price for the majority of those to whom it would be most useful, this abridgement has been undertaken. It will be found to contain all that is essential for distinguishing the species and varieties, for their cultivation, their propagation, and, in general, their application to useful purposes, either in a living state in plantations, or, when felled or cut down, in different arts. With the exception of about half a dozen species, figures are given of the whole; all to the same scale of 2 in. to a foot. The total number of wood-engravings is 2106, of which nearly 300 were not included in the large edition; so that thus far the abridgement is superior to the large work. It is also superior in three other respects: it contains an analysis of trees and shrubs with reference to their uses; another analysis according to the leaves, for the purpose of enabling any person to discover the name of a tree or shrub by the leaves alone; and a complete alphabetical index of all the species and varieties, with their synonymes. In short, we flatter ourselves that this abridgement will be found a truly useful book for nurserymen, gardeners, and foresters, and also for amateurs. Those who wish to study the history of trees and shrubs more at large, and their portraits, will have recourse to the original edition.

Hortus Lignosus Londinensis abridged: or, a Catalogue of the hardy Trees and Shrubs, Indigenous and Foreign, cultivated in the Gardens and Grounds in the Neighbourhood of London: with all their Synonymes, scientific and popular, including their French, German, Dutch, Spanish, Italian, and other foreign Names. By J. C. Loudon, F.L.S., &c. London, Longman and Co., 1842.

We can most strongly recommend this three-and-sixpenny catalogue to

gardeners and nurserymen having collections of trees and shrubs, who possess neither the abridgement of the *Arboretum*, nor the large edition.

The Book of the Farm. By Henry Stephens, Esq., Editor of the "Quarterly Journal of Agriculture." Parts II. to V. 8vo, plates, and numerous woodcuts. 1842.

We noticed Part I. of this work in p. 125., and the parts before us more than justify the anticipations we there expressed. The *Book of the Farm* is, in short, an excellent, and, in many respects, an original work. We cannot give our readers a better idea of it than by continuing our list of the articles which the parts before us contain: — 15. Of dealing with the Details of Farming, p. 97. WINTER. 16. Of the Steading, or Farmstead; there are various details of construction and fittings-up in this article, clearly and beautifully illustrated by woodcuts. 17. Of the Farm-house. 18. Of the Persons who labour the Farm. 19. Of the Weather in Winter. 20. Of Climate. 21. Of observing and recording Facts. 22. Of Soils and Subsoils. 23. Of Enclosures and Shelter. 24. Of the Planting of Thorn Hedges. 25. Of the Plough. 26. Of the various Modes of Ploughing ridges. p. 464.

The History and Management of Bees, with a Notice of a newly constructed Hive. By John Wighton, Gardener to Lord Stafford. 12mo, pp. 103. London and Norwich, 1842.

Mr. Wighton has had great experience and great success in the management of bees; and this little work is the result. The newly constructed hive is on the Polish principle, which we can recommend from our own experience, as giving far less trouble than any other, both in general management and in taking the honey. We have given an account of the common Polish hive in the *Encyclopædia of Gardening*. Mr. Wighton's improvement on it consists chiefly in dividing it into two compartments, and introducing two panes of glass for the purpose of observing the proceedings of the bees. The great advantage of the Polish hive over those in common use is, that honey may be taken from it, when there is any to spare, without disturbing the bees, since it is done in the finest part of a sunny day, when most of the bees are out. We would strongly recommend a trial of these hives, and more especially as they may be made by any carpenter out of the trunk of a tree. Mr. Wighton's consists of the root end of a spruce fir, 9 ft. long, and 3 ft. 9 in. in circumference, from which the centre wood has been hollowed out. In many parts of Scotland, where the disease called pumping prevails among larch trees, excellent Polish hives may be had, almost ready made. Again, we strongly recommend the hive and Mr. Wighton's book to all who keep bees, and more especially to gentlemen's gardeners.

Railway Stations: being the executed Designs of Francis Thompson, Architect, made by express Commission for the Directors of the North-Midland Railway, under the Direction of Robert Stephenson, Esq., C.E. Folio, 9 plates. London, 1841.

The public is much indebted to the North-Midland Railway Company for the surpassingly beautiful examples of station-houses which they have erected on their lines of railroad. We know of nothing equal to them on the lines of any other company. There is not one of them that would not form a highly ornamental dwelling in a park. They are, for the most part, executed in stone in the most substantial manner; and the book, containing beautiful engravings of them on a large scale, may well be strongly recommended to landed proprietors, as affording valuable hints for the erection of ornamental cottages on their estates. We can answer for the competency of Mr. Thompson to design such cottages, having been fortunately able to induce him to contribute no fewer than six designs to the *Supplement* to our *Encyclopædia of Cottage Architecture*.

Sketches for Rustic-Work: including Bridges, Park and Garden Buildings, Seats, and Furniture. Eighteen Plates. The Scenic Views in the tinted Style of Zincography; with Descriptions and Estimates of the Buildings. By T. I. Ricauti, Architect, Author of a Work entitled "Rustic Architecture." 4to. London, 1842.

This is an elegant work, and one that will be found exceedingly useful to country gentlemen who are their own architects.

The first three plates are of rustic bridges, formed of young trees with the bark on. Elegant or picturesque forms for such bridges are much wanted in parks and pleasure-grounds in hilly districts, where the walks through the scenery must necessarily often cross brooks. We were, when in Scotland last summer, much struck with the poverty of design of the rustic bridges, as well as the rustic fences and gates, in the scenery of some very handsome residences; though in no part of the island is there such an abundance of young wood adapted for such structures.

Plates IV., V., and VI. contain the plans, elevations, and perspective view of a small building to answer the purpose of a gate-lodge, with a place for tools to the left of the lodge-keeper's room, and a seed-room in addition to the keeper's bed-room on the floor above. This building is in the style of the old half-timbered houses, now becoming comparatively rare in England. The design is exquisitely beautiful of its kind, and the estimated expense is only 110*l.*

Plates VII. and VIII. are the plan, elevation, and perspective sketch of a winter-house for plants; very handsome, and suitable for preserving evergreens, such as oranges and camellias, in a dormant state.

Plates IX., X., and XI., a gardener's cottage with fruit-room, designed in strict accordance with the principles advocated by Dr. Lindley; expense about 160*l.* Very elegant, and suitably arranged for the end proposed.

Plate XII., plan and elevation of an octagonal pigeon-house. A very handsome rustic structure; as is plate XIII., a garden gate and fence.

Plates XIV., XV., XVI., and XVII., chairs, seats, benches, tables, flower-stands, &c., all in rustic-work with the bark on. Cleverly designed, and very picturesque.

Plate XVIII., a idea for a rustic cottage. Very picturesque.

All the chimney tops in Mr. Ricauti's designs for cottages rise boldly up much higher than the apex of the roof, and are remarkably handsome.

The following notice may be useful to some of our readers, as we trust it will also to Mr. Ricauti:—

"Mr. Ricauti having observed, in many instances, that gentlemen are often deterred from employing a 'professed architect,' because they do not know into what expenses it might lead them, he here inserts his terms for making designs of buildings and for superintending their erection. If, however, the estimate of a building should exceed 1000*l.*, no charge is made for the drawings, but the architect receives a commission of 5 per cent on the cost; and his travelling expenses, in all such cases, are charged to the employer. In preparing a set of drawings, the style of architecture in which they are designed will not, in the least degree, heighten the following charges, which are founded upon the relative proportions and quantity of work required in making out the drawings, &c., for various designs.

	£	s.	d.
For making plans, elevations, sections, and perspective sketch of a small building, such as a gate-lodge, green-house, labourer's cottage, &c., the estimate not exceeding 100*l.* - -	3	3	0
For making the working-drawings of ditto - - -	2	2	0
For a building, the estimate not exceeding 150*l.* - -	4	4	0
For making the working-drawings of ditto - - -	3	3	0

And so on, in proportion, adding one guinea to the expenses of the drawings for every 50*l.* added to the estimate.

	£	s.	d.
For a visit of superintendence, or to examine and report upon the site for a building, requiring but one day's time, travelling, and all expenses - - - - - - - -	4	4	0
For a visit to any place, requiring two days' time, and travelling expenses - - - - - - -	8	8	0

And so on, in proportion, adding 4 guineas for every additional day, which includes the charges for travelling and all expenses.

Mr. Ricauti's address, whether he be in town or country, can always be obtained of his publisher, Mr. James Carpenter, Old Bond Street."

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Theory can never be of the slightest use, unless based upon experimental enquiry and authenticated facts. Nor can extensive practice be deemed of real advantage, if it has been suffered to degenerate into empty empiricism, and the gardener simply adopts a routine he has before found satisfactory, without ever examining the principles on which its success depends. In the latter instance, certain circumstances, unseen by all but those who search for them, may impart a temporary excellence to the plants cultivated; whereas, should these be accidentally wanting, failure would be experienced. With the assistance of theoretical acquirements, this might probably have been artificially obviated. It will herein be seen that experience, unsupported by aught besides, is liable to mislead, and to prove ineffective in its application. At this point theory steps in, and gives certainty to every process that is not rendered nugatory by remarkable and unexpected adverse agents. (*Gard. Chron.*, 1841.)

Effect of Light on Cuttings. — Take Alonsòa incisifòlia, and make cuttings from it, and insert them in three pots of equal dimensions; then place them in a close pit or frame, in the following order: the first at 2 ft. from the glass, the second at 2 ft. 3 in., and the third at 2 ft. 6 in. The result of this will be just what might have been naturally expected, namely, the first in the order placed will be rooted, and the cuttings very little grown; while the second will be more elongated in the tops, and only callused at the roots, and the third grown to the height of the other two, but neither rooted nor callused. (*John Caie*, in *Gard. Chron.* for 1841, p. 782.)

The radiating Power of Hot-water Pipes. — Amongst all that has been said yet on the heating of houses, we have seen no notice taken of the radiating power of the substances employed as pipes. When the radiating power of lampblack is 100, polished iron is estimated at 15; and though rough cast-iron, and oxidated on the surface, will be much more, still it would add greatly to the effect to have them coated with lampblack. One of the greatest benefits to be derived from Mr. Corbett's open gutter system will be the radiating power of water, which is equal to lampblack. The new improvement lately suggested in steam-boilers, to connect the fire and water by pins of iron passing from the fire through the bottom of the boiler into the water, thus conducting the heat at once to the water, should be useful, especially when speedy effect is wanted. (*R. Lymburn*, in *Gard. Chron.* for 1842, p. 22.)

On the Effects of Lime on Soil. — [The following is a copy of a letter which was sent to the *Farmer's Journal* newspaper in 1822, but never published. It will be found to contain the germs of some of the new doctrines on this subject]. Amongst the various treatises on lime which I have perused I have not seen one that explains its nature sufficiently to account, in my opinion, for the grand effects produced by that mineral when applied to a soil

containing but little or no calcareous matter. To suppose, agreeably to the theory of Sir Humphry Davy, that carbonate of lime operates only by giving a proper texture to the soil, and furnishing plants with an ingredient necessary to their structure, is, to say the least, attributing a seemingly small power to such disproportionate means, if it be considered that, to all appearance, every purpose of a substance so inert, according to this theory, might be answered equally well by a particular combination of the other earths : and if Hornby's dissertation be looked to for a solution of the wonder-working power of this mineral, the answer there given, that it supplies by its decomposition in the plant, as vegetable food, the carbonic acid which it retained, is not only unsatisfactory, but at variance with the assertion of Sir H. Davy, that the lime found in plants is usually in its carbonated state. The mechanical action of lime insisted upon by the first-named gentleman seems insufficient to robe the coarse brown turf with a coat of the richest green, and the chemical operation of the other gentleman accounts but ill for the uncultivated grasses and plants giving place to a sweet herbage wherever lime has been applied.

My purpose of addressing you, however, is not to find fault with former theories on the subject of lime (that were an easy task), but to offer, with all humility, a new one to your consideration. It is well known to chemists, and also to many other persons, that carbonate of lime has the power of creating nitrate of lime by its combination with the nitrogen of the atmosphere, and also with that escaping from decomposing animal and vegetable matter. That this saline substance enters into, and is of use in, the constitution of plants, there is every reason to believe, and, that it under goes decomposition there, I can have but little doubt, notwithstanding the author of *Lectures on Agricultural Chemistry*, holds an opinion unfavourable to the decomposition of alkaline substances. M. Th. de Saussure's *Researches on Vegetation* furnish something like a proof of a change taking place in saline matter, after its absorption by plants. That philosopher states that 100 parts of ashes from wheat, in flower, yielded him 43·25 of soluble salts, whilst the same quantity of ashes from wheat, the seeds being ripe, produced only 11 parts; and he gives also another analysis of the same vegetable in like states, and also a month before flowering, the result of which answers almost precisely to the former one, in the point upon which my opinion of a change is grounded, saving that in the ashes of the wheat cut a month before flowering there were found 60 parts of salts; a circumstance still more in favour of that opinion. Thus it appears that wheat in a green state possesses more salts than when dry, and we may conclude that most other vegetables agree with it in that particular; indeed, the analysis of some other plants by M. Th. de Saussure gave results that would strengthen the propriety of such a conclusion. Such being the case, what other inference can be drawn, but that decomposition generally takes place in saline matter after its entrance into plants? Supposing me, then, to have established what I aimed at proving, the next question to be considered will be, how nitrate of lime can be serviceable to growing vegetables. My answer is, that most probably nitrate of lime offers to the plant a substance better than all others, by its ready solution, for lime being absorbed into its system; and it may not be impossible that its decomposition should furnish nitrogen for the production of gluten and albumen, since those substances are found more especially in plants delighting in a calcareous soil, such as wheat, clover, saintfoin, &c. If this argument in support of the utility of nitrate of lime in vegetation be one founded on true principles, by a parity of reasoning considerable light may be thrown on the doctrine of paring and burning, as the ashes arising from that operation might yield salts answering at least to that substance in having nitrogen in their composition, and might thereby furnish an essential element for the production of albumen in the particular plants possessing that matter. Agriculturists are well aware that a peaty soil, except it be pared and burned, will not produce good crops of grain, but that, when the ashes yielded by burning are employed, an average produce of oats, if not of other grain, may be expected:

and they also know that carrots may be grown in such a soil without the preparation of burning, which may be probably owing to those roots having little if any albumen in their composition, and consequently requiring nitrogen in the same proportion ; whilst oats, though possessing a much smaller portion of that vegetable matter than wheat or rye, may stand in need of a much larger quantity of nitrogen than a peaty soil could yield without part of its vegetable remains were submitted to the action of fire, and compelled to give up at once what, in the ordinary course of nature, it would have dealt out sparingly in a number of years.

It has often struck me as surprising, that some soils should bear repeated cropping with the aid of but little manure, whilst others seem exhausted with a succession of a few crops. May not the former, besides being extremely tenacious of vegetable food, have such an attraction for the carbonic acid in the neighbouring atmosphere, as to have a favourable influence on the vegetation of plants growing upon them ?—*R. T.*

Neatness in Turf Edgings.—Having to renew some turf edgings this spring, I sunk pieces of thin tile between the gravel and turf about an inch high, and the edging has been particularly neat all the summer. The tile (slate would do as well) prevents the grass from growing or spreading over the gravel, so that it does not require cutting every year; but, when the grass has grown over the side, merely clipping with the shears. Care must be taken not to raise the tiles above the turf, so as to catch the scythe in mowing it. Nothing looks so bad in a walk as a high raw edge, as though a plough had cut it ; the lower the edge, the neater it looks. (*Wm. Tillery*, in *Gard. Chron.* for 1842, p. 7.)

To destroy Moles.—Drive them from their holes by placing slices of leek, garlic, or onion, in a green state, within their holes : their antipathy to these vegetables is so great, that they will immediately leave them, and expose themselves to be taken. In the month of May and beginning of June, if one sees a mole-hill larger than usual, it is pretty certain there is a nest of young within 1 ft. or 18 in. from it. (*Camb. Chron. and Journ.*, March 26. 1842.)

Woodlice may be caught in hollow cabbage-stalks, and also by laying down thin slices of carrot. (*Gard. Chron.*, 1841, p. 733.)

To destroy Worms.—Dissolve a quarter of an ounce of corrosive sublimate in 3 gals. of water. This does not destroy grass, but effectually brings up the worms to the surface. (*Gard. Chron.*, 1841, p. 798.)

Yew Branches are greatly to be preferred to most others for protecting wall trees ; for the foliage, when withered, adheres firmly to the wood, and the branches become almost as light and airy as dried fern. (*Gard. Chron.*, 1841, p. 845.)

Nitrate of Soda has been tried by Mr. Rivers as a top-dressing for the pine and fir tribe, and found greatly to increase their vigour and the deep green of the foliage. The quantity of nitrate was one pound to the square rod, applied in the beginning of June. (*Gard. Chron.*, 1841, p. 749.)

Mr. Cree's Mode of pruning Timber Trees.—You ask my opinion of Mr. Cree's system of pruning trees. At present, it may be enough to say that I shall adopt it in every instance where the trees are planted with a view to profit only ; and perhaps in some other instances too. I wish you would give us one or two cuts of trees in different stages of this process, in the Magazine. I am certain that timber might be brought to sale much sooner than it generally is, by other modes of treatment in conjunction with the Cree or Billington system of pruning. I allude particularly to scarification and (pray do not think me mad) decapitating. You can have no conception, unless you saw it, how rapidly some sorts of trees increase in girth when the head is taken off at 30 or 36 feet from the ground. Few have had an opportunity of observing this. I have, and can produce some striking examples here. We all know the beneficial effects of scarification on stunted fruit trees, and why not apply it to forest trees also? But I would not be understood to confine myself to merely making an incision with a knife in the bark ; I would strip out half an inch

in breadth of bark from the bottom to the top of the trunk. I shall have some interesting observations on this subject to make in the course of a few months, when I have more leisure.—*J. M. Feb.* 6. 1842.

Fences.—In the notices on planting and training quick hedges, your correspondents repeatedly direct the shoots to be cut back every year, with a view to thickening the hedge. My experience has shown that such a practice will effectually mar the object that it is wished to advance. It is right to cut the thorn within an inch of the root at planting, for the purpose of making it throw out a number of shoots at that point; and if the plant is pruned afterwards at 2 or 3 feet from the ground, the same result follows, i. e. a number of shoots spring from just below the cut: but these shoots soon steal the sap, and nothing but a bare stem will, in a few years, remain below that point; thus making the hedge hollow at the bottom. My rule is this, and experience has proved it to be a good one: never top a hedge till it has attained the required height; when it has been planted three years, the sides should be trimmed up with the shears or hook, to encourage the laterals to multiply shoots, taking care not to injure the leading shoots. This will make a single row of thorns, originally planted at 4 in. apart, so thick that a bird will not build in it. When the hedge has reached its full height, trim it level at the top, and keep the sides cut, so as to allow no part to overhang another. The practice of "laying" hedges, formerly so much in vogue, is now giving way to an improved plan, viz.: after five or six years, cut out single plants at intervals where the bottom may be thinnest, at 6, 9, or 12 inches from the ground. The hedge will thus be kept full at bottom; whereas, after twenty years, a "laid" hedge is good for little. (*Gard. Chron.*, 1842, p. 142.)

Grapes in Pots.—The only utility of growing grapes in pots, where there are plenty of hot-houses, is to have a few to ripen in March and April. West's St. Peter's, if properly managed, will hang in good condition till the end of February, or, in some seasons, till March; and, where there is an early vinery, good grapes may be ripened in the beginning of May, where the border is protected from frost and snow, so that a regular succession can be had all the year round. I have put a dozen pots in on the 10th of October, and cut on the 2d of March; another dozen in the beginning of November, and cut in April. Where grapes can be grown on the rafters, and proper attention paid to the borders, it is so much time thrown away to attempt growing them in pots. To the amateur and gardener with, perhaps, only a hothouse or two, the case is different, for they are worthy of all his care and attention, as I know of no plant to be compared with a vine well managed in a pot. (*W Tillery*, in *Gard. Chron.*, 1841, p. 830.

Gooseberry Cuttings, which have a little wet moss tied on the bottom of the cutting, are said to develope roots more abundantly than when this is not the case. (*Gard. Chron.*, 1841, p. 781.)

Filberts and Cosford Nuts, grafted on stocks of the Spanish nut, grow fast, never throw up any side suckers, come immediately into bearing, and are very prolific. (*Gard. Chron.* 1841, p. 781.)

A simple Method of producing early Cauliflowers.—Every one knows that hand-glasses are useful for this purpose when they can be had; but as all are not so wealthy as you in the South are, and therefore cannot afford so many hand-glasses, it may be of some use to notice a method by which, without these aids, I have produced cauliflowers fit for table somewhat earlier than others which were sown at the usual time and protected in that way. The seed was sown in the month of January under a hand-glass; and, as soon as the plants were of sufficient size, they were pricked out into a piece of ground, with which a large proportion of sand had been incorporated, for the purpose of inducing them to root well. When fit for final transplanting, they were carefully lifted with good balls, which is easily done when the ground is not too wet, in consequence of the numerous rootlets which they form in the sand, and they were planted in the usual way. By this treatment

they were fit for use some time before those which were sown in August; I cannot exactly say how long, but they were generally getting over before the latter came in. It is true they came into flower prematurely, and the heads were consequently small; but they were quite fit for use, and of that size which is prized in many families, and preferred to larger. These are not the results of one year, but of a number of years in which the same effects were invariably produced. (*W. Falla, Lisswood House, Northumberland,* in *Gard. Chron.* for 1842, p. 54.)

Sowing Cabbage Seed for Spring Cabbage. — Poynter, who published the *Cottage Gardener*, in 1833, and who was a market-gardener at North End, Fulham, says: " It has been an old practice among the market-gardeners at Fulham, perhaps for many generations, and it is continued to this time, to sow their cabbage on or as near the 25th of July as possible. It is not superstition, it is not whim, it is the result of experience traditionally delivered in this parish from a successive body of careful and observant growers." He further adds, " on cold lands I would sow in the middle of July." I beg to add, that for many years I have sown as near that day as circumstances would admit, and produced as early cabbages as come to the London market. (*R. G., Old Brompton,* in *Gard. Chron.* for 1842, p. 54.)

Training Calves and Horses. — In Ellis's *Horse Training*, reviewed in the *Athenæum* for April 2. 1842, it is shown that breathing into the nostrils of calves, horses, and various wild animals, renders them quite tame. The experiment has been tried in England with success; and Mr. Ellis is of opinion, that this is the secret of the celebrated Irish horse-charmers, who pretend to whisper to the animal and play with his head, and thus, probably, breathe into his nostrils. The experiments made by Mr. Ellis are founded on the following passage in Mr. Catlin's work, *On the Manners and Customs of the North-American Indians:* — " I have often, in concurrence with a well-known custom of the country, held my hand over the eyes of the calf and breathed a few strong breaths into its nostrils; after which I have, with my hunting companions, rode several miles into our encampment, with the little prisoner busily following the heels of my horse the whole way, as closely and affectionately as its instinct would attach it to the company of its dam. This is one of the most extraordinary things that I have met with in the habits of this wild country; and although I had often heard of it, and felt unable exactly to believe it, I am now willing to bear testimony to the fact, from the numerous instances which I have witnessed since I came into the country. During the time that I resided at this post, in the spring of the year, on my way up the river, I assisted (in numerous hunts of the buffalo with the Fur Company's men) in bringing in, in the above manner, several of these little prisoners, which sometimes follow for five or six miles close to our horses' heels, and even into the Fur Company's fort, and into the stable where our horses were led. In this way, before I left for the head-waters of the Missouri, I think we had collected about a dozen. In the same way the wild horses are tamed. When the Indian has got him well secured with the lasso, and a pair of hobbles on his feet, he gradually advances, until he is able to place his hand on the animal's nose and over his eyes, and, at length, to breathe in its nostrils, when it soon becomes docile and conquered; so that he has little more to do than to remove the hobble from its feet, and lead or ride it into camp."

Art. II. *Foreign Notices.*

GERMANY.

Quercus pedunculàta fastigiàta. — A remarkably fine specimen of this tree exists at Herreshausen, a small village of the Grand Duchy of Hesse Darmstadt, about twenty-five English miles from Frankfort, and two from Baben-

hausen. The total height of this tree is 90 Hessian feet, one third of which is a clean, bare, straight stem of 12 Hessian feet in circumference at 3 ft. above the ground. A Hessian foot is 11¾ in.

This oak is generally propagated by grafting, the acorns not being sure to produce plants of the same strict habit; some, however, turn out the same as the parent tree. The finest I have seen are on the lawn at Wilhelmshohe, near Cassel, and in Mr. Wild's garden in Cassel; they sometimes assume a round bushy form, but will probably end by shooting upwards. (*Gard. Chron.* for 1842, p. 36.)

Art. III. *Domestic Notices.*

ENGLAND.

Trees and Shrubs deserving to be more generally cultivated. — *C*órnus más is a small tree which will grow as large as a small apple tree. It has the male and female flowers on different plants. The female flowers are inconspicuous; but the male blossoms are of a rich yellow. They appear about the middle of January, in such profusion as to cover the entire tree; and they remain in that state for upwards of a month. Sometimes the tree comes into blossom in the autumn, and remains covered with flowers through the winter. There are very few plants of this species of *C*órnus in the neighbourhood of London, and most of those that are there, as for example at Syon, are crowded and deformed We would recommend this kind of *C*órnus to be planted singly on lawns, where it will be found to form a handsome symmetrical head, with a clear stem of 5 or 6 feet. It flowers when of very small size; and, as it is not exhausted by bearing fruit, it produces an abundant crop of flowers every year. No lawn or shrubbery, however small, should be without a plant of *C*órnus más.

*C*ratæ'gus *O*xyacántha obtusàta, a very distinct variety of the common thorn, a native of France, comes into bloom fully a fortnight before the species, and bears a profusion of pure white blossoms, smaller and more compact in form than those of the common kind. A double form of this variety would be a most desirable acquisition. As the tree does not grow nearly so large as the common hawthorn, it is well adapted for lawns and shrubberies of limited extent.

*B*étula *p*opulifòlia laciniàta is one of the most graceful of small trees, and in every garden or pleasure-ground, where trees can be cultivated, it deserves a place. *P*ópulus balsamífera is the first tree, after the common elder, that comes into leaf in the neighbourhood of London; and, its foliage being of a rich yellow, it makes a fine appearance among evergreens, or trees which have not yet come into leaf. In the direction of the wind, its fragrance, like that of the wallflower and of the mignonnette, may be scented at half a mile's distance.

*C*lématis montàna, a native of the Himalayas, appears to be the most rapid-growing of all the *C*lematídeæ. A plant which we received from Messrs. Whitley and Osborn in 1839, and planted at the foot of a wall covered with the giant ivy, with no particular care and no training whatever, has reached the top of the wall and extended among the ivy, 20 ft. on one side, and 30 ft. on the other. At this moment (May 18th) it is covered with its beautiful white blossoms, which appear in thousands over the ivy, like a mantle of rich white lace over a robe of green velvet. It is the admiration of every body. If the growth of this plant in a perpendicular direction is as great as it is in a horizontal one, and we see no reason to doubt this, it will be a delightful plant for placing at the root of unsightly tall trees, along with the Virginian creeper, or five-leaved ivy, and the giant ivy. We have recommended some friends at Brighton to try if it will endure the sea-breeze. — *Cond.*

Ashmolean Society. Oxford, Feb. 26. — The president, the Rev. Dr. Cramer, in the chair. The secretary, Mr. Bigge, read a paper "On the Balance of Preservation and Destruction in the Animal Kingdom." He commenced with a brief review of the proportionate amount of animal life in the various geological zones of the earth, showing how the balance of numbers is constantly maintained by ever-varying means. He then gave instances of partial derangements in the relative numbers of animals caused by man, and the readjustment of the balance by the operations of nature; and pointed out the frequent occasions where a spirit of indiscriminate destruction has led to the extermination of animals whose beneficial uses were not justly appreciated. Thus Mr. Yarrell, in his *History of British Birds*, mentions the remarkable fact, that in some large farms in Devonshire, when the rooks had been destroyed from their supposed hostility to the young crops, the caterpillars, and other insects that feed on vegetable substances, increased to such an extent, and ruined the crops so utterly for three successive years, that the farmers were obliged to import rooks in order to restore their farms. He then alluded to the circumstance, that insects which are hurtful in their larva state are frequently beneficial in some stage or other of their transformation, and that the good in general overbalances the mischief caused by them. An extraordinary increase in the number of any variety of animal is generally accompanied with a corresponding increase of the animal whose province it is to check its numbers; thus, in 1814 and 1815, the swarms of field mice in the Forest of Dean, which threatened at one time to destroy all the young trees, were followed by swarms of hawks, owls, weasels, and magpies; and ultimately the mice turned and destroyed each other. Sometimes, however, the means of readjusting the balance are not within reach. Thus in the Island of Mauritius, the introduction of rats from the ships of the early Dutch settlers almost led to the abandonment of the colony, as, from the distance of the island from the main land, no influx of the natural enemies of the rat could take place. In 1826 the governor of the island offered a reward for rats' tails, and about 800,000 tails have been annually brought in; fire, as well as other means of destroying them, have also been adopted, but no artificial checks appear to be so efficacious as those provided by nature. There is no instance of the extermination of a single species of animal except the dodo. Mr. Bigge concluded the paper with pointing out, that, amidst the great variations in the relative numbers of animals, the general result is, the preservation of each species in sufficient force, that wherever the balance is disturbed, adequate means are provided by nature to readjust it; and that it is our duty, as well as our interest, to study carefully the habits of animals supposed to be noxious, lest, in our indiscriminate zeal to suppress them, we should abuse our power over the inferior races, and inadvertently disturb the general harmony of the animal system. (*Athenæum*, April 9, 1842.)

March 7. Professor Daubeny exhibited a specimen of Mr. Daniel's new Patent Manure, which is stated by the inventor to consist of carbonate of ammonia, sawdust, and bituminous matter. As the materials from which this new kind of fertiliser is drawn appear to consist of inorganic matter exclusively, Dr. Daubeny pointed out its discovery as an instance, amongst many others, of the means which nature has placed within our reach for increasing the amount of vegetable produce proportionately to the increase of mankind, and so maintaining the necessary ratio between subsistence and an increasing population. In a purely pastoral or agricultural community, it might be unnecessary to have recourse to any other fertilising substances than those which the manure of animals affords; but, in a highly advanced condition of society, in consequence of the large amount of produce consumed by the inhabitants of the great towns, it becomes necessary to seek for new materials to supply the loss which the soil of the country sustains. Thus, bone-dust is procured from South America in such quantities, that it is computed, on the calculation that each head of cattle supplies bony matter equal to 84 lb. in weight, that not less than 1,200,000 oxen are slaughtered annually in

that country for the supply of bone manure to England alone. Guano, or the dung of sea-birds, is also an extensive article of importation for the same purpose; but, as both these sources will fail in proportion as the several countries become more peopled, it is fortunate that we may find substitutes for them in inorganic substances. Such is the nitrate of soda, so much used of late; such is the new manure invented by Mr. Daniel; and it may be confidently predicted, that, by the discovery of such agents, agriculture will be enabled to keep pace with the increase of population, if the latter be not stimulated with unwise regulations; and that as animal life increases in a direct ratio to the amount of subsistence, so the nutritious effects of animal manure, by giving greater energy and vigour to the organs of plants, will cause them to draw more abundantly from the atmosphere, and thereby force a proportionately larger quantity of them into existence. Dr. Buckland thought that an important principle respecting stimulating manures had been brought forward, viz., that a plant, under their action, draws more freely from the atmosphere. In addition to the increase of human manure with population, the quantity of carbon given out by animals, and left to be absorbed by plants, is proportionately increased. He further adverted to the discrimination necessary to be exercised, in restoring artificially land that has been exhausted; and instanced a case furnished by Professor Johnston of Durham, of certain pastures in Cheshire, which had been exhausted of their phosphate of lime by its being absorbed into the cheese made with the milk of the cattle fed there, and which were restored by a top-dressing of bone manure. (*Athenæum*, April 9. 1842.)

Chatsworth. — The entrance to the great conservatory that I showed you a sketch of while here is completed. The basin in which the conservatory stands is nicely laid out with walks and ornamental flower-plots. They have laid down green turf, and changed what looked like a dirty road a month or two back into a beautiful flower-garden. A yew hedge is planted all round the upper terrace, and round the conservatory, and I am now designing what I call watch-towers for the four extreme angles. The plants grow very rapidly in the large house. I was there to-day, and was astonished at the difference since I was there last. — *J. R. March* 15. 1842.

Candahar Fruits. — The East India Company presented to the Horticultural Society, in November last, the following collection of seeds of fruit trees from this province, which may be regarded as one of the mothers of orchards: — Grapes: Lall, large, round, green; Eytah, long green; Early luscious black; Houssainee, long green; Jundah, round green; Early white, good flavour and sweet, "Loll;" Umbherree; Culmuck and Sybee, red. Apricots: Char Mugzah; Suffárd Chéh; Kussee; Soorooz Chéh; Pus Rus; Sukkur Pára; and Pus Rus Surdchee. Plums: Purple and Aloochah. Peaches and nectarines of the richest quality. Cherries. Mulberries: a large black sort, called "Sheeh Lool." Melons: Surdah, a musk melon; and several kinds of water melons. (*Gard. Chron.*, 1841, p. 767.)

Tomato Figs. — I some time since received from Steuart, from New York, some preserved tomato figs. He suggested that by sending you some, they might be brought into notice as an article of culture; but I fear the general humidity of our climate, and the great want of bright sunshine, would prevent them being matured so early in the season as to secure their being rightly preserved. However, I send you some, that you may taste them, and be convinced that they are really worth notice. — *G. Charlwood. Covent Garden, April* 15. 1842.

The preserved fruit sent is not a tomato, but the winter cherry, Phýsalis *Alkekéngi*; or possibly the Peruvian winter cherry, P. peruviàna. The taste is sweet and pleasant, and, on the whole, it makes a very agreeable sweetmeat. — *Cond.*

Art. IV. *Retrospective Criticism.*

Mr. Niven's Stove for various Purposes (p. 190. and 241., and our Volume for 1841, p. 234. 334. 429. 478.).—I see by your Magazine for this month that Mr. Niven has noticed, in some degree at least, the remarks made in some of the preceding Numbers of this work on his "stove for various purposes." Before proceeding farther, I may just state that Mr. Niven is quite mistaken, if he supposes that my letter and the letters of Catius proceed from any other source than that of being far removed from each other. Also, that it was a mere act of inadvertence in me not appending my place of residence to my name in my last letter; therefore, Mr. Niven might have spared himself the trouble of showing off his maritime bravery. In future, I apprehend, we must hold our tongue, and walk about in dread of this redoubtable "Charley Napier." Why, one would be almost led to imagine, from his recent exhibition, that Lord Elliot has been using his influence to get him the command of the channel fleet.

Now, Mr. Niven, you are pleased to tell us that, "but for what you owe the public, for whom you act and write, you would have passed by in silence any remarks made on your 'stove for various purposes." Now, Sir, allow me to tell you, that those of the public for whom you act I hope pay you well, and some of those of the public for whom you write you expect will employ you to act in turn; therefore, I do not see any very great act of condescension in your noticing the above remarks made on your stove, when you consider that part of the public may be very much interested therein.

In the remarks you vouchsafe to make in your last letter, you take very good care to keep silent on the points where I requested you to speak out. If I have gained nothing by the controversy so far as it has gone, I think I have made you repudiate the two-year-old youthful system of queen pine growing. True, you don't do it in words, but you do it virtually by your non-allusion to the subject. But, I beg pardon, you have been enlightened on this subject since the appearance of your first letter. You can now grow pine plants in six months, equal to any two-year-old plants you ever saw. Well, this is something like keeping up with the spirit of the times. But, why not find this out before? In your first letter you told us that you used "Rogers's pit" for growing succession plants, and of which you highly approved. It was there, also, wherein you grew your youthful "two-year-olds." I apprehend I was not far from the mark, in my last letter, when I said you had been a little premature in your first glowing description. You go on, Sir, in your last letter, to cry down low pits for fruiting the pine-apple, and to recommend your semi-curvilinear-roofed house for that purpose. This carries a great deal of the "puff professional" along with it; but let that pass, I maintain that lofty houses are quite unfitted for fruiting the pine plant well; and that lofty or low houses have nothing to do whatever in giving the pine flavour; if they have, it must be in favour of low pits, where the plants are kept near the glass. Withholding water judiciously for some time previous to ripening, is the only way to insure high flavour. Now, Sir, as I hate "iron houses," I take every means and opportunity of running them down. In fact, the only advantage they possess may be likened to a gewgaw that looks better made up of any fragile substance, than one composed of more massy materials. You admit the original expense of iron houses over wooden ones, altogether keeping out of view the after expense of working them. The same quantity of coals, you must know, that would keep a wooden house going would very far from suffice for an iron house of the same dimensions; therefore, if gentlemen will build iron houses, they must be prepared to keep them up.

Again, Sir, you tell us that "probably larger fruit may be grown in low pits than under the circumstances you describe, but that has yet to be proved." I have never heard of any thing extraordinary having been produced in iron houses yet. I shall now give you a few cases where pines have

been grown on the old "burning system," which I am almost certain will not be equalled by your chambering system for years to come. In this neighbourhood there is a nurseryman who grows pines well. His houses were built by himself and men, so that you may suppose they are not over fine, neither are they. Well, Sir, I recollect seeing a Providence plant in fruit, in one of the above houses, that ripened in September, 1838. In October of that year the crown of the above fruit was planted. During its progress, I had an opportunity of seeing it several times, and was struck by its beautiful growth. The above plant produced a fruit in 1840, and was shown at an exhibition on the 21st of September; and what did it weigh, Mr. Niven? exactly 9½ lb. Now, Sir, I will give your commodore, as you facetiously term him, the benefit of your chambering apparatus, ay, and he may also have the advice and assistance of the admiral of the "curvilinear fleet" into the bargain, and let him try and raise a production like the above if he can. Another case: I suppose, Sir, you are aware that Mr. M'Murtrie of Shugborough, who has long been famed as a pine-grower, is a decided advocate for wooden houses; and so he may, for his success with them has been great. Mr. M'Murtrie has grown the Otaheite pine to 12¼ lb. This is something like proof in favour of wooden houses, Mr. Niven, is it not? I will give one more case, and have done on this part of the subject. At Ragley, the seat of the Marques, of Hertford, Mr. Brown, formerly the assistant, now the worthy successor, of the celebrated Baldwin, grows pines with great credit to himself. The houses at Ragley are all built of wood, got up in the most homely style. Now hear some of the results of the "burning system," as practised there. In April and May of 1839 Mr. Brown had a house of Providence pines ripe, not one of which was under 5 lb., many of them were 7 lb., several of them 8 lb.: you must bear in mind that the plants producing the above fruit were started at a season of the year the very reverse of favourable for the production of large fruit; yet mark the results.

Oh, but say you, "What is an overgrown fruit? Not better than a turnip." Indeed! Well, I, in my turn, only ask you, Sir, what is the value of a small puny pine? Is it worthy the name of pine at all? being void of juice, or any thing else to recommend it. It is often stated by those who seemingly know little of the matter, that the Providence pine is not worth growing, owing to its indifferent flavour. If there is any truth in this, it will only hold good when the Providence pine is badly grown; for it is an undoubted fact that the Providence pine increases in flavour in the ratio of the size, proper care being taken to withhold water for some time before ripening. This I will leave to the judgement of any connoisseur in pines. Yes, Mr. Niven, I will leave it to the judgement of yourself, being perfectly satisfied of what I have advanced on this head carrying on the face of it the "test of truth."

It seems, Sir, that you "feel thoroughly satisfied of the correctness, simplicity, and economy of your system," that is, of growing small pines; "and after much experience, observation, consideration, and care," &c. Now, Sir, I never doubted your ability in growing small pines, nor, I believe, has any one else; on the contrary, I would be astonished, if you take into consideration the system recommended in your first letter, if you could grow any thing else.

As regards the economy of the succession pit you describe in your last letter, I apprehend it is rather questionable. "Throughout the summer months a single fire at night was generally sufficient to keep up the requisite charge of temperature in the chamber below." What, fire every night all the summer out! do you call this economical? why, you are retrograding already. In the chamber under your pine pit, in your "stove for various purposes," we are told that once a week in summer was enough for the pipes to be heated, and with your new succession pit you must have a fire every night all the summer out; and then, forsooth, this is economy! Respecting, the originality of your chambering system, do you mean, Sir, to claim it as your own? Did you never see it in operation in Ireland previously to

your applying it to your "stove for various purposes?" I apprehend it was in use in Ireland for several years before we heard any thing of your applying it, which I will prove by addressing myself to Mr. Loudon. Well, Mr. Editor, I suppose you have not yet forgotten your old friend, now no more, Mr. Ellis, late of the Palace Gardens, Armagh. In the account of his death given in the newspapers of the day, it was stated that Mr. Ellis was the first to apply hot water to the heating of hothouses in Ireland. Mr. Ellis had a chamber underneath the pine bed, in one of his houses heated by hot-water pipes. In the year of his lamented death, Mr. Ellis left a pit of queen pines the like of which had not, in all probability, been seen in Ireland before, nor, I am pretty sure, have their equals been seen since. They were in general 4 lb. apiece, some of them 4½ lb. The above account is due to the memory of a most gentlemanly man, who was possessed also of undoubted talents as a gardener. The above, Mr. Niven, cuts the originality of the "chambering system" from under your feet. "Ah! now," you may say, "had that 'heroic privateer' not sent his shot into this, my vulnerable side, I might have had the credit of being the first to apply the chambering system by hot water." Yes, Sir, but you must be aware that those who, like you, "write for the public," must be prepared to abide by any ulterior results.

One word more, and I have done on the pine, in the "easy way of question and answer." Well, Mr. Niven, whom did you ever hear running down large pines, who could get them? And whom did you ever hear praising small pines, who could get large ones? Answer me this if you can: for my part I never heard one. You then go on to tell us about the prize having been gained at the Royal Horticultural exhibition in September last, for the best pine, from out of your stove. Well, what do you mean to prove by this? Why, according to your own showing, the puniest one would get the prize, at least the largest would not gain it, if you were a judge; you would reject the largest by saying they were not better than "turnips," and give it to one of those of small calibre, because they come nearer your standard. Will you, once for all, Sir, give us the weight of any pines that you may cite in future for examples, and we can then judge of their merits ourselves.

You keep very silent, Sir, about what can be done in the cucumber way in your stove, by sowing in November, December, and January: you have good reasons for this. Although, I admit, your account of those sown in February is very satisfactory, but they will not reach two feet in six weeks from sowing, will they? I see that 23½ in. is the length that cucumbers have been grown in your stove; now, I cut a brace of cucumbers the other day off one plant, 24 in. long, with the flowers at the point of them. The above were grown in a pine-house that had no "chambering apparatus;" so do not flourish too much about your 23½ in. If your musas do not cover more space than what you say, they are not very strong, that is all; neither have they been very expeditious in fruiting, considering the account you gave us of their "rapid growth," fifteen months ago. You must look sharp, or you wo'n't have them ripe by September next.

You are pleased, Sir, to call my objections "silly," against growing plants, natives of the same country, together. Who said any thing about the "gross impropriety" of doing so? You, Sir, contend that plants from the same country can be grown equally well under the same roof; that this holds good in all, or nearly all cases, I deny. Do you think, Mr. Niven, that there is no difference of climate in the same country within the tropics? Contrast a mountain with a valley, and apply it. Do you suppose that *G*eraniàceæ from the Cape, and *E*ricàceæ from the same country, will grow equally well under the same treatment? Would not the latter stand a degree of cold that would totally destroy the former? Therefore, my good Sir, my objections are not "so silly" as at first sight may appear.

You will see that I am rather distantly situated, to be able to compete with

your "stove" productions at the September show in Dublin; therefore, I respectfully decline that honour. However, I do not like the idea of your cruising about in the "bright broad bay" of Dublin till September next. I would merely suggest, for your consideration, that, in the interim, as your decks are clear, you might as well put your helm up, and take a cruise away to Batavia (that is the capital of the Dutch dominions in Java, you know), where they grow pines large, and sell them cheap, You can take one of your puny ones along with you, and contrast the flavour of it with a large one of Java. This is to decide whether my opinion on the flavour of large pines is correct or not. Now, if you go, I beg you will do it fairly; and, as I allow you to be the judge, if you have a doubt on your mind, you must give me the benefit of it. In the mean time, the commodore can look after the fleet at home.—*W. Hutchinson, Gardener to E. J. Shirley, Esq., M.P., Eatington Park, Shipston-on-Stour, Warwickshire. May* 9. 1842.

The Squirrel in Gardens and Woods.—I have just seen (p. 202.) an interesting letter by Charles Waterton, Esq. Mr. Waterton appears to be an enthusiastic naturalist, and would fain hide, as far as possible, the misdeeds of his favourites, particularly the squirrel. Now, much as I admire this nimble little quadruped, and anxious as I am to afford it protection, still I would not have it concealed from your readers that the nut orchard is not the only place where the presence of the squirrel is to be dreaded. In plantations of larch or spruce fir, he is the most destructive little wretch alive. Three or four years since, in a fir belt that had been planted eight years previously, I observed that many of the leading shoots of both larch and spruce, but particularly of the larch, were cropped over when in their most succulent state. At first I suspected the poor jackdaws, or some such playful customer, for the deed; but, on riding along one morning, I discovered the real rogues, the squirrels, busy at work. On making the discovery, they were, as Mr. Waterton says, "consigned over to the tender mercy of the gamekeeper;" but Mr. Waterton will rejoice to learn that the order only went to thin off, but not to extirpate them. This was done, and since then the firs are gradually recovering their leaders. Nor is it small trees chiefly which they attack, by eating off the current year's shoot: I can show spruce of considerable dimensions, which, from repeated attacks, are become quite tufted at their tops, so that the contending leaders resemble a cluster of small turrets. My predecessor imagined that these trees were cut down annually by the severity of the weather; and, although the situation is the most eligible for the purpose to be met with, he had actually resolved to discontinue planting spruce.

The squirrel is a most provident little fellow. He generally lays up a store of nuts where he can reach them, to serve him through the winter, or until the return of the nut season. I have dropped once or twice upon his little granary, and can testify to the excellence of the sample which he can produce; not an empty shell amongst the lot. No, he is too good a judge for that. But whether this latter circumstance is to be accounted for by the total absence of commercial restriction, and consequently the natural result of free trade, is a question which I shall not decide upon at present; but, in the meantime, I cannot help thinking, and I wish the squirrels would think so too, that trees, like trade, would flourish all the better if let alone to take their own course.

When defrauded of his little winter store, either by the ruthless hand of man or by pilfering companions, the squirrel will avail himself of the best substitute which he can find. That he has constituted fir tree tops an article of daily consumption, I have had ample proof; nor would I begrudge him a few leaders, either of spruce or larch, if he would only keep within bounds; but to go over a whole coppice, in these pinching times, cannot be tolerated, nor afforded, by "our country squires."—*James Munro. Castle Ashby, April* 9. 1842.

A new Description of Indian Corn.—I observe (p. 229.) some remarks on a new variety of maize recently introduced into America from China. I now

beg to send a sample of this corn, but at the same time wish you to understand that it is by no means new, or recently introduced. I have had it, under the name of pearl corn, for more than ten years. I have also cultivated it with the other varieties. Its growth is materially different; inasmuch, as it throws up many stems or offshoots; and is, I think, admirably adapted for culture in a warm dry climate, as an article of forage for cattle, and would, I have no doubt, yield, in its proper state of culture under the preceding circumstances of climate, an abundant crop of grain, as it is extremely prolific; and although the grains are very small, yet they are very numerous on the cob: nor does there appear to be so much waste, compared with the bulk, as in the larger species. I have no doubt that it is a distinct species of the *Zèa*, and ought to be so stated in the catalogues. I will cultivate some this season, and send specimens to the learned in these matters for determination. Some years since M. Lagasca, the Spanish botanist, cultivated a large collection of cerealia at Chelsea Botanic Garden, including many varieties of the *Zèa*, but, as he had not this variety or species amongst them, at that time I had not an opportunity comparing them. I have only, in addition, to observe that I have never succeeded in getting it to produce seed in this climate, but have to import it every year from the southern states of North America.—*G. Charlwood. Covent Garden, April* 15. 1842.

Art. V. *Obituary.*

Died, at his residence, Flower Bank, on Sunday, 8th May last, aged 75 years, *Allan Fowlds, Esq.*, nurseryman, Kilmarnock, one of the primitive race of nurserymen in Scotland, and (with the exception, perhaps, of the venerable Mr. Smith of Monkwood Grove, near Ayr) the oldest then alive. The nursery was established by his brother Alexander and himself nearly sixty years ago, contemporary with that of the Messrs. Dickson at Edinburgh, and the Messrs. Austin at Glasgow, and was carried on under the firm of A. & A. Fowlds till a few years after his brother's death, in 1810. A separation took place between his brother's heirs and himself in 1817; subsequently he carried on the nursery and seed business under the firm of Fowlds and Lymburn, and latterly under that of Allan Fowlds and Son. The deceased was professionally educated at Mile End, Brentford, and Kew, which laid the foundation of an intimate knowledge of his profession. He was accustomed to boast of being the first that brought the rhododendron from London to Ayrshire. He was also the first to introduce the purple beech, the original of which is now a magnificent tree at Caprington Castle, the seat of J. Smith Cunningham, Esq.; and the hydrangea, the original of which is still in the possession of Mrs. Cochrane of Ladyland. From the suavity of his manners, with his amiable and social disposition, he was universally esteemed among a large circle of acquaintances, most of whom are now gone before him. For the last ten years of his life he was mostly confined to the house, unless when able to take an airing in the nursery grounds. Though the want of his usual exercise must have drawn severely on the strength of his constitution, yet his cheerful and happy disposition sustained him through his many infirmities, till at last he died, almost without a struggle, and like one falling asleep.—*R. L.*

Died, on Wednesday, the 27th inst., after a long and distressing illness, borne with Christian fortitude and resignation, *Mr. William Rollison*, nurseryman, of Upper Tooting, Surrey, in the 77th year of his age, deeply lamented by his family and friends. (*Times.*)

THE

GARDENER'S MAGAZINE,

JULY, 1842.

ORIGINAL COMMUNICATIONS.

ART. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the CONDUCTOR.

(*Continued from* p. 197.)

JULY 28, 29. — The road from Bothwell Castle to the village of Hamilton presents some grand masses of wood on hilly ground, and crosses the Clyde and its steep rocky banks, also crowned with wood. The plantations belonging to the park of Hamilton Palace border the road on each side, from the bridge till we arrive at the village. This village, which in 1804, when we first saw it, was a dirty miserable place, with scarcely a good house except the inn, is now entirely changed. It contains a number of substantial houses, some in streets, but the greater number detached. The old inn is turned into the office of the Duke of Hamilton's land-steward, and there is a most substantial new inn built, in which we obtained most excellent fresh salmon and old whiskey, and the very best treatment; but very indifferent potatoes and other vegetables, from there being no market-gardener at Hamilton, and no early potatoes grown in the landlord's garden, and from every vegetable, except potatoes, being obtained from Glasgow. We do not recollect a single objection to this inn, except that the upper sashes of all the rooms, whether bed-rooms or sitting-rooms, were fixed, and, consequently, the rooms could never be properly ventilated. We afterwards found this to be the case with the windows of even the best houses in Princes Street, Edinburgh, which we were not so much surprised at, as they have been built half a century; but we did not expect to find it in a first-rate inn, built by the Duke of Hamilton within a few years. The fault is of course the architect's or the carpenter's, for it cannot be supposed for a moment that an individual so exalted in station, so liberal in sentiment, and of such excellent taste, more especially in architecture, as the present Duke of Hamilton, would build other-

wise than on the very best principles. With respect to the greater part of the houses composing the village or town, as it may now be called, they are, we suppose, built on feus, which are generally leases of 999 years; and the builders, as almost everywhere else in Scotland, seem to have carefully avoided showing the least appearance of improved design or of ornament. But what forms the greatest objection to the detached houses of Hamilton is, that they have no front gardens, or, at least, we recollect very few, and they display no flowers or flowering shrubs. The plainest cottage that may be built can be rendered a delightful portion of scenery, if it be surrounded by a few square yards of ground, planted and cultivated with a little care and taste. Even if no creepers are trained against the walls of a cottage, two or three low trees, and especially pyramidal ones, such as the balsam poplar, the pyramidal common thorn, the Irish yew, Swedish juniper, Cembran pine, pyramidal oak, various kinds of pears, cherries, plums, and apples, and several varieties of the white-beam tree, with a number of others, all hardy enough to ripen their wood in this part of Scotland, would break the meagre sharp lines of the slated eaves that have no gutters (roans, as they are called here), and throw a shadow on the broad expanse of roof. It might, as it appears to us, be worth while for the Duke of Hamilton, and other extensive proprietors, each to maintain a small nursery of fruit-bearing and ornamental trees and shrubs suitable for planting cottage gardens, and give or sell them, not only to the cottagers on their own estates at a low price, but to all other cottagers in the surrounding country who choose to become purchasers. In this way, and by the occasional advice and assistance of an intelligent gardener, a taste for cottage gardens would soon spread over the country. We do not recollect much of the church or the market-house in Hamilton, but we have in our mind's eye a dissenting chapel, and its burying-ground, both of considerable size, and the chapel as deficient in every thing like design or taste as such a mass of building could well be. Even the workmanship appeared bad; there being apparently neither a truly perpendicular line in the walls or openings, nor a correctly horizontal line in the roof. Ivy, the Ayrshire rose, Clématis montàna, and a few scattered trees, would totally change the character of this scenery.

Hamilton Palace is a noble pile of Roman architecture, standing in a park of 1700 acres. Through His Grace's kindness we were permitted to see the interior of the palace, which is admirably arranged, and superiorly finished and furnished. Among the ancient and curious furniture, are several cabinets, beds, chairs, tapestry, and other things, which belonged to Mary Queen of Scots; and many articles, also, which were once those

of Marie Antoinette. Besides these, we saw such a profusion of articles, in china, glass, marble, silver, and gold, and of furniture ornamented with precious stones, as we should suppose is nowhere else to be found, either in Scotland or England, not even excepting Windsor Castle. The pictures are numerous, but we had only time to glance at them, and to notice "Daniel in the Lion's Den." The proportions of all the modern rooms are satisfactory, the chimney-pieces superb, and the carving of the mahogany doors and other fittings most elaborate. One of the most striking and imposing rooms, which is called the Tribune, is a lofty saloon, lighted from the ceiling, with rich projecting galleries, and forming a centre of communication to a suite of state-rooms. The hall and grand staircase were being finished with black marble, of which we saw numerous columns, but we had only an imperfect glance at them from the scaffolding. The exterior of the building is grand and imposing, from its magnitude, and the unity of architectural design which pervades every part of all the elevations; and the same character of grandeur being preserved within, and heightened by richness of finishing and furniture, becomes magnificence. The only fault that we could find with the interior of the house is one which may be made to every house that we have been in, not even excepting the royal palaces; that is, that there is no artistical connexion between the fenders and the grates, or between the fenders and the chimney jambs to which they belong. It would occupy too much room to enter into details, which, indeed, we have done in the *Suburban Gardener*, p. 125., but *fig.* 33. from that work shows a fender artistically united to the chimney jambs, and will be sufficient to give a general idea of what is meant by artistical connexion.

Nothing has been done to the grounds around the house, or at least nothing at all worthy of such a building. There are various systems on which the grounds of such a palace might be laid out. Supposing the ancient system were to be adopted, then the first step would be to form the main public roads leading to and from the palace into straight avenues for as many miles as they pass through the property, the palace forming the central object. Next we would turn the Clyde in such a manner as that the avenues should cross it on suitable bridges at right angles, immediately before arriving at the gates. The public roads would at a distance, to strangers driving along them, appear to terminate in magnificent gates leading to the palace; but the roads would, on arriving there, be turned so as to pass outside the park. Applying these principles to Hamilton Palace and Park, it would involve the alteration of a portion of the road from Glasgow, and a portion also of that from Lanark, according to the distance which the estate may extend in the direction of these places. It would also require a change being made in

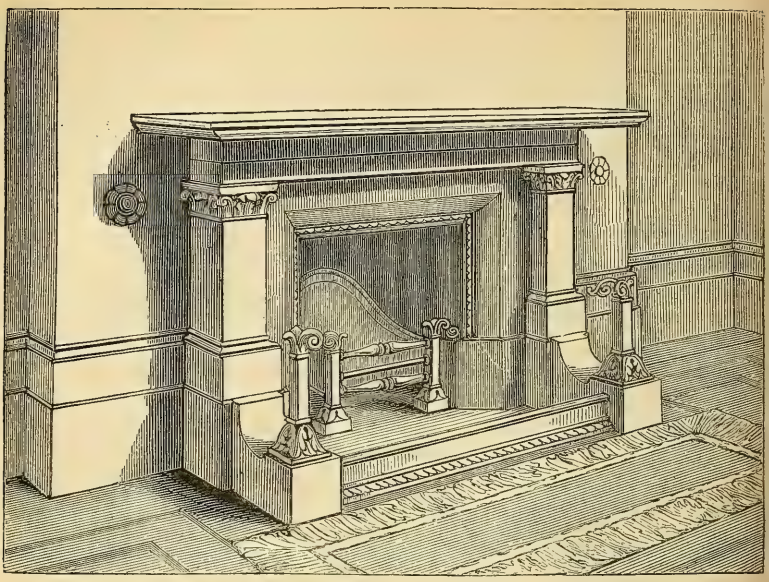

Fig. 33. *A Fender artistically united to the Chimney Jambs.*

the course of the Clyde near the two places where the two gates to the park would be formed. The expense would, no doubt, be great; but we are not considering the expense, but only what would be suitable for the grounds of such palace, if they had been laid out in the days of Louis XIV. The approach from the gates through the park to the palace we would, of course, have a straight avenue 200 or 300 feet wide, with a triple row of trees on each side, at 100 ft. distance in the row, so as to allow them to take the magnificent forms which may be seen in the remains of the old lime tree avenue at Culross Abbey. The house we would surround on three sides with an extensive architectural flower-garden, including a large architectural conservatory, in the form of a Grecian temple, attached to the mansion by an arcade or colonnade; and from this garden an archway should lead over the carriage road (which would become necessary to connect the avenue from Glasgow with the avenue from Lanark) to pleasure-ground scenery and the kitchen-garden, to be situated between the palace and the village. Perhaps, the arrangement of the public road and the turning of the river, might require the palace to be seen obliquely, instead of at right angles, as is usual in such cases: but to this we should not object; for we consider the proposed change in the public road essential to any grand arrangement in either the ancient or the modern style. A palace ought to command not merely the

park on which it stands, but the whole of the surrounding country, which should appear to belong to it; and this is only to be effected by showing a command over the public roads.

The management of the estate of the Duke of Hamilton appears to be admirably conducted by Mr. Brown, who has superintendents for the different departments, whom he sent with us; and with them we inspected the home farm, the improving farms, and the park; and the resident upholsterer, who has the charge of the furniture, conducted us over the house. Unfortunately we neither saw the forester nor the gardener, both being from home. The garden scenery at Hamilton bears no sort of relation to the palace, and is evidently a mere temporary affair. The farming is admirable; and we were shown extensive tracts raised in value from a few shillings per acre to as many pounds, by the frequent-drain system, subsoil-ploughing, liming, and manuring, chiefly with bones. The soil in this part of the country, and through great part of the West of Scotland, is admirably adapted for the frequent-drain system, being retentive, and chiefly injured by the retention of the water that falls on it, rather than from subterranean springs. The young plantations we saw enough of to justify us in saying that they are too thick, and not pruned on Mr. Cree's system. The hedges are kept with the greatest care in the Berwickshire manner, which, though good in respect to pruning, is objectionable in the management of the soil by the process called tabling, which consists in taking it away from the extremities of the roots, where it supplies the fibrils with nourishment, and heaping it up about the extremities of the plants, where it can do little or no good. To convince a Berwickshire man, however, that he is wrong either in farming or hedging, would require little less than a miracle.

Cadzow Castle, the ancient baronial residence of the family of Hamilton, is situated on the top of a steep bank of the river Evan, which joins the Clyde near one of the entrances to Hamilton Palace. The old castle is approached through the remains of a forest of oaks, having from their age mostly the character of old decaying pollards. A few of them are very large, and one was pointed out to us with a trunk about 34 ft. in circumference at 6 ft. from the ground, and having the branches covering a space above 100 ft. in diameter. There are some very large ashes, sycamores, and broad-leaved elms, all evidently indigenous in this part of the country. The greater part of the oaks were of *Quércus pedunculàta*, which renders it probable that many of them were planted, as *Q.* sessiliflòra is the prevailing species on the banks of the Clyde and the Evan. In this park there is a herd of wild Scottish cattle, in

which the prevailing colour is white. They are said to be much less ferocious than the wild cattle of Chillingham.

We went to the old ornamental building called Chatelherault, and found it occupied by a solitary gardener, who, nevertheless, contrives to entertain himself in the evenings with the gardening newspapers, *Chambers's Journal*, and other periodicals. The soil of the gardens here is a light sand, and completely worn out for want of manure.

Barncleugh, the property of Lord Belhaven, forms a portion of the steep banks of the Evan before mentioned, amounting to 36 acres, with a small house with crow-step gables, and the banks of the river laid out in terraces, which, from their architectural remains, must at some former time have been extremely beautiful and interesting, in their striking contrast with the wildest description of woody scenery. The terraces and every part of the garden are now in a ruinous state; even the figures cut in yew and box not being clipt, and consequently fast losing their artificial shapes. This is easily accounted for, neither the gardener nor the person who occupies the house setting much value on this style of gardening. A portion of level surface on which they could grow kitchen crops would evidently please them much better. The bank appears to have been formed into three parallel terraces varying in width, retained by very high walls, most of which have been covered with fruit trees; and in some parts there are niches with seats, in others buttresses; and in one there is a recess with the remains of a bath, in front of which, in an area which, if we are not mistaken, the gardener told us was once covered with a glass roof, are still the lead pipes and other wreck of a basin and fountain. The beau-ideal of the ruins of this part of the garden, restored, forms the frontispiece to Sir Thomas Dick Lauder's edition of *Price on the Picturesque*. In that work is given an account of the origin of the garden, which, as it is very curious, we shall quote at length.

This garden, Sir Thomas informs us, "was constructed by that Lord Belhaven who lived about the middle of the 17th century, of whom—

"'It is formerlie observit, that the Inglisches haiffing routtit this natioun at the fight at Dunbar, upone the 3d September 1650, they possest this kingdome, and did foirfalt the maist part of these that wer ingadged in that unlauchful ingadgement in the Scottis ingoing to England; among quhome the Dukes of Hamiltoun, and all that formerlie were forfalt, the creditouris persewit the cautioneris for the Duke's dett and could get no relieffe. Among these cautioneris the Lord Belhevin being one, and being band for that hous in greater sumes of money than he was able to pay, he resolves to leave this natioun, that he mycht eschew comprysinges of his landis and imprissonement of his persone. This resolutioun he followes in this manner. He takis his jurney to England, and quhen he past by Silloway (Solway) Sandis, he causit his servand cum bak to his wyff with his cloak and hatt, and causit it to be vented

that in ryding by these sandis, both he and his horse quhuairon he raid were sunkin in these quick sandis and drowned, nane being privy to this, bot his lady and his man servand. This report passed in all pairtes as guid cunzie, that he was deid and perisched, for the space of six yearis and moir; and to mak this the moir probable and lykelie, his lady and chyldrene went in dule and murning the first two yeiris of his absens, so that during these six yeiris it was certifyed to the haill cuntrey that he was deid and perisched; all this wes done of set purpos to eschew the danger of the cautionary quhairin he lay for that Hous of Hamiltoun. Eftir his ingoing to England, he strypit himselff of his apperell, clothed himselff in ane base servill sute, denyit his name, and became servand to ane gairdner, and laborit in gardenes and yairdis during the haill space of his absence; na person being privy to this cours bot his Lady, (as for his servand he went to other service, not knowing that his old Lord haid becum a gairdner,) till efter six yeiris absens; efter quhilk tyme and space the Dutches of Hamiltoun haiffing takin ordour with the dettis, and compereit and aggreyit with the creditouris, than he returned to Scotland in Januar last 1659, efter sex yeiris service in England with a gairdner, to the admiratioun of many, for during that haill space it was evir thocht he wes deid, no persone being accessorie to his secrecy bot his awin Lady to hir great commendatioune. By this meanis his landis and estait wer saiff, and his cautionarie for the Hous of Hamiltoun wes transactit for, as is afoirsaid, and his estait both personall and reall fred and outquytt.'

"I believe that it was owing to my friend Mr. Kirkpatrick Sharp having on one occasion directed Sir Walter Scott's attention to this most singular story, that the first idea occurred to the great author of the Bride of Lammermoor, that he should terminate the existence of the Master of Ravenswood by a death similar to that which was thus feigned by Lord Belhaven, and which Sir Walter has made so sublimely affecting as the final fate of his hero. But the object which I have most particularly in view, in my present introduction of this piece of history is, that I may be enabled to mention, that it was the knowledge which Lord Belhaven thus acquired, during his six years' hard horticultural labour in England, that enabled him to lay out and construct this beautiful old terrace garden of Barncleugh."

However creditable this history may be to the Lord Belhaven of the 17th century as a gardener, it does not say much for him as a man. It is singular that a Scotch gentleman very fond of gardening, and who possessed one of the finest old places in the neighbourhood of Edinburgh, should have, a few years ago, endeavoured to defraud his creditors in a somewhat similar manner to Lord Belhaven, by inducing it to be believed that he was drowned in England, and in which he in part succeeded. He had not, however, like Lord Belhaven, taken the precaution of making his lady privy to his intentions, and, in consequence, after a certain time had elapsed, she was about to marry, which soon brought the supposed dead man to life.

(*To be continued.*)

Art. II. *Notes on Gardens at Brighton, and in its Neighbourhood.* By the Conductor.

The views from the Brighton Railroad exhibit an undulating country, with a general sameness of character, and uninterrupted

by a single plane or level surface. The greater part of the country is occupied by wood or pasture, and there are scarcely any gentlemen's seats seen from the road, with the exception of Gatton, and portions of the grounds of villas between London and Croydon. There are many deep cuttings; and these being mostly through hard chalk, admit of the sides being very steep, in some places so much so as to approach the perpendicular. These deep cuttings, in our opinion, are the most disagreeable, or, rather, perhaps, insipid, parts of railroads, excluding all distant view, and presenting in every part of the country the same monotonous foreground of a steep tame bank. We would therefore plant the whole or the greater part of them with trees and shrubs, so that in future these parts of the railroads would be woods or groves, in time overarching the road, and giving it the appearance of passing through a ravine in a mountain forest, or through a dark avenue. The kind of trees and shrubs we would vary according to the soil, the exposure, direction of the road, and other circumstances, so as never to interfere with utility. In a road running east and west, we would intermix a good many low growths on the south side, so as to admit the sun here and there to the road; but where the direction was south and north, as in the Brighton road, attention to this point would be unnecessary, as the sun would shine on every part of the road that was not overshadowed by trees, at mid-day on every day in which he appeared. On the naked banks of chalk we would sow the seeds of the pine and fir tribe, previously forming a little pit of good soil for every patch of seeds; or, in order that the roots might spread along the surface, we would form intersecting gutters of only a few inches in width and depth, and fill them with good soil, in which the roots might extend themselves, till the foliage that would drop annually had formed a vegetable soil over the whole surface of the chalk. We are not aware of any harm that would result to the railroads from all the banks of the steep cuttings being planted, while in time there might be thinnings or timber trees to cut down, which would more than pay all the expense incurred. We question, indeed, whether there would not be a present gain in planting these banks, because, when once planted, they would no longer require to be mown two or three times a year as at present. The plantation would require very little attention, besides a slight annual pruning on Cree's principle, for the trees, leaving the shrubs untouched for a number of years till pruning became requisite; and the thinnings, even the first time the operation required to be performed, would at least pay the expense of the operation. The sides of the embankments which are not seen from the road, but over which the eyes of the passengers look to the distant country, ought not to be planted with trees, be-

cause that would shut out the landscape; but they might be planted with oak or ash to be cut as under-growth, with willows to be cut for hoops or basketwork, or with furze to be cut as fodder or as fuel for ovens or brick-kilns; and with here and there, say every 300 or 400 feet, a standard tree, to form a sort of running foreground to the distant parts of the picture. As these banks generally contain immense masses of good soil, whatever was planted on them would grow vigorously, and perhaps soon afford sufficient profit to pay the expense of planting and managing the banks of the steep cuttings, as well as the slopes of the embankments. However, putting profit out of the question, we think that, at all events, the deep cuttings ought to be planted for the sake of ornament.

The bridges which cross the railroad exhibit in some places forms not to be met with on the Birmingham line, such as the continuation of the main arch through the side arches, so as to serve as abutments, and the lightening of the piers by open work. This is beautifully exemplified in the grand viaduct over the Ouse, the piers of which are in one part a hundred feet in height. The sides of this splendid structure are, of course, not seen from the railroad, though this object might be accomplished by means of reflecting glasses, if it were thought desirable. The length of this viaduct is 1437 ft., or rather more than a quarter of a mile. It is justly considered a master-piece of engineering, and affords one of the finest examples of elegant simplicity combined with strength, that is any where to be met with. There are many skew bridges on this line, and one or two formed of single ribs 3 ft. apart, bridged over, apparently for the purpose of showing how skew bridges may be dispensed with. The station-houses are plain and neat, but without pretension to ornament. On a Brighton line we think more beauty and variety might have been displayed in them, but a due regard to economy no doubt prevented this.

The regulations at both extremities of the line, for safety and saving trouble to passengers, are far superior to those on the Birmingham line, or in any other with which we are acquainted.

The last thing which we shall notice, as connected with the railroad, is a young plantation of trees on the right hand just before arriving at Brighton. It affords a capital example of overpruning; the trees, which are from 10 ft. to 20 ft. in height, and both of needle-leaved and broad-leaved kinds, being deprived of their branches for two thirds of their height.

The Street Gardens of Brighton, as we noticed in our volume for 1838, p. 498., are in general very neatly kept, more especially those on the London Road, on both sides of St. Peter's Church. These gardens are now (May 15th to June 3d) rich in Brompton stocks and wallflowers, both of which thrive at

Brighton, and along the coast to Worthing and Tarring, with a degree of vigour which we have only seen equalled in the chalk pits at Greenhithe on the south bank of the Thames. The columbine in all its varieties is also in great abundance and vigour, the double red lychnis, and in some places the double yellow marigold; while masses of red and white valerian are just beginning to expand their blossoms. The prevailing colour in almost every garden is red, but this is finely contrasted by the rich yellows and orange of the marigolds, and relieved by the different shades of purple, red, and white of the columbines, by the purple and variegated stocks, and by stocks of a pure white; the whole garden being harmonised by the green of the foliage, or of a small plot of grass, and this again supported by the stone colour of the walls and the gravel of the walks.

In the Brighton gardens fronting the sea, the plants mentioned and various others thrive nearly as well as in the back streets, provided there is a dwarf wall to protect them from the direct influence of the sea breeze and spray. These gardens, however, are very inferiorly kept to those on the London Road; partly because they belong to wealthy families who only reside at Brighton a part of the winter, and hence their gardens during spring and summer are neglected, and partly because they belong to lodging-houses, the keepers of which do not in general trouble themselves with flowers. The last winter was more than usually severe on the tamarisk, which forms the principal shrub in all the gardens and squares exposed to the sea, and hence these shrubs are for the most part cut in and just beginning to shoot. There are very few plants of the sea buckthorn about Brighton, but there are a few; and where the tamarisk has been cut to pieces the buckthorn has not been in the slightest degree injured. At Gosford, in East Lothian, the sea buckthorn has proved the hardiest of all marine trees or shrubs. The evergreen oak has not been injured at a very short distance from the sea in the back streets; and the Dutch, Scotch, and Chichester elms appear to thrive just as well as the common sycamore. In short, wherever there is a little shelter from the direct influence of the sea breeze, every kind of tree and shrub appears to thrive quite well; though, from the soil being poor, thin, and on chalk, and the great want of rain in the growing season, their growth is very slow, and they never can attain a large size, as may be proved from the trees on similar soils in the interior of the country. The Leycestèr*ia* formòsa is a shrub which might be advantageously introduced into the sea-side gardens, not only, as our correspondent N. M. T. has shown (*G. M.* for 1841, p. 9.), because it stands the sea breeze, but because it makes the greatest show late in autumn, when Brighton is fullest of company. The *Lý*cium bárbarum, the common ivy and the five-leaved ivy, and

climbing roses, thrive remarkably well when trained against the houses in the back streets, as would most other ligneous creepers, among which we would particularly recommend *C*lématis montàna (p. 329.) and other species, Wistàr*ia* sinénsis, and the common white jasmine.

Next to the street gardens in the London Road, are those in the Western Road, in which the wallflowers, stocks, columbines, marigolds, and red valerians now make a splendid appearance; and, against the houses, China roses of different kinds, but especially the commonest variety, which flowers earlier than any other, are profusely covered with bloom. The finest part of this street is the recess in which the house of Mr. Wild the architect stands, and which is mentioned in our volume for 1829, p. 120. The architecture is better here than in most of the old parts of Brighton, and the trees and shrubs have attained a comparatively large size. The house then occupied by Sir James Scott, to which the large conservatory called the Oriental Garden was then, and is still, attached, is now occupied as a ladies' school. All the gardens here are kept with very great care and neatness.

The Grounds in Front of the Pavilion are so shut in by increasing the height of the wall, and boarding the inside of the iron railing, that they no longer, as formerly, prove an ornament to the town. We cannot help thinking that if this matter were represented in a proper light to Her Majesty, she would order the wall to be lowered, and an open iron railing placed on it, leaving the border of trees and shrubs within as it is, so as to produce a barrier which may be partially seen through, similar to the palisades and borders of shubbery which surround the squares, and to that which existed some years ago, as shown in Mr. Repton's *Designs for the Pavilion*, &c., fig. 147., given in our edition of Mr. Repton's works, p. 403. Allowing the eye of persons in the street to penetrate here and there into these grounds would certainly be a great additional beauty to this part of Brighton, and we should think could be no annoyance to a queen who is not averse from showing herself in public, even if she were walking within. Much has been said respecting the architecture of the Pavilion. For our part, we admire it throughout, for its novelty in this country and its consistency, for the unity of style which pervades every part, and for the substantialness of the execution of the work. We speak only from general impressions, without specific examination or entering into details. We hope every part of the edifice and its appendages will be kept up in good repair as long as it will stand. We regret to see some chimney-tops repaired with common red chimney-pots, instead of the ornamental forms with which they were formerly terminated; but we hope the repairs

to which we allude are only temporary. We know not whether the town of Brighton is rich or poor; if it be rich, we would suggest the idea of clearing away all the houses round the Pavilion, and presenting the cleared ground to the queen, so as to enable Her Majesty to surround her residence with lawns and trees, and an open iron railing; and, to make this gift complete, we would at the same time clear away some houses, so as to admit a view of the sea from the principal rooms. Whether the expense of these improvements would be compensated to the town, by inducing the court to pay more frequent visits to Brighton, is a point that can only be matter of conjecture.

The Squares, or open spaces between the grounds of the Pavilion and the Rose Hill Nursery, are varied only with one or two clumps, unconnected among themselves or with any thing around. There is not a walk in any of them in which there is the slightest shade, which, in our opinion, is a very great defect in all public gardens; but it might be remedied by planting trees along one system of walks for summer use, and forming open walks for use after rain and during winter.

St. Peter's Church, a very handsome edifice by Mr. Barry, has a considerable area round it, but it has not been used as a place of interment; because, from its low situation, it is supposed that it might deteriorate the water which supplies the wells of the town. This piece of ground is surrounded by a marginal plantation, which has a very good effect; and the interior, as it is not to be used as a cemetery, might be diversified with flowering shrubs and low trees, and with small circular beds of flowers of different sizes grouped together, each bed planted with only one kind of flower. Both trees and flowers we would have named for the benefit of the young; for we should not treat it as a cemetery, but rather as a botanical pleasure-ground.

St. Nicholas Church has lately had two or three acres of ground added to it, which is laid out as a cemetery. This ground is on the steep side of a hill, with a terrace along the upper boundary, formed by a series of cells or catacombs, each of about the size of a common coach-house, and with large boarded doors, which rather remind us of the stable-yard than of the cemetery. The doors are too large; for though we speak of "the gates of death," the entrance to the tomb is generally made narrow, widest at bottom, and the door that closes it of stone or metal. In our opinion it would be a great improvement to remove these coach-house doors, and substitute others much narrower, and formed of one slab of slate, or of Caithness flagstone. The trees planted in this cemetery are horsechestnuts, limes, and other unsuitable kinds, instead of *Pyrus Aria*, sea buckthorn, the common elder, sycamore, the common and Irish yew, the evergreen oak, the Swedish juniper, &c. The flower-beds neither

group with one another nor with any thing else. The soil, except a few inches on the surface, is naturally of pure chalk. The entrance to this cemetery is Roman, while the church to which it belongs and adjoins, and the catacombs it contains, are Gothic.

Hanover Chapel has a burying-ground which is quite unique. A straight avenue of elm trees leads from the entrance-gate to the door of the chapel; and on each side of the gravel walk, which runs down the centre of the avenue, is a narrow margin of smooth highly kept grass. Next, there is on each side a neat low wire fence, beyond which is the burying-ground, the greater part of which is dug and planted with herbaceous plants, interspersed with low trees and flowering shrubs, and divided by walks, in some places straight and in others winding. The whole is interspersed with graves and grave-stones, and as the gates in the wire fence are all kept locked, no person is allowed to walk among the graves who is not admitted by the gardener. Every recent grave is covered with a mound of green turf, kept smooth by clipping or mowing, and all the rest of the ground is kept dug and planted; so that no flowers can be said to be grown on the recent graves, but only beside them. The recent graves are those in which interments have taken place within two or three years; and are always known by being covered with green turf, which is kept fresh by watering, and short and thick by frequent mowing. Nothing that we ever saw in a cemetery or churchyard comes up to the high keeping displayed in this one. The walks and their edges were perfect; the grass every where like velvet; the dug ground as fresh and garden-like as if it had been recently dug and raked; the flowers neatly staked and tied up, where tying was required; and not a single decayed flower or leaf could we observe any where. The boundary walls were covered with ivy and other climbers, and we observed trained on them one or two fig trees and some other plants of the tree kind; but as, in consequence of the wire fence, we could not get into the interior walks, we speak only of what we saw from the avenue.

The Royal Tea Garden in the outskirts of the town is on a level surface, and might be made a scene of considerable attraction. It has been ten or twelve years planted, and the trees are 30 ft. high and upwards, and thriving as well as could be desired. There is a handsome broad straight walk down the centre of the garden, completely and densely shaded by elms; a great variety of side walks and side scenes, such as open circular areas of gravel, of flower-beds, of arbours and other rustic structures, of basins of water, &c. There is a sunk oval area of turf, 100 ft. by 200 ft., surrounded by an open lawn, which may serve as a verdant amphitheatre, or for a large company to see a play acted on a temporary platform, to hear music, or see fireworks, for a dance, a fancy fair, a masquerade, or other

amusements. There is a labyrinth at the farther extremity of the garden, and a large building for refreshments at the main entrance. It does not, however, seem in a thriving state, for most of the wooden structures are tumbling to pieces, and the flower-beds were neglected, and, instead of a gardener among them, we found a cow.

Rose Hill Nursery, Messrs. J. and G. Evans. We noticed this garden on a former occasion (*G. M.* for 1838, p. 501.) as being cultivated with great spirit, and receiving the additions of various plant structures. In our present rapid glance we observed admirable crops of grapes, a splendid show of geraniums and other greenhouse plants, and the whole garden in the very highest order and keeping. Neither of the Messrs. Evans were brought up to gardening, which is, doubtless, the reason why they are so fond of the pursuit, and why they keep everything in such excellent order. Though we have little room for details, yet we must not forget to record the dimensions and crop of one vinery. Length, 45 ft.; breadth, 10 ft.; height at back, 10 ft.; at front, 3 ft. Heated by one fire, over which there is a boiler, the water from which circulates in pipes at the back of the house, while the smoke passes along a flue in front. The vines have been six years planted, are spurred in, and on each shoot only one bunch is left to be matured; these bunches commonly averaging 1 lb. weight each. They are calculated to ripen in the first week of July. The weight of grapes cut annually from this house is from 3 cwt. to $3\frac{1}{2}$ cwt.! This produce is very seldom equalled, and we are not aware that it has been often surpassed. The border is a strong chalky loam, 2 ft. deep, on a chalky bottom, perfectly dry; the soil is well enriched with stable manure and night-soil, and mulched on the surface, but not cropped.

Norman's Market-Garden, at the eastern extremity of Brighton, in Park Street, is remarkable for its vineries, which form a range 400 ft. long, 15 ft. wide, and 12 ft. high at back. There is no front glass, but a parapet of 2 ft. with openings with wooden shutters for admitting air, and there are corresponding openings and shutters at the top of the back wall. Both are opened by jointed wooden levers, in a very simple manner. These houses were put up about twenty years ago; and they are heated by flues, which Mr. Norman, after nineteen years' experience, considers cheaper than the hot-water system. The vines are spurred in, and one bunch only left on each lateral branch. The bunches are not large, but they are numerous, and equally distributed over the whole vine; and the laterals being twice as numerous as in the house of Messrs. Evans just mentioned, the total weight of grapes produced from a square foot of glass is probably not materially different. Mr. Norman begins to force his earliest house on Feb. 1st, and his crop generally ripens in

sixteen weeks. He had just (May 25th) begun to cut in his earliest houses. The vines are so far apart that abundance of light is admitted between each main stem, and to this circumstance, the dryness of the fire heat, and also the dryness of the soil and subsoil, Mr. Norman attributes the high flavour of the grapes, which, he says, are the highest in flavour which are brought to Covent Garden Market. The borders are broad, occasionally very slightly cropped, or sometimes mulched, and in very dry weather, while the fruit is growing, watered along the outer extremity, where most of the fibrous roots are supposed to be. The kinds grown here, and also in the Rose Hill Nursery, are almost entirely the Hamburgh, with a few of the white Nice for the size of the bunch, and one or two muscats for flavour; but, as the muscats now seldom bring a higher price than the Hamburghs, they are not much grown.

Rogers's Flower-Garden, and Parsons's Flower-Garden, both on the Western Road, have had considerable accessions of glass since we noticed them in our volume for 1829, and we found an increased variety of pelargoniums and new showy greenhouse plants. Both parties have several acres of ground about a mile out of town.

The Market-Gardens which supply the ordinary vegetables to the Brighton market are mostly at the distance of a mile or two in the interior; but the superior vegetables are brought from the neighbourhood of Shoreham, and from different places along the coast as far as Arundel. We saw excellent asparagus, broccoli, cabbage, cauliflower, lettuces, rhubarb, &c. Lettuces of the brown Cos kind were particularly abundant, and chiefly as this variety stands the winter near the sea as well as the common cabbage. We found two excellent kinds of potato in the market, brought from Storrington, not far from Arundel. The one was called the Yorkshire kidney, and the other was a roundish potato, neither of them hollow-eyed, or showing the least symptom of vegetation on June 3d, the day we left Brighton. We learn from the grower, Mr. Linfield, that these potatoes, which are grown in a sandy peaty soil, are kept in pies; that is, buried in pits in dry sandy soil that does not retain water. The flesh of the round potato is yellow, rather waxy than mealy, very solid in consistence, and of an excellent flavour. They may be had of Mr. Linfield, Storrington, or, in Brighton, of Wilkins, a fruiterer in East Street.

There seems a very general taste for keeping pots of flowers in the windows in Brighton, more particularly pelargoniums, and a number of these, with heaths and other plants, are exposed in the market. Among them we noticed some fine double bloody and double yellow wallflowers; a double wallflower, very fragrant, which appeared to be a hybrid between a wallflower and

a Virginian stock, and which, though called French, was, we were informed, first introduced to Brighton by the late Mr. Cobbett of Horse Hill Nursery, near Woking. There is also here a single wallflower called the Harlequin, which bears yellow, dark brown, and nearly white flowers, all expanded at the same time.

The Park is a piece of ground of from 40 to 50 acres in extent, and forming a basin open at one point to the south-east and to the sea, and every where else surrounded by rising ground, which shelters the interior of the basin from the north, west, south-west, and north-east. The area is arranged in such a manner as to be eventually surrounded by a belt of villas, containing from 1 rood to 2 acres each, and all looking on the basin, which is planted as a park, and contains upwards of 20 acres. This park, which will be equally enjoyed by all the surrounding villas, is, in the words of the prospectus for letting the ground, "not to be built upon, but to be left free, and for ever appropriated, as at present, for lawn and plantations." The trees in the park are of ten years' growth, and average from 15 ft. to 20 ft. in height; and, considering the soil and the situation, they are in thriving state. The situation is naturally sheltered; and, when it is farther protected by being surrounded by a belt of villas and their gardens, the trees will admit of being thinned out, when the roots of those which remain, having greater range, and their tops more room, they will grow much faster. Indeed they are at present much too thick, even for an exposed situation. We suspect the ground was not properly prepared at first planting; for, had it been deeply trenched and manured, the trees need not have been planted nearly so thick, and they would have grown much faster. There is also a want of single trees and small groups to break the larger masses, and these ought to be added without delay from the thinnings, each tree being headed in, in the Belgian manner (p. 131.). There is a plan of this park, and a view exhibiting the general appearance which will be produced by the surrounding line of villas, very beautifully lithographed by Hulmandel. There are three entrance-gates, erected from designs by Mr. Barry, all excellent, but more particularly that called St. George's Gate, which calls to mind the portals to the villas in the neighbourhood of Florence. There is a steam-engine in an elegant tower in the highest parts of the grounds, for the purpose of raising water from a deep well, so as to supply all the houses that may be built, even to their upper stories.

Some borders of shrubs and flowers have lately been planted along the outer drive of the park by Mr. Attree, the proprietor, which we notice because they have been very tastefully planted in groups, so as to form masses of the same forms and colours,

and blending into one another at their boundaries. The masses of lavender, rosemary, rue, red valerian, wallflower, rocket, columbine, and other plants which thrive well on chalk, look remarkably well; and among the shrubs Coronílla E'merus was conspicuous, being then in full bloom.

Park Villa, Thomas Attree, Esq., is situated in the upper part of the surrounding belt, and occupies about 2¼ acres. The house, which is in the Italian style, was designed by Mr. Barry, and built under his superintendence. Mr. Barry also designed the architectural garden, terrace walls, and open garden buildings, which form conspicuous ornaments to this villa, whether seen at a distance or from the windows of the house, as a foreground to the park and the sea. The interior of the house is admirably arranged, and the principal apartments are finished in a style of great simplicity and beauty. There is a loggia in the centre of the principal front, with which the smaller drawingroom communicates; and the larger drawingroom looks into a small conservatory or plant cabinet, from which a flight of steps descends to the garden. In consequence of the steepness of the ground, the ascent to the entrance front is only by a few steps, but the garden front, which looks on the architectural flower-garden, is so much lower than the other as to exhibit the windows of the basement story. It is this steepness of the surface which has given rise to so much architectural beauty and variety in this villa and its accompaniments.

The architectural gardens are on three levels. The first, descended to by a flight of steps from the conservatory, has the beds edged with stone, and a handsome basin and fountain in the centre; some pedestals and vases, a handsome open temple or pavilion at one angle, and a massive stone seat at the other. The garden, on two sides, is bounded by a high retaining wall, which has a formidable appearance from below, and is terminated above the level of the garden by a rich parapet surmounted by vases; and this parapet is also continued on one side of the house so far as to connect this central garden with one above it, in which there is a bowling-green, and one below, in which the flower-beds are on turf, and in which there are a number of low ornamental trees and shrubs, besides numerous creepers and roses on the terrace walls. The contrast between the open aërial effect of the upper elevated garden, which has no other boundary than the low parapet on two sides, and overlooks the park with the sea in the distance, and the lower garden, which is surrounded by high architectural walls, and in which the eye is confined to the garden itself and the architectural ornaments which terminate the walls, is excellent; while the bowling-green garden forms a third character, quite distinct from the other two. Besides these three gardens, there are a large arti-

ficial mount thrown up to shelter the house from the south-west, which is covered with shrubs interspersed with walks; a shrubbery combining a fruit border, which leads to another mount with shrubs and walks; and a third walk with glades of lawn and groups of shrubs and ornamental trees, which leads to the kitchen-garden and reserve greenhouse and hotbeds. The beds and shrubberies were remarkably well stocked with flowers, among which the China rose, heartsease, wallflower, and Brompton stock were conspicuous; and under an awning there was a bed of tulips, containing many choice flowers. In short, we were charmed with the beauty and variety of this place, which we visited more than once, and should have wished to have brought away ground plans and sketches for publication, which we hope to do at some other time.

One point practised here by the gardener, who was not brought up to the profession, though not new, is too much neglected. He always keeps a strong reserve of well-grown bushy wallflowers in loamy soil or in pots, and whenever any bed becomes naked in the autumn, he fills it with wallflowers, which, being evergreens, have a lively appearance through the winter; and if the bed is not wanted for other flowers, they make a fine show in April and May, till the beds can be filled with geraniums, verbenas, &c. Many gardeners profess to adopt this plan, but for want of time, or some other cause, neglect it. It ought to be adopted as a rule, that no flower-bed in front of a house should at any time be left naked. It is scarcely necessary to add, that the kinds of evergreens for covering beds in this way should not be confined to the wallflower and the stock, but should be extended to other evergreen herbaceous plants and low shrubs, such as pinks, sweetwilliams, saxifrages, creeping thyme, common thyme, rue, sage, rosemary, periwinkle, tutsan, heaths, box, rhododendron, and all similar plants that may be grown in No. 32 pots, or that, when planted in the common soil of the garden, may be taken up with abundance of fibrous roots, so as not to cause them to flag or check their growth. In some cases the plants may be grown in thin beds of rich loamy soil, bottomed with flagstone; in which case all the roots might be taken up by inserting the spade between the soil and the flagstone, and taking the plants up in masses, like turves, to be laid down where they are wanted. To grow the plants in pots, however, is perhaps the best mode for all those that have ramose roots, such as the wallflower, stock, &c., using the proper means to prevent the roots from growing far through the bottom of the pot, by giving the pot a twist round occasionally. For saxifrages, pinks, &c., the turf-transplanting mode is perhaps preferable. Where the trouble of keeping a reserve of plants cannot be taken, a reserve of turf ought to be maintained for the same purpose.

The Architecture of Brighton is in general of a very inferior description, not so much from want of expense, as of taste. The greater part of the town bears evident marks of having been got up in a hurry; and the elevations are apparently for the most part the work of carpenters or bricklayers. No where are so many pilasters and columns degraded, or so little attention paid to doors or chimney tops. One characteristic of most of the houses, except those which come under the class of third-rate, is a semicircular or segmental bow projected from the front next the street, from the foundation to the summit of the elevation in which the windows are placed. The object is to present an oblique surface to the wind, which, being very violent, is in danger of blowing in the glass. These projections also serve as buttresses to the front; and, were they carried up occasionally one story higher than the rest of the house, they would break the tame uniformity and vulgarity of the sky outline. The walls are very thin, and frequently framed in wood, filled in with a single brick in thickness, and covered externally with what is called brick weather tiling (*Enc. of Cott. Arch.*, p. 228, 229.), which so exactly resembles brickwork, that no stranger could ever detect the difference. Ornamental weather tiling (*Ibid.*) is quite a different style of covering walls, and easily detected. There are symptoms of improvement in the shops; and the terminus of the railway, St. Peter's Church, and Mr. Attree's villa, are examples of good taste, which it is hoped will not be without their effect. The houses at the eastern and western extremities of Brighton are, in many cases, much superior to those in the interior and middle part of the town; and the upper and lower marine terraces at Kemptown, and the esplanades at the west end of the town, are grand and characteristic features. The town is also remarkably clean, and the roads in its neighbourhood, being Macadamised with broken flints from the sea beach, are kept in excellent order; though we cannot help noticing that men were breaking stones by the old mode; that is, by kneeling on a wisp of straw, and breaking the stones as they lie in the heap. The locomotive machine described in our volume for 1829, and which we shall here repeat, is an improvement so obvious that it requires only to be known to be introduced. We first saw this machine (*fig.* 34.) in Nottinghamshire in 1825. The diameter of the stones to be broken is reduced in the quarry, or on the

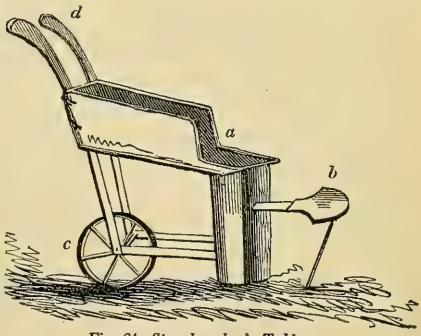

Fig. 34. *Stonebreaker's Table.*

ground, by heavy hammers, so as not to exceed in diameter 5 or 6 inches. They are then placed on a table of a triangular shape (*fig.* 34.), boarded on three sides like a dressing table, but open at the narrow end, which is placed next and in front of the operator, who sits on a stool (*b*), or stands, as he may choose, and has a block between him and the point of the table (*a*), the top of which block is about 6 in. lower than the top of the table. By means of an iron ring fixed into a handle of wood (*fig.* 35.), he draws from the table as many of the stones as the ring will enclose on the block, and then breaks them while still enclosed in the ring, which is held by his left hand. When this is done, then, with another motion of the left hand, he draws them in the ring off the block till they form a heap at one side, or he at once drops them into the handbarrow measure. (*fig.* 36.) To prevent any fragments from getting to his face, he puts on a wire guard or veil (*fig.* 37.), which may be tied by a riband round his head, or suspended from his hat. In the same handbarrow, which serves as a cubic yard measure, stones are conveyed to any distances. The price paid is so much a yard. In some places the breaking apparatus consists of three separate parts, the table, the block, and the stool; in others, the whole is combined in one machine, furnished with a wheel (*fig.* 34. *c*), which serves as one foot when the machine is stationary, and handles (*d*), by means of which it may be moved from place to place as easily as a common wheelbarrow. In some places there is a light triangular frame with thatched hurdles, one for each side, and one for the top, which can be used for protecting the operator from rain, snow, or cold winds.

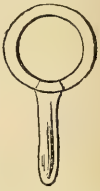

Fig. 35. *Measuring Ring.*

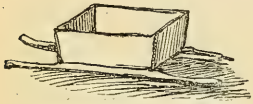

Fig. 36. *Handbarrow Measure.*

Fig. 37. *Wire Guard.*

We consider these contrivances for raising the character of stone-breaking as a fine example of what may be done for man, even in the humblest, most unintellectual, and most monotonous of occupations. An article in the *Journal of the Royal Agricultural Society*, vol. ii. p. 353., published in December last, shows how the labour of keeping roads in repair may be rendered greatly more interesting to the operator, by letting the work at so much per mile, furnishing the operator with certain appropriate articles of clothing, and forming a scale of merit, by which the portions of road under each man is to be tried, and gratuities awarded to them accordingly once or twice a year. How different must be the feelings of men so employed from the feelings of those who have no more interest in the road they are repairing than the horse has in the cart which he drags over it!

Some other gardens in the neighbourhood of Brighton, and some at Shoreham, Lancing, Worthing, Tarring, &c., we must defer noticing till next Number.

Art. III. *Descriptive Notice of Blair-Adam.* By Alexander Mackenzie, Gardener there.

> Where nought but heaths, and ferns, and thistles grew,
> Cedars and pines arise, and flowers of every hue. A. M.

Blair-Adam, remarkable for its extensive plantations, is beautifully situated on the east end of Cleish Hills *, in the county of Kinross, twenty-one miles north from Edinburgh, and twenty south from Perth. In the neighbourhood are many castellated ruins †, once the strongholds of the feudal lords who inhabited them, at whose proud look their vassal slaves obeyed and did them reverence. In the county are two lochs, early mentioned in Scottish history. The first is Loch Ore, about one mile to the east of Blair-Adam, containing upwards of 200 acres, with an ancient picturesque castle in the midst of trees on an island in its centre. About fifty years ago it was all drained, and is now converted into arable and pasturage ground. It is now the property of Sir Walter Scott. Near this place, in A. D. 83, Agricola, having divided his troops into three bodies, one of them consisting of the 9th legion, was so suddenly attacked by the natives that the Romans suffered much loss, and were only rescued by a forced march of Agricola to their support.

The other is Loch Leven, four miles to the north, about ten miles in circumference, of considerable beauty, and abounding in historical interest. It is of an irregular oval figure, and possesses several islets, as well as being surrounded with scenery of a pleasing or imposing kind. It is justly deemed one of the many places in Scotland worthy of a visit from tourists. The chief islands in Loch Leven are two in number, viz. one situated near the shore opposite Kinross, on which are the picturesque ruins of a castle, once dignified by the compulsory residence of the hapless Mary Queen of Scots. The other is called St. Serf's Isle, on which are the ruins of a priory dedicated to St. Serf. In Loch Leven are all the different species of hill, or burn, or river trout to be met with in Scotland. The grounds command beautiful and extensive views, bounded on the north by the Grampians, upwards of 3,500 ft. in height, and on the south by

* There are four lakes among the hills, the largest above a mile and a half in circumference. On Drumglow, the highest of these hills, are the remains of a Roman encampment.

† There are nearly a dozen ancient castles, most of them in ruins, within a few miles, including the romantic scenery of the Rumbling Bridge and the Caldron Linn.

the Pentland Hills, which rise to the height of 1,700 ft. To the east are seen part of the Frith of Forth, with the Bass and North Berwick Law in the distance. During the last century improvements have been carried on to a great extent by the late Lord Chief Commissioner, his father and grandfather, and also by the present proprietor, Admiral Sir Charles Adam, at present commander in chief of the West Indian and North American stations.

Little more than a century ago, before the improvements were begun, there was only one tree, which ever since has gone by the name of *the tree*. It is still standing, but not so large as many of the numerous progeny which have sprung up around it. There are now nearly 1000 acres of thriving plantations, and about sixty miles of roads, rides, and walks, and all in good repair. On the summit and sides of the hills and undulating ground which abound here is seen the lofty silver fir * towering majestically over the surrounding trees of the forest, producing a pleasing effect by relieving that sameness which generally prevails in woodland scenery. The silver fir rises to the height of 90 ft., and attains 13 ft. in circumference.

The house has rather a singular appearance. Additions have been made to it from time to time, and it now forms a square with a court in the centre. There is also a large court in front of the house. It affords much accommodation; there is an excellent library and many fine paintings. To the north-east, about a quarter of a mile distant, lies the garden, nearly six acres in extent. The principal entrance is from the south by a large gate, whence a fine view of the garden is obtained. On the lawn are two fine specimens of the silver fir, upwards of 70 ft. in height, and feathered to the bottom, which have a grand effect, and are greatly admired by all visiters. Near them are two fine specimens of hemlock spruce, 32 ft. in height, with finely formed round heads. To the right of the gate is a group of large silver firs. There are a great many shrubs in the garden shrubbery, chiefly evergreens of great size, which give this part of the garden the character of a winter garden, a desideratum which has often been attempted, but seldom well accomplished.

* The following dimensions were taken for Mr. Loudon when he called at Blair Adam in August last (1841). The largest silver fir measures, at 1 ft. from the ground, 14 ft. in circumference; and, at 4 ft. from the ground, 10 ft. 9 in. There are a great many silver firs which, at 4 ft. from the ground, measure 9 ft., 10 ft., 10½ ft., and 11½ ft. in circumference, and 90 ft. in height. A large beech, and a Scotch elm, at 4 ft. from the ground, measure each 10 ft. in circumference. An evergreen oak, at the same height, measures 7 ft. 4 in., and is 40 ft. high. A hemlock spruce, at 1 ft. from the ground, measures 7 ft. 8 in., above which it divides into two limbs, each of which is 5 ft. in circumference; and the height of the tree is 32 ft. 6 in. In front of the house is a *R*hododéndron pónticum, 60 ft. in circumference, and 12 ft. high.

The garden is divided into two parts by a burn, or small rill, running from west to east. From the north wall to the burn, the ground has a gentle declivity. This part of the garden is devoted to fruit, flowers, and vegetables; while the south part, which has some slight undulations and natural inequalities, is all kept in short grass, and is covered with silver firs, forest, and ornamental trees, placed at irregular distances from each other. The south wall is hid by the large and ornamental shrubbery above mentioned. The north wall is about 20 ft. in height, and 426 ft. in length. It is constructed with flues, which are kept in constant use. At regular distances under the coping are placed brackets, which render it highly ornamental. The gardener's house is in the centre of the north wall. In the south front is a large Venetian window, which is kept uncovered and open to view; the other part is entirely covered with jessamine and China roses entwined. The walk which runs parallel with the north wall is 12 ft. in width. At the east end of this walk there is a door of handsome Doric architecture, entering on a small space intended for a temple.

On the west end there is likewise a door of Doric architecture, chaste in style, which opens upon a small shrubbery; beyond which is verdant pasture ground, well clothed with trees of considerable size. On each side, and on the top of these doors, are placed handsome vases of stone; and also on the south side of the walk are placed Maltese vases on stone pedestals, opposite to each of the brackets on the high wall. The two side walls are 12 ft. in height, and 240 ft. in length, with parallel walks 7 ft. in width. In the centre of the garden, from the gardener's house southward, is a grass walk 16 ft. in width, and joining the lawn on the south side of the garden. On each side are flower-borders 10 ft. wide. The borders on each side of all the walks in the garden are adapted for flowers. The borders next the wall are laid out in beds, and the south border is filled with greenhouse plants, stocks, &c. The length of the flower-borders is 1054 yards, more than half a mile; and the ground so occupied in all makes a flower-garden of nearly one acre. As the vegetables are all hid by the espaliers covered with fruit trees, the enjoyment of the flowers thus united with the kitchen-garden is not broken in upon by the sight of the vegetables. There is an arrangement of herbaceous plants collected and systematically arranged by the late gardener, Mr. Henderson.

The author of *Waverley*, in the *Abbot*, has immortalised a spot on the grounds of Blair-Adam, "A romantic dell well known by the name of Kiery Craigs." When speaking of carriers stopping at certain houses on the road, a long established custom, he says: "Attractions of a kind very different from those which arrested the progress of John Auchtermuchty and

his wains still continue to hover round the romantic spot; and none has ever visited its vicinity without a desire to remain long, and to return soon."

Blair-Adam may be taken as a specimen of what cultivation, combined with refined taste, can do to beautify, enrich, and adorn, even a wild unsheltered moor.

Blair-Adam, June 1. 1842.

[Sir Walter Scott, as member of the "Blair-Adam Club," spent a few days here about midsummer every year from 1816 to 1831 inclusive. The club generally met on a Friday, and the members returned to Edinburgh early on Tuesday to attend the courts. The mornings were spent (Sunday excepted) in visiting the scenes of high historical interest in the neighbourhood; and to these visits we owe the splendour of many of Scott's romantic descriptions, particularly of Loch Leven, Macduff's Cross, &c., as well as the weightier obligation of the *Abbot* in the dog-days of 1819. At the suggestion of Sir Walter, the Lord Chief Commissioner arranged materials for "The History of Blair-Adam, from 1733 to 1834," in which he gives a most instructive as well as entertaining history of the agricultural and arboricultural progress of the domain in the course of a hundred years. This *liber rarissimus* is unfortunately not open to public inspection.— *Life of Scott.*]

The book above referred to is thus noticed in Sir Thomas Dick Lauder's edition of *Price on the Picturesque.* The note is long, but we quote it entire, because it is extremely interesting, and also instructive. It will serve also as a specimen of the notes which Sir Thomas Dick Lauder has added to Sir Uvedale Price's work.

"Before proceeding to plant the grounds of a place ornamentally, it is necessary carefully to study its character, to become thoroughly acquainted with the various inequalities of its surface, to consider also the different soils which present themselves, and, after well digesting all these particulars, let the improver then bestow some thought upon the question how Nature would have done the work, had she been pleased to have executed it. Here I am presupposing the existence of two things; first, that the place has some variety of surface; and secondly, that the improver has studied the wooding of nature, which is still abundantly to be met with in all the wilder parts of our own country, especially in Wales or in the Highlands of Scotland, as, for example, in the valleys running down in all directions from the Grampians, where the beauty of the natural woods is so very remarkable. If the place is so utterly devoid of variety of surface as to be absolutely a dead flat, and if it has no timber on it already, the existing arrangement of which might suggest to the improver some design for ultimately producing intricacy and interest, I should be disposed to advise the proprietor to fix his residence elsewhere. But if he is reduced to the necessity of settling there, by having no other choice, I should say that the best advice that can well be given him is, to plant and spare not; so that, although he may be able to do nothing very effectual

in producing beauty, he may at least have the gratification of seeing his trees grow, with the hope of leaving behind him something which his son or his grandson may work into a place. He should always bear in mind that trees are more easily removed than reared, and that there is more hope of a place where the house stands in the middle of a forest, than there can be where it appears staring in the midst of a bare plain, without a single tree within view. But in planting—whether in the smaller groves or larger woods, the different kinds of timber trees should not be mixed, so as to produce one general *uniformity of variety*, if I may so express myself; but, for the most part, though perhaps not always, the individuals of each kind should be grouped together in considerable masses, irregular both in form and size. The trees, moreover, should be planted at such distances from each other as may enable them, when grown up, to stand without risk of much interference with each other, being well intermixed with hollies, thorns, yews, hazels, mountain-ash, elders, bird-cherries, junipers, and all the different kinds of trees and bushes of smaller growth. These should especially prevail about the edges of the grove or wood, and they should likewise be planted as much as possible in patches of the same plants. In short, the plantations of nature should be imitated as nearly as may be. The woods at a distance from the site of the house should be of larger dimensions, and they should partake more of the character of groves as they draw nearer to it; and as they get smaller in size, the variation of the trees of which they are composed may become more frequent, and the groves and woods should be so arranged as that they may play upon one another as you move among them,—those nearer to the eye shifting upon those that are more distant, so as to give the idea of continuity, whilst, at the same time, the eye may have full permission to find its way in among them in different parts. And as I should rather prefer an over-doing than an under-doing of wood at first, so I should wish the proprietor to be early alive to the necessity of making frequent inroads upon the outline of his groves and woods, by carrying glades into them in certain places and loosening their edges in others, so as by degrees to give air, that is, relative distance, as well as nature, to the whole scene. But the attempt to convert so utterly flat and unfavourable a subject as that which we have now supposed to exist is rarely to be made.

"Then, if the improver has never enjoyed the opportunity of studying the manner in which nature plants, he will labour under great disadvantages, and must even make up the deficiency by availing himself as largely as he can of the study of the works of the best landscape-painters, modern as well as ancient.

"But, granting that the place which is to be improved is blessed with some degree of variety of ground, though it should even be altogether without any other requisite, plantation alone may in time give wonderful charms to it. For then the sides of the steeps may be covered with woods, the trees of which may be brought feathering loosely down from the denser parts, and scattered in irregular confusion upon the sloping lawns. Dingles and dells may be made mysteriously intricate and interesting, by filling them with dark woods and tangled thickets in one place, and leaving natural openings of fairy-like turf in others, on which the richest mellowed lights may fall. Groves and dense coverts may clothe the knolls, and straggle towards one another with a species of broken continuity, so as to leave no mass in a staring and isolated condition, and the whole may thus be made to resemble a portion of one of nature's own wild woodland scenes.

"The question will naturally arise, how many years must elapse before such a change could be effected on a perfectly treeless place? The answer to this question will naturally depend upon the nature of the soil and the degree of liberality of expenditure which the proprietor may be disposed to lay out upon its plantation. But, even under circumstances the least favourable, it may be answered by any one who has had the good fortune to read a most interesting volume called the *Blair-Adam Book*, written and printed, though not

published, by my venerable and highly respected friend, the late Right Honourable William Adam, Lord Chief Commissioner of the Jury Court in Scotland. The origin of this work is thus graphically recorded in its own pages:—'It was on a fine Sunday, lying on the grassy summit of Bennarty, above its craggy brow, that Sir Walter Scott said, looking first at the flat expanse of Kinross-shire (on the south side of the Ochils), and then at the space which Blair-Adam fills between the hill of Drumglow (the highest of the Cleish Hills), and the valley of Lochore, "What an extraordinary thing it is, that here to the north so little appears to have been done, where there are so many proprietors to work upon it, and to the south, here is a district of country entirely made by the efforts of one family in three generations, and one of them amongst us in the full enjoyment of what has been done by his two predecessors and himself; Blair-Adam, as I have always heard, had a wild, uncomely, and unhospitable appearance before its improvements were begun. It would be most curious to record in writing its original state, and trace its gradual progress to its present condition." The idea thus suggested by Sir Walter Scott so pleased the Chief Commissioner, that he resolved to carry it into effect, and thus was the *Blair-Adam Book* produced.

"Before the year 1733, the property of Blair-Adam, lying in an extremely dull and unpromising country, which might be said to be entirely destitute of wood, had but one solitary ash tree upon it. The author of the book divides the history of the progress of its improvement from this truly hopeless state into three distinct eras, viz:—that from 1733, when his grandfather William Adam began his operations, to 1748, when he died—the second era, that from 1748, when his father John Adam, succeeded, to 1792, when he died—and the third, from 1792, when the late Lord Chief Commissioner succeeded, to the date of writing the book in 1834. To explain more perfectly the extent of beneficial change produced on the property during these different eras, the work is illustrated with four plans.

"The first of these plans shows the state of the property before 1733, with that single tree upon it, in which it had then so much reason to rejoice.

"The second exhibits the state of the property, as left by the grandfather, in 1748.

"The third represents it, as left by the father, in 1792.

"And the fourth gives the whole improvements on the estate as executed up to 1834, and consequently it furnishes a valuable example of what may be accomplished in the course of a century. There being now about 900 acres of wood, great part of which is well-grown timber, yielding, without any sacrifice of beauty, a very considerable revenue.

"Mr. William Adam, the grandfather, adopted that formal style of planting which prevailed in his time, so that the second plan, which shows the state of the property at his death, is covered with straight hedgerows, bisecting each other at right angles; long avenues regularly lined off, each mathematically to correspond with the other; and in certain places circles, some of solid plantation surrounded by lawn, and others of open lawn surrounded by a circle of trees. A reference to the third plan, that of 1792, shows that John Adam, the father, had not only very much increased the plantations, but that he had succeeded in destroying the formality of the place as left by his father, as well as in giving to it a considerable degree of intricacy and interest. But the fourth plan, that of 1834, proves that the Lord Chief Commissioner added both to the extent of the timber on the estate and to the beauty of the place, in a still greater degree.

"In thus so particularly noticing Blair-Adam, I by no means desire to bring it forward as a perfect specimen of landscape-gardening. Its late venerable and highly gifted owner himself considered it in no other light than as a *terre ornée*, where agriculture and the necessary evils of its accompanying fences, were objects of too great importance to be sacrificed, and which consequently fettered the hands of taste, though even these were executed with unusual care and judgment. My reason for selecting Blair-Adam is rather to show

how much may be made of a place of the most unfavourable promise, by planting perseveringly, and with some attention to the nature and form of the ground. Where it has been possible, without sacrificing utility, to introduce touches of beauty, such favourable opportunities have not been neglected, but have been rendered successfully available. I need not particularise instances, but I may mention the Glen, and the Burn, and the Kiery Craigs, all of them objects of little interest until rendered interesting by the beautiful manner in which they have been wooded, as well as the fruit-garden, which, though walled on three sides, has been converted into a most interesting spot, by the manner in which it has been enclosed on the south side, and in a great measure surrounded by a wilderness, in which is to be found intermixed a profusion of evergreen trees and shrubs of remarkable growth. Were it a matter of prudence to make a large sacrifice of income to absolute taste, often in itself unprofitable, I should say that Blair-Adam is now in that very state in which a judicious landscape-gardener, with full powers and means allowed him, might produce the happiest effects in the shortest period of years, and with the least comparative labour, so as to introduce the appearance of perfect nature into every part of it.

"It is somewhat remarkable that it should have fallen to the lot of the same individuals of the same family, I mean William and John Adam, the grandfather and father of the Chief Commissioner, to create and alter another place in the same way as they did Blair-Adam. This was the small property of North-Merchiston, near Edinburgh. It consisted of a square field of about thirty acres, which was surrounded by a wall and planted by the grandfather with a circle in the centre, which had four regular avenues breaking off from it in four different directions. One of these avenues terminated in a straight row of trees running at right angles to it and flanking a broad walk ending with a lime tree on each side. The vista to this walk to the east was the castle of Edinburgh, and the tower of St. Giles's Church, and the house was placed at the western end of it. John Adam broke up his father's formal lines here, as he did at Blair-Adam, and, from what I recollect of the place when I visited it as a boy, the effects of his operations were very pleasing. From the intimacy that subsisted between Mr. Adam and Shenstone, whom he visited at the Leasowes, it seems to be doubtful whether the poet's formation of that celebrated place was not materially assisted, if not suggested, by the hints which he received from his Scottish friend. The place of North Merchiston afterwards passed into other hands, and it has since been much demolished by having its timber greatly diminished, and the Edinburgh and Glasgow Canal carried directly through it, so as to subdivide it. But injured as it has been, there yet remains enough of beautiful features about it, to encourage a proprietor of taste to give it such restoration as might yet convert it into a very delightful villa; and the rich distant views which it commands add much to the temptation to commence such an undertaking.

"In considering the effects of the growth of plantation during a century as exhibited at Blair-Adam, it must be remembered that a much shorter period of active and judicious planting may produce changes the most satisfactory, so as richly to reward the proprietor who may have so employed his time and money, both by the pleasure and the profit he may reap during many years of his own life. This, of course, will be more easily accomplished if ancient trees or older woods have chanced to exist already, especially if they do so amidst a variety of surface, and a favourable combination of natural features. I could mention many places where the proprietors who made the plantations on them still live in green vigour, to enjoy the daily improving effects of their earlier operations. But the seat of a friend, which I have had occasion lately to visit, is at this moment particularly in my mind, as a most pregnant example of this. I mean Blairquhan in Ayrshire, the residence of Sir David Hunter Blair, Bart. There the situation is peculiarly favourable from the variety of form of the surrounding grounds and the shapes of the retiring hills; from the noble ancient trees that exist in the vicinity of the house, as

well as from the stream of the Girvan and its romantic glen, up which you approach the wider valley, where the mansion stands on its elevated side. But the great extent of judiciously planted and well-grown woods, which Sir David has created within the short period of thirty years, has already had the effect of giving a noble magnitude to the demesne. It may now be said to be in that stage of advancement when the happiest results may be anticipated; and these will certainly be produced by the gradual destruction of the hard lines inevitably occasioned by fences, the loosening of the edges of woods and groves, the introduction of glades in certain parts of them, and perhaps by the enrichment of portions of the more open lawns by partial plantations.

"I may likewise notice Dunskey, near Portpatrick, a place belonging to Colonel Hunter Blair, brother to Sir David, which affords, if possible, a still more remarkable example of what may be done by plantation, even in apparently the most unfavourable circumstances. About 800 acres of thriving wood having been got up there within a very short period of time, on ground generally much elevated and exposed to the whole blast from the Irish Channel. In the Island of Islay, also, Mr. Campbell of Islay, though a young man, has in his own time raised about 1300 acres of wood, and he has now the satisfaction of being able to drive for miles under the shade of thriving trees of his own rearing.

"To conclude the few remarks which I have ventured to subjoin to those of Price upon planting, I shall only add that the effects sought to be produced by the mixture of the different varieties of trees and shrubs must be much guided by the comparative greatness or smallness of the place on which the improver is operating, minute attention to the introduction of particular kinds being more admissible in a smaller place or in the smaller or more observed parts of a larger place, than in other positions. On this particular point Mr. Wheatley speaks most sensibly—as indeed he does on planting in general:—'All these inferior varieties,' says he, 'are below our notice in the consideration of great effects; they are of consequence only where the plantation is near to the sight; where it skirts a home scene or borders the side of a walk; and in a shrubbery which in its nature is little both in style and in extent they should be anxiously sought for. The noblest wood is not indeed disfigured by them; and when a wood, having served as a great object to one spot, becomes in another the edge of a walk, little circumstances varying with ceaseless change along the outline will then be attended to; but wherever these minute varieties are fitting, the grossest taste will feel the propriety, and the most cursory observation will suggest the distinctions: a detail of all would be endless, nor can they be reduced into classes. To range the shrubs and small trees so that they may mutually set off the beauties and conceal the blemishes of each other; to aim at no effects which depend on a nicety for their success, and which the soil, the exposure, or the season of the day may destroy; to attend more to the groups than the individuals,—and to consider the whole as a plantation not as a collection of plants, are the best general rules that can be given concerning them.'

"One remark more, and I have done with this part of the subject. Nothing can be more unwise than to trust to delicate foreign trees or shrubs for the production of important effects, which may thus be all ruined by the destructive cold of some severe winter. Such tender strangers may be well enough introduced experimentally; but they should have places assigned to them where their failure may produce no serious blank, if they should unfortunately perish.

"I shall offer but a single word on the subject of lawns. Levelling, smooth shaving, and rolling, are operations only admissible close to the house; and even there it is better that it should be associated with terraces, bowling-greens, flower-knots, and such minor pieces of formality as are in keeping with that of the architecture. Everywhere else the lawns should be in rich and natural-looking pasture, especially where they begin to sweep away under trees, or to lose themselves in the woodlands. In such places, some of the

more graceful wild plants, such as those of the fern tribe, the great tussilago, and others, may occasionally be permitted to show themselves, and even tufts of whins may not be altogether out of place. And as it is well known that the best way to produce good pasture, is to put a great variety of animals upon it; so by having groups of cattle, horses, sheep, goats, and even asses, constantly grazing together, you will not only thereby insure the richness of the surface, but you will also add to the interest of your scenery by the variety of the living objects which will thus be seen giving animation to it."

[In an open glade in the shrubbery, surrounded by evergreens, a handsome pedestal contains the following inscription, which was copied for us by Mr. Mackenzie last year.]

WILLIAM ADAM
(BORN 1688, DIED 1748) BEGAN, IN 1733,
WITH A SPIRIT OF ENTERPRISE, AND WITH FORECAST GREATLY IN ADVANCE
OF THAT AGE, TO IMPROVE AND PLANT THIS DOMAIN,
THEN A WILD UNSHELTERED MOOR.

JOHN ADAM,
THE SON OF WILLIAM, (BORN 1721, DIED 1792)
WITH DISTINGUISHED TASTE,
EXTENDED THE IMPROVEMENTS AND ENLARGED THE WOODS.
IN 1751 HE BEGAN, AND IN 1761 HE COMPLETED, THE GARDEN,
WHICH HAS BEEN PRESERVED WITHOUT CHANGE OF DESIGN OR ALTERATION
OF EFFECTS,
EXCEPT WHAT GROWTH HAS PRODUCED.

A CENTURY AFTER THE IMPROVEMENTS WERE BEGUN,
WILLIAM (THE SON OF JOHN), AGED 82.
COMPOSED THIS INSCRIPTION AND PLACED IT HERE, A. D. 1833.

Art. IV. *The Powers of Vegetation.* By Charles Waterton, Esq.

In those good days of old, when there were no corn-factors in England to counteract that part of our Redeemer's prayer, "Give us this day our daily bread," by hoarding up vast stores of grain, until mouldiness and vermin have rendered it unfit for the use of man, there stood at Walton Hall a water-mill, for the interest of the proprietor and the good of the country round. Time, the great annihilator of all human inventions, saving taxation and the national debt, laid this fabric low in ruins some sixty years ago; and nothing now remains to show the place where it once stood except a massive millstone, which measures full 17 ft. in circumference. The ground where the mill stood having been converted into meadow, this stone lay there unnoticed and unknown (save by the passing hay-maker) from the period of the mill's dissolution to the autumn of the year

1813, when one of our nut-eating wild animals, probably by way of a winter store, deposited a few nuts under its protecting cover. In the course of the following summer, a single nut having escaped the teeth of the destroyer, sent up its verdant shoot through the hole in the centre of the procumbent millstone.

One day I pointed out this rising tree to a gentleman who was standing by; and I said, "If this young plant escape destruction, some time or other it will support the millstone, and raise it from the ground." He seemed to doubt this.

In order, however, that the plant might have a fair chance of success, I directed that it should be defended from accident and harm by means of a wooden paling. Year after year it increased in size and beauty; and when its expansion had entirely filled the hole in the centre of the millstone, it began gradually to raise up the millstone itself from the seat of its long repose. This huge mass of stone is now 8 in. above the ground, and is entirely supported by the stem of the nut tree, which has risen to the height of 25 ft., and bears excellent fruit.

Strangers often inspect this original curiosity. When I meet a visiter whose mild physiognomy informs me that his soul is proof against the stormy winds of politics, which now-a-days set half the world in a ferment, I venture a small attempt at pleasantry, and say, that I never pass this tree and millstone without thinking of poor old Mr. Bull, with a weight of eight hundred millions of pounds round his galled neck; — fruitful source of speculation to a Machiavel, but of sorrow to a Washington.

Walton Hall, June 1. 1842.

Art. V. *On the Atmosphere in Houses.* By R. Lymburn.

The necessity of keeping up the atmosphere in houses to a proper degree of moisture, and of varying the degree of moisture according as growth, or ripening, or fruiting is wanted in the same plant, or according to the different necessities of different plants for that aliment, has been frequently and ably pointed out in the Magazine. On this account it has become a great desideratum, to be able to ascertain how far the air in houses is below the point of saturation. The method pointed out by Professor Thomson, in his *Treatise on Heat*, is so simple and easily understood, and so accurate (the professor says, on repeated trials he has found the results more correct than from Daniel's hygrometer, or Jones's thermometer converted into a hygrometer), that I have thought it might interest such of your readers as have not the benefit of reference to that work to have it detailed; the more so as I do not recollect to have ever seen it

alluded to in the pages of your Magazine, which is a record of so many valuable inventions.

It proceeds on the fact, ascertained long ago, that if a piece of glass one degree colder than the atmosphere be surrounded with air saturated with moisture, dew will be deposited upon it. All that is necessary is to provide a plain tumbler, the *thinner* in the glass the better, and a jug of water a few degrees colder than the air of the house; cold spring water should be best. Pour the water into the tumbler, the glass will immediately be cooled down below the air of the house; and dew will be deposited on the sides of the tumbler, till the heat of the water rises up to the point to which the air of the house is saturated. To ascertain this point, continue to pour the water from the tumbler into the jug, wiping the tumbler carefully on the outside with a dry towel, and again pouring the cold water back into the tumbler, watching carefully the moment that dew ceases to be deposited on the outside of the tumbler; and a thermometer, plunged into the water precisely at that period, will denote the point to which the air of the house is saturated. Unless where great accuracy is required, it may perhaps be sufficient to wipe the outside of the tumbler, and continue to do so so long as moisture is deposited. To pour the water in and out from the jug and tumbler is more troublesome, but more correct. The thinner the tumbler, and the more alkaline the glass, the more quickly will dew be deposited, and the more perfect the result. The thermometer in the house will tell the temperature of the air; and the difference between it and the temperature of the water, at the moment dew ceases to be deposited on the glass tumbler, will point out how many degrees the moisture in the air is below the point of saturation.

The quantity of vapour which can exist in the air at either of the above-mentioned degrees, or any other between the freezing and boiling point, may be known by consulting the table annexed; which shows the elasticity of vapour, as ascertained by the experiments of Mr. Dalton, and which, though slightly differed from by others, will be sufficiently accurate for all ordinary purposes. Water, and many other liquids, have a tendency to assume the form of vapour at all temperatures; but the quantity is regulated by the degree of heat which keeps the particles of vapour asunder, and gives them elasticity. The quantity of vapour which can exist in the atmosphere is therefore regulated by the elasticity of that vapour. The mean height of the barometer at the sea shore in this country is 30 in. nearly, or 29·82. As shown by the annexed table, at 32° (the freezing point), the vapour of water is capable only of supporting a column of mercury 0·2 in. in height; consequently, this being only the 5th part of an inch, the air at the freezing point is only capable of con-

taining the 5th part of 30, or the 150th part of its volume in the state of vapour, of water. At 212° the vapour of water is capable of supporting 30 in. of mercury, consequently at that temperature the whole volume might be water; at 179½° the table would denote about 15 in. of elasticity, or a capability of containing one half; at a little above 162°, a 3d part, or 10 in.; at 80°, 1 in. of elasticity, or a capability of containing a 30th part of its volume in water, in the state of vapour. The amount of capability for any degree of heat may be thus ascertained, by making the elasticity in the annexed table the numerator of a fraction, of which 30 is the constant denominator.

Elasticity of Vapour in Inches of Mercury, from 32° to 212°, according to Mr. Dalton.

Temperat.	Elast. of Vapour.	Temperat.	Elast. of Vapour.	Temperat.	Elast. of Vapour.	Temperat.	Elast. of Vapour.	Temperat.	Elast. of Vapour.	Temperat.	Elast. of Vapour.
32°	0·200	62°	0·560	92°	1·44	122°	3·50	152°	7·81	182°	15·86
33	0·207	63	0·578	93	1·48	123	3·59	153	8·01	183	16·23
34	0·214	64	0·597	94	1·53	124	3·69	154	8·20	184	16·61
35	0·221	65	0·616	95	1·58	125	3·79	155	8·40	185	17·00
36	0·229	66	0·635	96	1·63	126	3·89	156	8·60	186	17·40
37	0·237	67	0·655	97	1·68	127	4·00	157	8·81	187	17·80
38	0·245	68	0·676	98	1·74	128	4·11	158	9·02	188	18·20
39	0·254	69	0·698	99	1·80	129	4·22	159	9·24	189	18·60
40	0·263	70	0·721	100	1·86	130	4·34	160	9·46	190	19·00
41	0·273	71	0·745	101	1·92	131	4·47	161	9·68	191	19·42
42	0·283	72	0·770	102	1·98	132	4·60	162	9·91	192	19·86
43	0·294	73	0·796	103	2·04	133	4·73	163	10·15	193	20·32
44	0·305	74	0·823	104	2·11	134	4·86	164	10·41	194	20·77
45	0·316	75	0·851	105	2·18	135	5·00	165	10·68	195	21·22
46	0·328	76	0·880	106	2·25	136	5·14	166	10·96	196	21·68
47	0·339	77	0·910	107	2·32	137	5·29	167	11·25	197	22·13
48	0·351	78	0·940	108	2·39	138	5·44	168	11·54	198	22·69
49	0·363	79	0·971	109	2·46	139	5·59	169	11·83	199	23·16
50	0·375	80	1·00	110	2·53	140	5·74	170	12·13	200	23·64
51	0·388	81	1·04	111	2·60	141	5·90	171	12·43	201	24·12
52	0·401	82	1·07	112	2·68	142	6·05	172	12·73	202	24·61
53	0·415	83	1·10	113	2·76	143	6·21	173	13·02	203	25·10
54	0·429	84	1·14	114	2·84	144	6·37	174	13·32	204	25·61
55	0·443	85	1·17	115	2·92	145	6·53	175	13·62	205	26·13
56	0·458	86	1·21	116	3·00	146	6·70	176	13·92	206	26·66
57	0·474	87	1·24	117	3·08	147	6·87	177	14·22	207	27·20
58	0·490	88	1·28	118	3·16	148	7·05	178	14·52	208	27·74
59	0·507	89	1·32	119	3·25	149	7·23	179	14·83	209	28·29
60	0·524	90	1·36	120	3·33	150	7·42	180	15·15	210	28·84
61	0·542	91	1·40	121	3·42	151	7·61	181	15·50	211	29·41
										212	30·00

The other requisites to be known as to how far the dew point of the house should be maintained below that point of complete saturation, and the quantity of surface of water required to be exposed to maintain the proper degree of moisture, varies so much with different plants and states of plants and capacities of houses, and has already been so ably explained in the Magazine by Mr. Rogers and others, that nothing need be added on that head. — *June* 3. 1842.

ART. VI. *Notice of Four new Plants, discovered in the South Sea Islands by the late Mr. James Corson, Surgeon.* By GEORGE DON, Esq., F.L.S. *With a Biographical Notice of Mr. Corson,* by the CONDUCTOR.

MR. JAMES CORSON was the son of one of those highly respectable Scotch gardeners, who, on very moderate salaries, contrive to give their children such an education as to fit them for qualifying themselves, by subsequent self-instruction, for any station they may be afterwards destined to occupy. He was born at Dalscairth in Dumfriesshire, where his father was gardener to a family of the name of Douglas, and he was educated at the parish school. Before he was twenty years of age, he was competent to become usher in the school of Mr. Stockdale of Whitehaven, where he remained till, in consequence of our advertising for an amanuensis, he was engaged by us in that capacity in 1836, and he continued with us till the beginning of 1838. Having always had an ardent desire to acquire a knowledge of surgery, he attended the class of G. D. Dermott, Esq., of Charlotte Street, Bloomsbury, in the evenings, and very soon became a great favourite with his instructor. His medical reading kept pace with his practice in the dissecting-room; and so rapid was his progress that in 1838 he was considered competent to fill the office of surgeon to a South Sea whaler. He was accordingly engaged by Captain Benson, the master of the Kitty, and sailed with him from the Thames in the autumn of 1838.

Nothing particular occurred in the voyage, except that one man had his leg so mangled by the bite of a shark, that amputation became necessary; and the operation was performed by Mr. Corson in so satisfactory a manner, that the patient recovered completely in the course of nine weeks. On their way home, Mr. Corson was unfortunately attacked by intermittent fever, which carried him off in fourteen days, on the 16th of June, 1841, in the 27th year of his age. His remains were interred in the Island of Timor, in the Dutch burying-ground, where a stone was erected to his memory by his captain, to whom, and to the whole ship's crew, he had greatly endeared himself by his meek, affectionate, and amiable disposition.

The following extract is from a notice of the death of Mr. Corson, which appeared in the *Cumberland Pacquet* of February 8th, 1842:—"We regret that we are unable, within our present limits, fully to commemorate the excellence of this highly gifted and meritorious young man. He was born at Dalscairth, in humble circumstances, and by his own unaided efforts had gained the position he last occupied, as surgeon of the above-named vessel. His mind was of a very superior order, and his perse-

verance in the pursuit of knowledge most animated and untiring. He was well versed in the ancient classics, an expert mathematician, and acquainted with several of the languages of modern Europe; and had, besides, made considerable progress in various departments of natural science, by his ardent devotion to which he was, undoubtedly, in a great measure, led to engage in the perilous occupation in which he met his fate."

We can add our testimony to that of the author of the above paragraph. Mr. Corson was indefatigable in industry, and most assiduous in all his duties; and from his amiable disposition he acquired the esteem and regard of all our family, who may be truly said to have felt as much at hearing of his loss as if he had been a relation.

Previously to Mr. Corson's sailing with Captain Benson, through the kindness of the late Professor Don, Dr. Brown, and others, he had received instructions for collecting and drying plants, and collecting and preserving shells, seeds, &c., and of each of these he accumulated a considerable number. Among the shells were some very fine specimens; and among the plants Mr. George Don has discovered four new species, of which the characters are given below, and the specimens from which they were taken are deposited in the herbarium of the Linnæan Society. The shells were distributed among his friends, and, as one of these, we have retained duplicates of between forty and fifty species for Mrs. Loudon's cabinet. The seeds we have divided between the Horticultural Society of London and the Caledonian Horticultural Society; and the specimens we have sent to Mr. M'Nab, jun., to be presented by him to the Edinburgh Botanical Society.

Plants discovered by Mr. James Corson, and named by George Don, Esq., F.L.S.

1. *Elæocárpus Corson*iànus (G. Don, MS.). Ferrugineo-pubescens, foliis oblongo-obovatis integerrimis obtusè acuminatis basi subcordatis supra glabriusculis, racemis axillaribus lateralibusque multifloris, segmentis calycinis lanceolatis, filamentis brevibus pubescentibus, antheris uniaristatis, ovario piloso. ♄ Hab. Batagoda. Corson, 1839.

   [*Elæocárpus Corson*iànus (G. Don, MS.). Corson's Elæocarpus. Clothed with rust-coloured pubescence; leaves oblong-obovate, quite entire, bluntly acuminated, somewhat cordate at the base, almost glabrous on the upper surface; racemes axillary and lateral, many-flowered; calycine segments lanceolate; filaments short, pubescent; anthers furnished each with a single awn; ovarium pilose. ♄ Batagoda. Corson, 1839.]

2. *Scæ'vola Corson*iàna (G. Don, MS.). Herbacea, foliis oppositis oblongis integerrimis acuminatis glabriusculis, cymis axillaribus dichotomis bracteatis, calycibus corollisve pubescentibus. ♃ Hab. Insula Geby. Corson Jan. 1840. Fructus capsularis, bilocularis. Petiolus pubescens. Flores albi. Affinis S. oppositifòlio *Roxb.*

   [*Scæ'vola Corson*iàna (G. Don, MS.). Corson's Scævola. Herbaceous; leaves opposite, oblong, quite entire, acuminated, nearly glabrous; cymes axillary, dichotomous, bracteate; calyxes and corollas

pubescent. ♃ Native of the Island of Geby. Corson, Jan. 1840. Fruit capsular, two-celled. Petioles pubescent. Flowers white. Allied to S. oppositifòlia of Roxb.]

3. L*ithospérmum Corson*iànum (G. Don. MS.). Erectum hispido-strigosum apice ramosum, foliis linearibus, spicis binis terminalibus bracteatis, segmentis calycinis acuminatis, tubo corollæ calyce æquali. ⊙ Hab. Batagoda. Corson, 1839. Herba annua, basi simplex, 4—5 uncialis. Flores parvi, lutei.

[*Lithospérmum Corson*iànum (G. Don, MS.). Corson's Lithospermum. Erect, hispid from strigæ, branched at top; leaves linear; spikes twin, terminal, bracteate; calycine segments acuminated; tube of corolla equal in length to the calyx. ○ Native of Batagoda. Corson, 1839. Herb annual, simple at the base, 4 or 5 inches high. Flowers small, yellow.]

4. *Zàmia Corson*iàna (G. Don, MS.). Squamis strobili cuneatis apice supra incurvo-uncinatis. ♄ Hab. ? Cætera ignota.

[*Zàmia Corson*iàna (G. Don, MS.). Corson's Zamia. Scales of strobile cuneated, each with an incurved hook at top, on the upper face. ♃ Native country, as well as all other particulars, unknown.]

Bayswater, June, 1842.

SHELLS COLLECTED BY MR. CORSON.

The following names include most of the genera:—

Tritònia variegàta, Hárpa ventricòsa, Dòlium oleàrium, Nássa 3 sp., Ricínula 3 sp., Térebra maculàta and babylónica, Pteróceras laciniàtus, Aphorràis pes-pelicàni, Strómbus many sp., Cònus millepunctàtus and other species, Columbélla several sp., Ceríthium sp., Pirèna terebràlis, Volùta several sp., Púrpura, Búccinum sp., Mìtra sp., Cypræ'a several species (particularly the money cowry), Olìva sp., Ancillària sp., Turritélla sp., Túrbo several species (from a very large size to a very small one), Delphínula (dolphin shell), Tròchus several species, Haliòtis sp., Pátula several species (particularly a beautiful specimen of the tortoiseshell limpet), Chìton squamòsus, Búlla sp., Naútilus Pompílius, Sòlen or razor-shell, Venus shells, Híppopus, Tridácna (formerly included in the genus Chàma), A'rca, Avícula, Pínna, Lìma, Málleus vulgàris (the hammer oyster), Ranélla neglécta, Mùrex several species, Monodónta or Odonìtis làbeo, Fissurélla òriens, Nerìta, Fùsus Còlus, Fasciolària trapèzium, Scárabus ímbrium, Pótamis muricàta, and many others.

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

BOTANY, being Part of a Popular Cyclopædia of Natural Science, published by the Society for the Promotion of Popular Instruction. 8vo, pp. 301. to 536. London, 1842.

Of the previous part of the volume, which treats of vegetable physiology, we gave a summary of the contents in our Volume for 1841, p. 327. The following advertisement, prefixed to the part now before us, will give the reader an idea of what he is to expect.

"The object of the following treatise is to communicate a popular, but at the same time a scientific, view of the chief tribes of flowering plants, arranged according to the Natural System. The author is not aware that any similar attempt has been heretofore made, to embody this arrangement in a

work of a strictly elementary character, except in the useful but expensive 'Ladies' Botany' of Dr. Lindley, which he would strongly recommend to such of his readers as can gain access to it. Being persuaded, however, that through the aid of this system alone can any definitive idea be gained, of the vast extent and varied aspect of the vegetable kingdom, he has not hesitated to employ it here. In his selection of orders, he has regarded those as having the best claim to notice, which contain plants of greatest importance to man, or which present some remarkable peculiarities of structure or habit; a few, however, which possess neither of these distinctions, have been introduced, as containing well-known British plants, or on account of their great abundance in particular spots of the globe. The Cryptogamia have not been treated of in this part, since a popular view of their character was included in the former one, and further details would not have possessed sufficient interest."

Both the letterpress, and the cuts are chiefly taken from Dr. Lindley's *Ladies' Botany* and *School Botany*.

Elements of Agricultural Chemistry and Geology. By James F. W. Johnston, M.A., F.R.S., Honorary Member of the English Agricultural Society; and Author of "Lectures on Agricultural Chemistry and Geology." 12mo, pp. 237. Edinburgh and London, 1842.

Of all the different works which have lately been published on the chemistry of agriculture, that now before us appears to be the most likely to be of real service to the practical man. It is clear and comprehensive, without being needlessly profuse; and what gives the practical farmer a direct interest in every statement is, that its application to culture or produce is pointed out in such a manner as to be clearly understood. In a word, Professor Johnston is at once a scientific and a popular writer. This little work is to be considered as a familiar outline of the subjects of agricultural chemistry and geology, which are treated of more at large in the professor's *Lectures*, now publishing in numbers; and we have no doubt it will induce many persons to procure and study the *Lectures;* who, without the fascination, if we may so term it, of the *Elements*, would never have ventured upon the task of studying the larger work.

The author commences by pointing out the distinction between the vegetable or organic parts of plants, and the earthy or inorganic. The latter are discovered by the ash left after burning. The quantity of ash left by a ton of wheat straw is sometimes as much as 360 lb.; while a ton of the grain of wheat leaves only about 40 lb.; and a ton of oak wood only 4 or 5 lb. The organic parts of plants, therefore, when in a perfectly dry state, constitute from 85 to 99 per cent of their whole weight. It is chiefly culmiferous plants (hay and straw) that contain so much as 10 per cent of inorganic matter. The organic part of plants consists of carbon, a solid substance, and of hydrogen, oxygen, and nitrogen, peculiar kinds of air. One half the weight of most plants, when dried, consists of carbon, about one third of oxygen, 5 per cent of hydrogen, and from 2 to 3 per cent of nitrogen. These elements are chemically combined; a result produced in art by the application of heat, and in nature by vital action. By either of these means two or more substances may be united together, so as to form a third possessing properties different from both. Carbon, and the other substances which constitute the food of plants, enter by the minute pores of the roots, and the pores in the green part of the leaves and of the young twigs. Carbon is absorbed from both the soil and the air in the form of carbonic acid, and from the soil in the form of the humic and ulmic acids. The hydrogen and the oxygen are absorbed in the form of water, which is a chemical compound of these gases, and the nitrogen is absorbed in the form of ammonia or nitric acid. As a specimen of the manner in which Professor Johnston treats his subject, we shall quote what he says of ammonia and nitric acid; two substances of immense importance in vegetation, and peculiarly interest-

ing at the present time, when so much has been recently said respecting them by Liebig, Dr. Daubeny, and others.

"*Ammonia.*—If the sal-ammoniac of the shops be mixed with quicklime, a powerful odour is immediately perceived, and an invisible gas is given off, which strongly affects the eyes. This gas is ammonia. Water dissolves or absorbs it in very large quantity, and this solution forms the common hartshorn of the shops. The white solid smelling-salts of the shops are a compound of ammonia with carbonic acid,—a solid formed by the union of two gases.

"The gaseous ammonia consists of nitrogen and hydrogen only, in the proportion of 14 of the former to 3 of the latter, or 17 lb. of ammonia contain 3 lb. of hydrogen.

"The chief natural source of this compound is, in the decay of animal substances. During the putrefaction of dead animal bodies ammonia is invariably given off. From the animal substances of the farm-yard it is evolved, and from all solid and liquid manures of animal origin. It is also formed in lesser quantity during the decay of vegetable substances in the soil; and in volcanic countries, it escapes from many of the hot lavas, and from the crevices in the heated rocks.

"It is produced artificially by the distillation of animal substances (hoofs, horns, &c.), or of coal. Thousands of tons of the ammonia present in the ammoniacal liquors of the gas-works, which might be beneficially applied as a manure, are annually carried down by the rivers, and lost in the sea.

"The ammonia which is given off during the putrefaction of animal substances rises partially into the air, and floats in the atmosphere, till it is either decomposed by natural causes, or is washed down by the rains. In our climate, cultivated plants derive a considerable portion of their nitrogen from ammonia. It is supposed to be one of the most valuable fertilising substances contained in farm-yard manure; and as it is present in greater proportion by far in the liquid than in the solid contents of the farm-yard, there can be no doubt that much real wealth is lost, and the means of raising increased crops thrown away, in the quantities of liquid manure which are almost every where permitted to run to waste.

"*Nitric Acid* is a powerfully corrosive liquid, known in the shops by the familiar name of *aquafortis*. It is prepared by pouring oil of vitriol (sulphuric acid) upon saltpetre, and distilling the mixture. The aquafortis of the shops is a mixture of the pure acid with water.

"Pure nitric acid consists of nitrogen and oxygen only; the union of these two gases, so harmless in the air, producing the burning and corrosive compound which this is known to be.

"It never reaches the roots of plants in this free and corrosive state. It exists in many soils, and is naturally formed in compost heaps, and in most situations where vegetable matter is undergoing decay in contact with the air; but it is always in a state of chemical combination in these cases. With potash, it forms *nitrate of potash* (saltpetre), with soda, *nitrate of soda*, and with lime, *nitrate of lime;* and it is generally in one or other of these states of combination that it reaches the roots of plants.

"Nitric acid is also naturally formed, and in some countries probably in large quantities, by the passage of electricity through the atmosphere. The air, as has been already stated, contains much oxygen and nitrogen *mixed* together; but when an electric spark is passed through a quantity of air, a certain quantity of the two *unite* together chemically, so that every spark that passes forms a small portion of nitric acid. A flash of lightning is only a large electric spark; and hence every flash that crosses the air produces along its path a quantity of this acid. Where thunder-storms are frequent, much nitric acid must be produced in this way in the air. It is washed down by the rains, in which it has frequently been detected, and thus reaches the soil, where it produces one or other of the *nitrates* above mentioned.

"It has been long observed that those parts of India are the most fertile

in which saltpetre exists in the soil in the greatest abundance. Nitrate of soda, also, in this country, has been found wonderfully to promote vegetation in many localities; and it is a matter of frequent remark, that vegetation seems to be refreshed and invigorated by the fall of a thunder-shower. There is, therefore, no reason to doubt that nitric acid is really beneficial to the general vegetation of the globe. And since vegetation is most luxuriant in those parts of the globe where thunder or lightning is most abundant, it would appear as if the natural production of this compound body in the air, to be afterwards brought to the earth by the rains, were a wise and beneficent contrivance by which the health and vigour of universal vegetation is intended to be promoted.

"It is from this nitric acid, thus universally produced and existing, that plants appear to derive a large, probably, taking vegetation in general, the largest portion of their nitrogen. In all climates they also derive a portion of this element from ammonia; but less from this source in tropical than in temperate climates. (For fuller information on this point, see the Author's *Lectures on Agricultural Chemistry and Geology*, Part I.)"

Plants derive a portion of their nourishment from the atmosphere; which consists of a mixture of oxygen and nitrogen gases, with a minute quantity of carbonic acid, and a variable proportion of watery vapour. The carbonic acid affords an important part of their food to plants; and the watery vapour aids in keeping their surfaces in a moist and pliant state. The various substances which constitute the food of plants are decomposed in the interior of their vessels, and recompounded so as to form new substances. The leaves of plants are spread out in the air for the same purpose for which the fibres are extended through the soil; and while the roots suck in chiefly liquid food, the leaves inhale almost solely gaseous matters. "*In the sunshine, the leaves are continually absorbing carbonic acid from the air and giving off oxygen gas. When night comes, this process ceases, and they begin to absorb oxygen and to give off carbonic acid.* It has been ascertained, that in our climate on an average, not less than from one third to three fourths of the entire quantity of carbon contained in the crops we reap from land of average fertility is really obtained from the air.

"We see, then, why, in arctic climates, where the sun once risen never sets again during the entire summer, vegetation should almost rush up from the frozen soil, the green leaf is ever gaining from the air and never losing, ever taking in and never giving off, carbonic acid, since no darkness ever interrupts or suspends its labours."

In the growth of plants from seed, the starch is changed into sugar; and when the shoot first becomes tipped with green, the starch is again changed into the woody fibre. The seed also contains gluten; and, neither the gluten nor the starch being soluble in water, it is so arranged that when the seed first shoots, there is produced at the base of the germ, from a portion of the gluten, a small quantity of a substance called diastase, which has the power of rendering the starch soluble in the sap.

"This change of the sugar of the sap into woody fibre is observable more or less in all plants. When they are shooting fastest the sugar is most abundant; not, however, in those parts which are growing, but in those which convey the sap to the growing parts. Thus, the sugar of the ascending sap of the maple and the alder disappears in the leaf and in the extremities of the twig; thus the sugar-cane *sweetens* only a certain distance above the ground, up to where the new growth is proceeding; and thus, also, the young beet and turnip abound most in sugar, while in all these plants the sweet principle diminishes as the year's growth draws nearer to a close.

"In the ripening of the ear also, the sweet taste, at first so perceptible, gradually diminishes and finally disappears; the sugar of the sap is here changed into the *starch* of the grain, which, as above described, is afterwards destined, when the grain begins to sprout, to be reconverted into sugar for the nourishment of the rising germ.

"In the ripening of fruits a different series of changes presents itself. The fruit is first tasteless, then becomes sour, and at last sweet. In this case the acid of the unripe is changed into the sugar of the ripened fruit.

"The substance of plants,—their solid parts that is—consist chiefly of *woody fibre*, the name given to the fibrous substance, of which wood evidently consists. It is interesting to enquire how this substance can be formed from the compounds, carbonic acid and water, of which the food of plants in great measure consists. Nor is it difficult to find an answer.

"It will be recollected that the leaf drinks in carbonic acid from the air, and delivers back its oxygen, retaining only its carbon. It is also known that water abounds in the sap. Hence carbon and water are thus abundantly present in the pores or vessels of the green leaf. Now, woody fibre *consists only of carbon and water* chemically combined together; 100 lb. of dry woody fibre consisting of 50 lb. of carbon and 50 lb. of water. It is easy, therefore, to see how, when the carbon and water meet in the leaf, woody fibre may be produced by their mutual combination.

"If, again, we enquire how this important principle of plants may be formed from the other substances, which enter by their roots, from the ulmic acid, for example, the answer is equally ready. This acid also consists of carbon and water only, 50 lb. of carbon with 37½ lb. of water forming ulmic acid; so that when it is introduced into the sap of the plant, all the materials are present from which the woody fibre may be produced.

"Nor is it more difficult to see how starch may be converted into sugar, and this again into woody fibre; or how, again, sugar may be converted into starch in the ear of corn, or woody fibre into sugar during the ripening of the winter pear after its removal from the tree. *Any one of these substances may be represented by carbon and water only.* Thus:—

50 lb. of carbon with	50 of water,	make	100 of woody fibre.
50 lb. - -	37½ -	-	87½ of ulmic acid.
50 lb. - -	72½ -	-	122½ of cane sugar, of starch, or of gum.
50 lb. - -	56 -	-	106 of vinegar.

In the interior of the plant, therefore, it is obvious that, whichever of these substances be present in the sap, the elements are at hand out of which any of the others may be produced. In what way they really are produced, the one from the other, and by what circumstances these transformations are favoured, it would lead into too great detail to attempt here to explain. (For fuller and more precise explanations on these interesting topics, see the Author's *Lectures on Agricultural Chemistry and Geology*, Part I.)

"We cannot help admiring to what varied purposes in nature the same elements are applied, and from how few and simple materials substances the most varied in their properties are, in the living vegetable, daily produced."

The ash of plants consists of a mixture of several earthy substances, sometimes as many as the eleven following:—Potash, soda, lime, magnesia, silica, alumina, oxide of iron, oxide of manganese, sulphur, phosphorus, and chlorine. The quantity and quality of the ash of plants is, as might be expected, very different. In the grain of wheat and oats, all the eleven substances are found, except the oxide of manganese; but in the straw of wheat the oxide of iron also is wanting; and in oat straw there is no soda, alumina, oxide of iron, of manganese, nor chlorine. The kind of organic matter varies with the part of the plant, and one inorganic ingredient may be abundant in the seed, and scarcely to be found in the leaves and stems. Thus, the grain of wheat contains 20⅓ per cent of soda, while the straw contains only ¾ per cent. Hence the leaves and stalks of a plant, without its seeds, will not constitute a sufficient manure for that plant, because it does not supply all the inorganic ingredients that have been carried off by it.

But we have said enough to give an idea of this very excellent work, which we most strongly recommend to the young cultivator who is desirous of acquiring one of the most important parts of the science of his art.

On the Growth of Plants in closely glazed Cases. By N. B. Ward, F.L.S. 8vo, pp. 95. London, 1842.

The simple yet comprehensive principle on which plants are grown in closed cases does not, Mr. Ward observes, appear to be clearly understood, and the object of the present work is to remove erroneous notions respecting it. This self-imposed task is most beautifully and philosophically executed under the following heads: — I. On the Natural Conditions of Plants. II. On the Causes which interfere with the Natural Conditions of Plants in large Towns, &c. III. On the Imitation of the Natural Conditions of Plants in closely glazed Cases. IV. On the Conveyance of Plants and Seeds on Shipboard. V. On the Application of the closed Plan in improving the Condition of the Poor. VI. On the probable future Application of the preceding Facts.

Natural Conditions of Plants.—Plants are influenced by the atmosphere, heat, light, moisture, varieties of soil, and periods of rest. The effect of an impure, as compared with a pure atmosphere, is exemplified in the plants which grow in large towns, or within the reach of manufactures evolving noxious gases, as compared with those which grow in the open country. Plants grow in different degrees of heat, from 32° to 170° or 180°, in which last temperature certain *Cácti* alone are found to live. The intensity of light to which plants are subjected varies from almost total darkness to a light double that of our brightest summer's day. The state of atmospheric moisture varies as much as those of atmospheric heat and light. All plants require rest, and obtain it in some countries by the rigour of winter, and in others by the scorching and arid heat of summer.

Plants in large Towns suffer from deficiency of light, dryness of the atmosphere, fuliginous matter with which the air of large towns is always more or less loaded, and the evolution of noxious gases from manufactories.

Of all these atmospheric causes tending to depress vegetation in large towns, Mr. Ward is of opinion that the fuliginous matter is the most influential. Sulphurous acid gas generated in the combustion of coal, when added to common air in the proportion of $\frac{1}{9000}$ or $\frac{1}{10000}$ part, has sensibly affected the leaves of growing plants in 10 or 12 hours, and killed them in 48 hours or less; and hydrochloric or muriatic acid gas, in the proportion of $\frac{1}{10}$ of a cubic inch to 20,000 volumes of air, produced an injurious effect in a few hours, and entirely destroyed the plant in two days. Such were the results of experiments made by Drs. Turner and Christison, and quoted in an article on Mr. Ward's plant-cases, by the late Daniel Ellis, Esq., in our Volume for 1839, p. 488. Mr. Ward has no doubt of the correctness of the experiments quoted; but he contends "that it yet remains to be proved that there exists generally, in the atmosphere of London or other large cities, such a proportion of these noxious gases as sensibly to affect vegetation." (p. 17.) In proof of this, Mr. Ward refers to the hundreds of geraniums and other plants, seen in the windows of shops and small houses in numerous parts of London, "growing very well, and without any crisping or curling of their leaves, care being taken in these instances to keep the plants perfectly clean, and free from soot." Now, Mr. Ward's cases "can, and do, exclude the fuliginous portion of the atmosphere," and hence the thriving of the plants grown in them. These cases, however, cannot exclude gases mixed with the atmosphere; from which it may be concluded that the proportion in which deleterious gases exist in it is not such as to be injurious to vegetation, nothing like so much so as the "acidulous emanations" which issue from the numerous chimneys of the chemical factories in a certain part of Glasgow, and which our correspondent in that city informs us "wither up the leaves in the course of a few hours" (p. 150.), while the fuliginous particles, according to the same correspondent, are not concerned in injuring vegetation.

Mr. Ward next shows, by quotations from Turner's *Elements of Chemistry*, and from other works, that the constant tendency of the gases and vapours

of the atmosphere is rapidly to permeate each other's bulks, and become equally diffused; and on this principle, and from his experience with the plant-cases, he concludes that the noxious gases, in all ordinary cases, have little or no influence in deteriorating the atmosphere either for plants or animals.

Imitation of the natural Conditions of Plants in closely glazed Cases.—A fern and a grass, which came up accidentally in a wide-mouthed glass bottle with a lid, first gave Mr. Ward the idea of growing plants in closely glazed cases. He had often tried ineffectually to grow ferns on rockwork in the yard at the back of his house, and he could not but be struck with one coming up and growing so well in a bottle. He asked himself seriously what were the conditions necessary for its growth. "To this the answer was, 1stly, an atmosphere free from soot (this I well knew from previous experience); 2dly, light; 3dly, heat; 4thly, moisture; and lastly, change of air. It was quite evident that the plants could obtain light and heat as well in the bottle as out of it; and that the lid which retained the moisture likewise excluded the soot. The only remaining condition to be fulfilled was the change of air; and how was this to be effected?" (p. 26.) The answer is, by the law of the diffusion of gaseous bodies, alluded to in the preceding paragraph; the crevices in the glass case admitting of the exit and entrance of air, but not of the entrance of fuliginous matter. This is the whole secret of the growth of plants in glass cases.

The consideration of the remaining chapters we must defer till a future Number; in the meantime we can assure our readers that these dry facts which we have quoted, though they are calculated to give a complete idea of the theory of the art of growing plants in glass cases, yet by no means exemplify the beautiful manner, accompanied by apt illustrations, in which it has been developed by Mr. Ward.

Sir Uvedale Price on the Picturesque: with an Essay on the Origin of Taste, and much original Matter, by Sir Thomas Dick Lauder, Bart; *and Sixty Illustrations, designed and drawn on the Wood* by Montagu Stanley, R. S. A. 8vo, pp. 586. Edinburgh and London, 1842.

The value of the essays on the picturesque by Sir Uvedale Price is known to every one in this country, who has the least pretension to taste in landscape or in landscape architecture, and therefore nothing requires to be said on that part of the volume before us. We reverence the memory of Sir Uvedale Price, whom we had the pleasure of knowing personally, both as an author and as a man; for the liberality of his sentiments, and his benevolence, were of a character as elevated and decided as his taste. Of the notes of Sir Thomas Dick Lauder, we have given specimens at length in p. 342. and p. 360. The only part of Sir Thomas Dick Lauder's editorial labours that we disapprove of is the introductory essay "On the Origin of Taste," in which every thing is referred to the principle of the association of ideas. We readily admit that the greater number of the emotions of taste, and all the more exalted emotions, are heightened by this principle; but we think that there are many of the pleasures of taste that are altogether independent of association, and, at all events, that many emotions do not originate in it.

There are certain combinations of colours and sounds which, according to the constitution of our nature, are disagreeable, and others which are agreeable. Now, either this point is conceded to us or it is not. If it be not denied, then the association of ideas cannot be said to be the origin of taste in music and painting. Mankind in general are less susceptible of feeling what is agreeable and what is disagreeable in combinations of lines and forms: but many individuals are sensible of the difference between forms and lines of different kinds naturally; and others, such as painters and architects of taste, by cultivation. Now, if this point also be conceded to us, it can no longer be said that the association of ideas is the origin of taste in matters relating

to form; and form may be considered as including lines and light and shade. Hence, our conclusion is, that the origin of taste in music, in painting, in landscape, and in architecture, is founded in nature, and only heightened, not originated, by association. We shall not enter farther into the subject, because those who will not agree to what we have stated are not likely to be convinced by any arguments founded on these statements.

The volume, we think, would have been much better without this essay; but, notwithstanding, the publisher deserves credit for having produced an edition of a first-rate standard work at a moderate price. The vignettes are numerous and highly ornamental.

A Treatise on Agriculture, comprehending the Nature, Properties, and Improvement of Soils; the Structure, Functions, and Cultivation of Plants; and the Husbandry of the domestic Animals of the Farm. By John Sproule. Second edition, with corrections and additions, illustrated with numerous engravings on wood. 8vo, pp. 695. Dublin, Edinburgh, and London, 1842.

We noticed the first edition of this work in our Volume for 1840, p. 34., and the demand for a new edition, in so short a period, may be considered as a proof of its suitableness for the purpose for which it was written. As a specimen of the work, we give the following concluding paragraphs from the chapter on the structure and functions of plants. Most of our readers will know where they are taken from, though the author has on this, and on other occasions of the same kind, not thought fit to refer either to the *Encyclopædia of Gardening* (see p. 463.), or the *Encyclopædia of Agriculture* (see p. 280.).

"The preservation of vegetables for future use is effected by destroying or rendering dormant the principle of life, and by warding off, as far as practicable, the process of chemical decomposition. When vegetables or fruits are gathered for preservation, the air of the atmosphere is continually depriving them of carbon, and forming carbonic acid gas. The water they contain, by its softening qualities, weakens the affinity of their elements; and heat produces the same effect, by dilating their parts, and promoting the decomposing effect of both air and water. Hence, drying in the sun, or in ovens, is one of the most obvious modes of preserving vegetables for food, or for other economic purposes; but not for reproduction, if the desiccation be carried so far as to destroy the principle of life in seeds, roots, or sections of the shoots of ligneous plants.

"The whole art of culture is but a varied developement of the above fundamental principles, all founded in nature, and, for the most part, rationally and scientifically explained on chemical and physiological principles. Hence the great necessity of the study of botany to the cultivator, not in the limited sense in which the term is often understood, as including mere nomenclature and classification, but in that more extended signification by which the student is also made practically acquainted with the structure and functions of the vegetable economy; by which he is enabled to modify his system of culture in such a manner as most effectually to accomplish the end in view. As this knowledge has increased, the produce of the land has increased in a corresponding degree, and will further increase as physiological knowledge extends. Cultivated produce has hitherto outrun population, and, to all appearance, will always do so. From the increasing enterprise and scientific knowledge of the cultivators of the soil, not only the merits of many of the varieties of roots, grain, and grasses, now in existence, and as yet very little known, will be further elicited; but new varieties, and even genera, possessed of more useful properties than any of those now cultivated, will continue to be discovered."

The following observations are judicious, and, as the author acknowledges having had recourse to *Loudon's Encyclopædia of Architecture*, we acquit him of any intention to pass them off as his own.

"As general rules in the erection of farm-houses, it may be observed, that it is always desirable that they should be placed upon a platform or terrace, with a view of keeping the ground floor of the several apartments dry, and consequently rendering them warmer and healthier; that the chimneys should be placed in the interior walls rather than in the exterior ones, this arrangement being better calculated to retain the greatest portion of the heat coming from the fires within the house; and by the additional heat contained within the central mass of masonry, to make the flues draw better; and that the ground plan should approach as near as possible to a square, as being that form which is calculated to afford the greatest accommodation with a given amount of expenditure."

The Grainer's Guide. By Charles Moxon. Large folio. Edinburgh, 1842.

This work is illustrated by a number of specimens of imitations of wood and marble, all done by the author himself, and, we may add, exquisitely beautiful. The work will be found of the greatest use to journeymen painters who wish to excel in the art of graining, and to architects and amateurs who wish to know what can be effected by this style of art. The author, we are happy to find, has opened an establishment in the metropolis (Bury Street, St. James's); and, when we add that he has been for a number of years the principal assistant of Mr. Hay of Edinburgh, his success may fairly be anticipated. We have seen some of Mr. Moxon's imitations of different kinds of marble, which are exquisitely beautiful, and show what may be done on the walls of halls, corridors, and staircases.

Art. II. *Literary Notices.*

The Amateur Florist, and Guide to the Flower-Garden. By W. P. Ayres, author of a "Treatise on the Cultivation of the Cucumber," will soon appear, price 2*s.* 6*d.*

A Narrative of a Visit to the Australian Colonies, by James Backhouse, with 3 maps, 14 etchings, and 700 octavo pages of letterpress, is expected to be ready in the ensuing autumn. Price, to subscribers, 14*s.*

A Descriptive Treatise on the Scottish Grasses, illustrated by 130 figures, by R. Parnell, M.D., F.R.S.E., is now in the press.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Gas-Lime applied to Horticultural Purposes.—It appears to me that this article, which, I believe, may be procured on application to the clerk of the works at any gasometer, for a mere trifle beyond the expense of carting, is not valued as it ought to be, and in but few instances have I seen it made use of; but, from these instances, I feel so thoroughly convinced of the many advantages to be derived from the use of it, that I am anxious to mention a few of the purposes to which it is particularly applicable.

As manure, when about three years kept and turned, I learn that it is very excellent, being, independently of its fertilising qualities, an excellent cleanser of the soil from destructive vermin of all kinds. In this particular I cannot fully expatiate upon its merits, but trust that, before long, some one of your correspondents, who may have a practical knowledge of its application and effects, will kindly commit the same to your pages.

In the formation of gravel paths it surpasses every thing that I have ever seen used, for protecting gravel against the unsightly casts of worms, as well as greatly preserving it from foul weeds, as couch, &c.; even, besides these excellent qualities, it forms an exceedingly clean surface for laying gravel upon, more particularly desirable in cases of scarcity of gravel, for over it a coat of gravel of 2 in. in thickness will make a good path, and, in usual cases, retain its colour for three years, when a slight coating of new gravel, carefully incorporated, will restore its appearance. For this purpose it should be spread equally over a good layer of stone rubble, broken smaller, rather than larger, than those used for mending roads on M'Adam's principle, to the thickness of 2 in., which will be found to settle down to about 1 in. Thus used, I have found, on taking up paths four or five years after their formation, that its quality was but little, if at all, diminished.

One other instance of its utility I will mention, perhaps of scarcely less importance than either of the preceding; which is, in the formation of basins for fountains, &c.; embellishments universally admired, but in too many instances altogether omitted in gardens, in a great measnre from the heavy expense attending the formation of them according to the best and usual mode. This article, however, at least in the vicinity of towns lighted with gas, and in a neighbourhood where good clay can be procured at a reasonable rate, opens, if properly applied, a means by which these luxuries may be enjoyed. It must not be thought that, in speaking of gas-lime thus favourably, I attempt to impress the idea that basins made according to the mode I am about to mention are entirely equal to those of masonry; but I merely wish to assert, and that from experience, that basins of almost any extent, and of great durability, may be made to vie with those of masonry in elegance, simply thus: — Where the basin is required, excavate the soil in accordance with the depth and outline of your desired basin, allowing an equal space every way to receive a thickness of at least 6 in., when settled, of gas-lime, bottom and sides, and 15 in., not less, in thickness of well-puddled clay, which may be lined, according to the circumstances of the place, with a single layer of brick or stone, merely to prevent any accidental perforation of the clay, and finished with a coping of turf neatly laid, or masonry. You thus, by the use of gas-lime between the natural soil and the clay, exclude worms, and, almost without exception, the roots of trees, &c., from the clay for an almost indefinite period.

I have, according to this manner, directed the construction of one or two basins, under very disadvantageous circumstances with respect to soil and situation, with the most perfect success, and, as compared with other modes, at an almost nominal expense.

I also find that gold-fish thrive as well in basins so formed, as in those where gas-lime is not used. — *W. H. B. Oxford, June*, 1842.

Kiln-dust as Manure. — Never having found any mention made of kiln-dust as manure, and having seen in one or two establishments plants, more particularly dahlias and pelargoniums, grown very excellently in soil manured with this article, which is simply the incipient shoot and roots which have been protruded by the malting or germination of the grain afterwards broken off by the drying and turning (see *Encyc. of Cott. Arch.*, p. 402.), I here beg to notice that it is, as far as I can understand, well worthy the attention of cultivators; and, although I have not a sufficient knowledge of its merits, expense, &c., to speak in detail, in all probability many of your experienced correspondents may, and will kindly communicate the same through the medium of your magazine.—*B. H. W. June*, 1842.

[The powerful effects of malt-dust as a manure are noticed in our *Encyc. of Ag.*, p. 335. 2d ed.]

A simple and good Mode of packing the Pistons of Hand-Syringes. — I am doubtless not the only gardener who has many times, when using a hand-syringe, especially when much force has been required, had a sharp dash of water on the face, or chest, or other part of the body, from its upper orifice while refilling the cylinder, owing to the packing admitting a portion of the

water to pass the sucker while ejecting its contents. This was so frequently my case, and that also after having the syringe more than once newly packed, that I felt resolved on adopting, if possible, some means of preventing it. The first means applied after depriving the sucker of the whole of its packing, was simply by replacing it with a strip of sponge, cut to fill the space allowed for the packing,, where it was secured by a single tie of thin copper wire. This, upon trial, I found to answer its purpose so well that I have applied no other remedy, and, from its cheapness and simplicity, I think it worth recording. I have now used a syringe so packed daily for about five months, free from the unpleasantness above mentioned. — *W. H. B. Oxford, June* 3. 1842.

Art. II. *Domestic Notices.*

ENGLAND.

The Exhibition at the Horticultural Society's Garden, on May 14th, was attended by upwards of 5,500 persons, including the queen, and 13,582 persons were present on June 11th; by far the greatest number that has attended these exhibitions at one time. We enter into no details, because these are given in the gardening newspapers, to which we refer once for all for whatever relates to the meetings of societies, either metropolitan or provincial. In general, we intend in future to omit the publication of all matters of a temporary nature, or that derive their chief interest from being immediately made known, and confine ourselves to matters of solid and permanent interest, the publication of which a week sooner or later is of no consequence. Of whatever is new and of a permanent nature, in the gardening newspapers, or in any other gardening publication, we shall transfer the essence to the pages of the *Gardener's Magazine*, sooner or later.

The Fountains in St. James's Park, and in Kensington Gardens. — In the *Gardener's Chronicle* of June 18., a writer who signs himself Ortolano has, with true artistical feeling, assigned the reason why a fountain now being erected in St. James's Park is objectionable; and we notice the subject, because his reasons apply with equal force to a fountain which has been recently set up in the river (as it is called) in Kensington Gardens. The water and scenery in that part of Kensington Gardens where this fountain is placed is in a style of what may be termed commonplace nature; but the fountain, which is placed in the middle of the river, consists of a series of circular cast-iron basins, arranged on a vertical axis one above another, exactly like an old-fashioned dumb waiter. The cast-iron axis rises abruptly from the water; and the whole, which may be 10 or 12 feet high, is painted white. Any thing less in accordance with the surrounding scenery it is difficult to imagine. We have often, when passing this fountain, asked ourselves whether it be possible that Lord Lincoln, and the other Commissioners of Woods and Forests, can approve of it: and, if they do not approve of it, how it happens that such a hideous object, or indeed any object intended to be ornamental, could be put up without their knowledge and approbation. If this fountain had risen out of a base of rockwork it would have been less hideous, but still liable to the objection of being altogether incongruous to the scene in which it is placed. A single bold jet from a mass of rock in such a scene we hold to be admissible, but by no means either a jet or a drooping fountain from sculpture or regular architecture. The most appropriate fountain which could be introduced in this part of the water in Kensington Gardens is what we suggested in our Volume for 1841 (p. 331.), viz., huge masses of rock in the form of a source, placed where the mock bridge now stands, from which the water might trickle down in streamlets. We say this kind of fountain would have been the most appropriate; because, being at the upper end or commencement of the river, or rather lake, it would have indicated how it was supplied, while no violence would have been done to the character of the

scenery. Instead of exhibiting a source of this kind, and disguising the termination of the lake by one or two islands, an attempt is made to keep up the character of a river by building three arches as a termination, the commonplace resource, in cases of this kind, in the infancy of the natural style of laying out grounds, but long since rejected by every modern artist of cultivated taste. Altogether, the termination of this piece of water is so bad in itself, and so ridiculous when contrasted with the real bridge within sight of it, that we think it will be instructive to exhibit its absurdity by sketches, which we intend sooner or later to do. The fountain at present only plays occasionally; but, if a rocky source were substituted, the supply of water might easily be so regulated as to flow throughout the whole of that portion of every day during which the gardens are open to the public.—*Cond.*

Kensington Gardens.—"As it appears that the public have not closed with the project of disposing of the site of the kitchen-garden at Kensington so readily as was expected, I beg to offer the following remarks on this most objectionable plan, in the hope that, before it be too late, the present government may be disposed to reconsider the subject.

"There are two points on which the planners of this scheme deserve some credit; and, as they are the only points deserving of commendation, candour requires their being noticed: the one is, the making of a kitchen-garden at Windsor worthy of the place; the other, the projecting of a road to connect Bayswater and Kensington, which will be a considerable public benefit. All the other bearings of the subject I hold to be worse than bad — to be discreditable to those who drew the plan, and even more so to those who adopted instead of repudiating it, as they ought to have done.

"To the north and west of Kensington Palace is the ground in question, a strip to the north forming a paddock used by the inmates of the palace, and a longer strip running quite from the Kensington Gate to the Bayswater Road, forming, in the whole, between 30 and 40 acres. The plan is to let the whole front along the Bayswater Road, including, I believe, part of the paddock, for building sites, and running a wide road down the centre of the old gardens, to divide the ground on each side into blocks of about an acre each, to be let to individuals for 99 years; that is, this invaluable piece of ground is to be jobbed out in the ordinary manner practised by individuals who have a few acres adjoining a watering place, to make the most they can of their land. Is this consistent with the dignity of the crown of England? Is the raising the beggarly sum, necessary to make the garden at Windsor, to be attained by the alienating for ever (for, disguise it as they may, this is the real truth) of such a piece of ground? Let any one see the manner in which the promenade in Kensington Gardens is attended, and see the plans and extension of buildings on every side, and say whether government is not called on, as a sacred duty, to do any thing rather than, in the manner here intended, to sacrifice even an acre which can be devoted to the public health and amusement? There is a cardinal point which should be carefully attended to in the management of the parks. No individual should be on any pretence allowed to establish an interest in them. We have just seen a nuisance removed from Piccadilly, and the private residences in the Regent's Park are perhaps the only blots in that beautiful enclosure, whilst the conditions entered into with the possessors are a serious bar to improvement, and the pecuniary return is wholly unworthy notice.

"Having now expressed my opinion on the plan, I beg to suggest a better mode of laying out the ground. The road might be carried quite along the west side, leaving all the open space possible. A necessary space of private ground, but fenced with open pallisade, should surround the palace and leave it isolated; the remainder should be laid out in choice and ornamental shrubbery and flower-garden in a plain way, and properly secured from injury by the public. The paddock I would leave as it is, if an equivalent cannot be found elsewhere; only, instead of the brick walls, open palisades should be substituted, and a communication made from the N. W. corner of the Ken-

sington Gardens to the s. w. one. If this plan be adopted, the public will have a delightful addition to the garden, and the inmates of the palace have the satisfaction of seeing that the ground is devoted to public use and enjoyment, instead of their being annoyed by the smoke and inconvenience of private dwellings which are to close it in upon the north and west. With respect to the raising the money, has parliament ever refused a grant for Windsor? We think not; though some grants might have excited observation from their enormous amount in proportion to their objects: the stables and kennels, for instance. If it be deemed necessary or expedient to alienate any portion of the crown land for the purpose, it should be done at a distance, and not so near the heart of London. A farm in Hampshire or Staffordshire is of no moment, if the full value be obtained for it; whereas, if a site like this be lost, it can never be regained.

"There is one more suggestion which may be made: a row of villa houses, contiguous, with a mere open space of a few feet, might be built on the extreme boundary facing the palace, and opening to the road, but without garden or ground. There is no question that this plan might answer, and would not be very objectionable. A depth of 50 ft. would realise some money; though I should prefer having the whole site clear, especially if there are hopes of purchasing ground to the west, which I have heard are entertained.

"I must now conclude, earnestly calling on members of parliament, more especially those connected with the metropolis, to stir themselves, and prevent the government thus carrying out the provisions of a legacy left them by their predecessors." (*W.* in *Gard. Chron.* for 1842, p. 380.)

Immense Shaddock — On Thursday, the 12th inst., a very fine shaddock was gathered by Edward Spicey, in the hall garden at Chippenham Park, weighing 2 lb., and measuring 18 in. in circumference. (*Camb. Chron. and Journ.*, May 28th, 1842.

SCOTLAND.

The Botanical Society of Edinburgh is in a prosperous state, and accounts of their proceedings appear from time to time in the gardening newspapers, which is the reason that we no longer enter into details, conceiving that these papers are perused by every one at all interested in practical botany and gardening.

Of the *Caledonian Horticultural Society* we may make the same remark, and which is applicable also to all the Scotch provincial societies.

The Edinburgh Botanic Garden has had bequeathed to it the interesting and valuable herbarium of the late Dr. Archibald Menzies (see p. 240.), which was chiefly formed in the course of his voyages round the world with Vancouver, and other circumnavigators. — *Cond.*

IRELAND.

A Farmer's Gazette and Journal of Practical Horticulture, we are happy to observe, is commenced in Dublin, the department of rural affairs edited by Edmund Murphy, A. B., landscape-gardener. A more competent editor could hardly be found either in Ireland or England, and if the paper be properly supported, we feel confident it will do much good. The paper is published weekly at 4*d.*, which very low price the proprietors bind themselves either to reduce, or to give more for money, by enlarging the size of the paper, as soon as the circulation shall have increased so as to cover the actual expense of publication. The *Farmer's Gazette* of June 4th, now before us, contains a number of appropriate extracts from agricultural and horticultural publications, and an account of a visit to an experimental ground for trying the effects of Dr. Sir James Murray's oxygenated fertilisers, by Mr. Murphy. "The experiments," Mr. Murphy says, "have been conducted in total absence of every thing like science and accuracy." — *Cond.*

Art. III. *Retrospective Criticism.*

The Subscribers to Donglas's Monument. (p. 296. to 301.) — In p. 299., for "Mr. Park, Paris Street, Exeter," read "Mr. Clark, Paris Street, Exeter." In p. 301., for "Messrs. Law and Co.," read "Messrs. Low and Co." In p. 298., for "Cairnmore," read "Cairnsmore," and for "Wm. Ross, Cardoness," read "Wm. Sinclair, Cardoness;" for "Adam M'Marran, Kirbuchtree," read "Adam M'Morrine, Kirouchtree;" for "Alexander M'Marran," read "Alexander M'Morrine;" for "Ewing Glover," read "Eben. Glover;" and for "Wm. Maxwell of Cardon," read "Wm. Maxwell, younger, of Cardoness." In p. 300., for "Mr. Smith, in a letter from Worcester, 6*l.* 6*s.*," read "Mr. Smith, in a letter from Worcester, 6*l.* 0*s.* 6*d.*" Add to the list, "M. Saul, Esq., Lancaster, 5*s.*," and "R. Tongue, Esq., Forton Cottage, near Lancaster, 5*s.*" How the last two names came to be omitted in the List of Subscribers we do not know. The care of the list was committed to a clerk, and he is not now in the country to give any explanation. — *Cond.*

Art. IV. *Queries and Answers.*

The Twining of Plants. — Might I trouble you, or some of your intelligent correspondents, to favour me with a scintilla of information respecting the laws that regulate, or influence, the twining of plants. It has been assumed that solar attraction was the agency directing that mode of growth, and that such as were natives of the northern hemisphere had a tendency from east to west; and if we confine our attention to the hop, the honeysuckle, the black bryony, &c., such an assumption might remain valid: but if we take, for example, the *C*onvólvulus sèpium, a plant well known to be indigenous, the above doctrine no longer holds good, as that plant invariably twines from west to east, in the same manner as the scarlet runner, and many others. — *D. B. June*, 1842.

Bridgeman, Kent, Wright, Lappidge, Eames, Meikle, Parkyns, the Author of "Monastic Remains," and the Authors of the "Epistle to Lord Lowther" and of the "Elements of Modern Gardening." — We shall be greatly obliged to any of our readers who can give us any information respecting these landscape-gardeners, or their descendants. — *Cond.*

Art. V. *Obituary.*

Died, in the end of May last, at an advanced age, *David Falconer, Esq.*, of Carlowrie, near Edinburgh. This gentleman, who enjoyed a moderate fortune, was a most zealous and successful cultivator of botany and horticulture. He had for many years in his garden at Carlowrie an excellent collection of herbaceous plants, which was extremely rich in some of the genera, particularly *I*ris, of which he had doubtless the best collection in Britain. Various enquiries by Mr. Falconer after rare species of different genera will be found in our earlier Volumes, particularly Vols. IV. V. and VI., and we hope some correspondent will favour us with further details respecting an individual so much esteemed both as a man and a botanist. — *Cond.*

THE

GARDENER'S MAGAZINE,

AUGUST, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the Conductor.

(*Continued from* p. 343.)

July 29. — *Hamilton to Allanton.* Leaving the valley of the Clyde, we pass over a tract of land, which, forty years ago, was little better than a moor, but which is now varied by hedge-rows and plantations, and traversed by good roads. The plantations every where want thinning, and the fields draining; but the latter improvement is making rapid progress, and will doubtless end in rendering this part of the country as productive as any tract in the West of Scotland. The walls of the labourers' cottages are generally of stone; and those which are built by feuars, such as carpenters, smiths, weavers, tailors, and others, have the stones squared, and frequently with as smooth a surface as those in the walls of Hamilton Palace; yet, with all this care of outward appearance in the building, these cottages have scarcely ever a front garden, or any flowers or flowering shrubs between them and the road. They have, however, generally placed over the entrance door, a stone, with the initials of the husband and wife, and the year in which the cottage was built by them, which it is always satisfactory to see, because we sympathise with the feeling of property and independence which we give the possessor credit for enjoying; and with the wish to participate in these feelings which we conclude to be felt by his neighbours, who, we may suppose, are saving money for a similar purpose. As to the front gardens, they will be formed in due time. If the gentlemen throughout the country were to direct their gardeners to advise with the cottagers with respect to their gardens, to furnish them with a few plants and seeds to begin with, and to look at them two or three times a year, for a year or two, the taste would spread rapidly. This effect would

be greatly aided by the establishment of Parochial Horticultural Societies.

The Village of Allanton contains some cottages of an ornamental character, for which the public are indebted to the late Sir Henry Steuart. They are all characterised by a peculiar kind of broad label over the windows and doors, resembling the boards which are used as labels over the openings of the mud-wall cottages of Huntingdonshire. Doubtless, much of the stonework of architecture, and particularly that of Grecian origin, has woodwork for its type; but we cannot quite reconcile ourselves to the fac-simile imitation of a plain deal board in a building the walls of which are built of squared stone. On the same principle, we should object to flag-stones cut to the width of deals, and laid down in imitation of a boarded floor; or to a stone barge-board, put up to protect the ends of wooden purlins. In other respects, these cottages are ornamental externally, and commodious within; and they have all sleeping-rooms up stairs, which is by no means common in this part of Scotland. Some of them were built by Sir Henry Steuart, but the greater number by feuars; Sir Henry having feued the land on terms favourable to the builder, and made an allowance in money for the ornamental parts of the cottage, as well as supplied designs and working-plans, and shrubs and flowers for the front gardens. So good an example, we trust, will be followed by other proprietors. Much of the beauty of every cultivated country depends on the beauty of its cottages and their gardens; because, in every civilised country, these must necessarily constitute the great majority of human dwellings. What can have a more miserable appearance than a wretched cottage out of repair, and without a garden? No one blames the cottager for this state of things; but the idea of a thoughtless or inhuman landlord, or of an unfeeling mercenary agent, immediately occurs. What, on the contrary, gives a greater idea of comfort, and of an enlightened benevolent landlord, than to see every cottage on his estate rearing its high steep roof and bold architectural chimney tops, indicating ample room and warmth within; the whole in good repair, and surrounded by fruit trees, in a well-stocked and neatly kept garden? Every one, in travelling through a country, must have observed how much of its beauty depends on the state of its cottages and their gardens. We would, therefore, entreat the possessors of landed property to consider how much of the beauty of the country depends upon them; and we would farther beg of them to ask themselves, whether it is not one of the duties entailed on them by the possession of landed property, to render it not only beneficial to their families and to all who live on it, but ornamental to the country.

Allanton Park has been done justice to by Mr. Nesfield, in our Volume for 1838. The gardener pointed out to us the different transplanted trees of which Mr. Nesfield has given the dimensions; and we found them, as might have been expected from the account which Sir Henry has published of the preparation of the soil, in vigorous growth. There can be no doubt of the success of the mode of transplanting adopted by Sir Henry Steuart; but it is a great mistake to suppose that it is the best that can be adopted in every case. Notwithstanding the small cost which attended this mode of transplanting at Allanton, every where else it will be found far too expensive for general purposes. It is also very tedious; for a large tree requires four or five years to prepare. In the great majority of cases, the best mode of transplanting large trees is to take them up with as many roots as possible, even though these should extend 10 ft. or 12 ft. on every side, reduce the head in proportion to the roots, envelope the trunk and main branches in hay-bands, plant in a mass of thoroughly prepared soil, and supply water liberally during the first summer. In all situations which are tolerably sheltered, this mode will be found to succeed; and it is evident, that it must be far less tedious and expensive than the mode adopted at Allanton. In the case of exposed situations, there is no better mode, in our opinion, than depriving the stem of all its branches, in the Continental manner described in detail in p. 130. The decapitated tree, in this case, will grow very slowly at first, but its growths, like those of a seedling plant placed in the same situation, will accommodate themselves to the exposure, and produce a vigorous tree there, in a shorter time than it could be produced by any other means; whereas a tree with a branchy head would, in the first year, be blown to one side, and, the shelter of that side occasioning every year the largest shoots to be produced there, the tree would continue one-sided for many years, if not always. We are quite aware of all that has been said against decapitating trees, and even cutting over the stems of thorn plants before planting a quick hedge; but we have seen and read enough to satisfy us that the modes we have recommended are the best for general purposes. In gardening, as in other arts, science will explain the cause of success or failure, and it will sometimes suggest new and improved practices: but no reasoning on scientific principles can set at nought practices which have been attended with success for ages; and one of these, in our opinion, is the Continental mode of transplanting large trees. On extraordinary occasions, it may be desirable to prepare a tree for three or four years before it is removed; and, in that case, no details can be more complete than those given in the *Planter's Guide.*

The taste displayed in the grounds at Allanton is in general good. One or two defects have been pointed out by Mr. Nesfield which might be remedied. It is pleasing to see evidence of the enthusiastic delight which Sir Henry must have had in improving his place, in an extensive plantation made at his expense on a hill belonging to an adjoining proprietor. Had this hill remained as it was, a naked moor, it occupies so large a space in the views from the grounds and house at Allanton, that it would have been a sad blemish in a landscape the chief merit of which is being wooded and rich in the midst of a comparatively naked and meagre country. The manner in which the single trees are scattered along the two approach roads, both of considerable length, so as to form foregrounds to the distant scenery, without destroying breadth of effect, deserves to be studied by the gardener; and not less so the manner in which the trees are grouped in the interior of the park.

The young plantations here are so thick, that, if not thinned in a very short time, such of them as have been planted as screens will defeat the object, by admitting the light and a view of the public road between their naked stems. The Turkey oak and the Norway maple thrive remarkably well in these plantations, and, what we were rather surprised at, we found a number of trees of *Acer hybridum*; not, however, so luxuriant as they are in the Horticultural Society's garden, the tree being indigenous on the mountains of Naples. In the kitchen-garden grapes are ripened annually, about the middle of April; the price of coal here being only 4*s.* per ton. Tile-draining is going extensively forward in the park and farm lands, and is found to pay well, even when it costs 10*l.* or 12*l.* per acre. On the whole, we were much gratified with Allanton and with the kind and hospitable reception given our party by Lady Seaton Steuart, who well merits the compliment paid to her by Mr. Nesfield.

Milton Lockhart, the seat of — Lockhart, Esq., M.P., brother to the celebrated editor of the *Quarterly Review*, is a very old place, celebrated in *Old Mortality* as the residence of Claverhouse. A new house, by Burns, in his peculiar combination of the old Scotch, or Belgian, style and the Tudor Gothic, is just finished. It stands on a prominent point of a peninsula formed by a remarkable turn of the Clyde; which, after washing the base of the bank on which the house stands, darts away from it across the valley, and, after a course of, we should suppose, above a mile, returns to another bank near the house, enclosing, as it were in a loop, a beautiful piece of meadow scenery, fringed with trees on the banks of the river. We confess, however, that our recollections of these features are insufficient to do them justice. The approach to the house is over the Clyde, on a lofty bridge of a single arch built by Mr. Lockhart; and the steep banks between the river

and the house have been begun to be laid out in terrace gardens, which, when completed, promise to have an admirable effect. At present, nothing is finished but the house; and all the ground work is at a stand-still, and likely to be so for some time, on account of electioneering expenses. We went over every part of the house, from the cellars to the garrets, and found in it everything which a villa, or rather a mansion, ought to contain, though on a small scale. When Milton Lockhart is finished, it will be a residence of great beauty and variety, from the contrast of the architectural gardens at the house, with the romantic windings and picturesque banks of the river, and the wooded hilly scenery which extends on every side. The greatest drawback to its beauty at present is the curved line of the approach, which ought to be conducted in one straight line from the bridge to the entrance court of the house. Such a straight horizontal line is wanted to balance the innumerable curved and broken lines which form the natural characteristic of the locality. In the flower-garden we found a collection of sweet-williams which surpassed in beauty every thing of the kind that we had before seen. The gardener had been collecting them for several years.

Milton Lockhart to Lanark. The ride from Hamilton to Lanark, along the banks of the Clyde, has long been celebrated for its beauty, and it forms a very good study for the landscape-gardener who has walks to form along the banks of a natural river. Here he may see the effect of such bends in the walk as command long reaches of the river, and others which merely look across it; of seeing the water from an open glade, and from a dark thicket; of seeing it near at hand, and at a distance; of the walk being parallel to the river's course, of going away from it, and approaching it; and, in particular, he will learn the fine effect of some of these changes, when accompanied by the sound of a waterfall, now rising and now dying away on the ear. The inn at Lanark is a larger house than that at Hamilton, but in point of comfort it is far inferior.

July 30.—*Cartland Crags*, a remarkable chasm with rocky sides, overhung with trees, and rich in wild plants, and also the Stonebyre Falls of the Clyde, afforded us much enjoyment, but we cannot stop to describe them. The natural oaks on the banks of the Clyde we found to be every where *Quércus sessiliflòra*.

Lee, Sir Norman Lockhart, is a place of great antiquity, and remarkable for some fine old trees. Amongst these are three larches (mentioned in the *Arboretum Britannicum*) of the same age as those at Dunkeld, the largest of which is 12 ft. in circumference at 4 ft. from the ground, and 100 ft. high; silver firs and spruce firs of the same age, and of nearly similar dimensions; a row of magnificent old limes, which, however, from standing too close together, have taken the character of a gigantic hedge;

an oak of extreme age (*Q.* sessiliflòra), 46 ft. round at the first branch, and a foot or two larger at the surface of the ground; a very fine beech, 3 ft. in diameter at 4 ft. from the ground; very large sycamores and ash trees; and very curious old yew and holly hedges. Altogether this is a most interesting place; but it has little or no artistical merit. The surface is undulated in the most inviting manner for planting, but there are, unfortunately, but few trees in proportion to the extent of surface, and these are by no means disposed so as to produce the best effect. The exterior of the house is imposing, from a massive central tower; and it stands on a terraced platform, covered with loose pebbles, very disagreeable to walk on, or rather wade through, or to drive over, but very suitable for a wet climate, as the surface soon becomes dry after rain, and indeed may be walked on immediately after the heaviest shower. One thousand single trees judiciously distributed over this place, without any other expense whatever, would render it one of the finest on the banks of the Clyde.

(*To be continued.*)

Art. II. *Notes on Gardens at Brighton, Shoreham, Worthing, and Lancing.* By the Conductor.

"One advantage to a poor man, arising from cultivating a taste for architecture and landscape scenery is, that it prevents him, in many cases, from envying the residences of the rich; not but that the poor man would be glad of the most tasteless place that could fall in his way as a property, but that the bad taste often displayed in places directs his thoughts in a different channel, and gives him a feeling of elegant superiority that wealth without taste cannot bestow. Next to the satisfaction of possessing any object is that of possessing a knowledge of its faults and beauties, or what we fancy are such."—*H.* These are the remarks of a friend of ours, which he applies to houses and furniture in town (and, having little to do, he visits most houses in the fashionable parts of London that are to be let, or where the furniture is to be sold), as well as to houses and grounds in the country; and we offer them as an excuse for not noticing one or two of the villas on the rising grounds to the north of Brighton.

The remains of the Antheum, the cause of the falling of which is given in our Volume for 1833, still exist; there being no demand at present for ground to build on in that part of Brighton. Had it succeeded, the effect exteriorly would have been good; for a dome is a form uniting grandeur and beauty in an eminent degree. The interior effect, however, would, we

think, not have answered public expectation; because there could not have been any sufficiently lengthened perspective to give the idea of interior grandeur. A parallelogram would not have been so attractive externally, but would have been far more interesting within, and executed at much less expense: witness the conservatory which connects the house with the armoury at Alton Towers.

The Swiss Gardens at Shoreham have been extended and improved, and they exhibit a very respectable assemblage of roses and showy flowers. We wish there had been a few more shrubs of different kinds, with labels exhibiting their names. Were only one shrub or tree of a kind, or even two, introduced in these gardens, they might contain a very tolerable arboretum; nor would this interfere with any of the uses or applications of any part of the garden. For example, there are, we should think, twenty or thirty plants of common willow on the banks of the water; and twice as many creepers on the walls, comprising only two or three species: but both willows and creepers might be of as many different species or varieties as there are plants. However, it is a most gratifying circumstance to observe the improvement that has taken place in these gardens since we last saw them in 1838; and their proprietor deserves the highest credit for forming them and keeping them up, as his object has evidently been more the accommodation of the public than his own emolument.

Worthing.—There are a number of very neat villas here, with the grounds more highly kept than is to be seen in most places; not excepting the vicinity of the metropolis. One of the handsomest is Tudor Cottage, which appears to have been formed within these two or three years. In the gardens of the town, close on shore, we found the red and white valerian forming conspicuous ornaments.

Tarring. — In the fig orchard, thirty-seven large trees were destroyed, or severely injured, by the winter of 1837–8; but a number of young trees have been since planted, and these and the remaining old ones are covered with a more than usually heavy crop of fruit. We found the Brompton stocks here remarkably strong; and a spot in the garden was pointed out to us, in which whatever kind of stock, whether red, purple, or white, is planted, becomes variegated.

Lancing, the seat of James Lloyd, Esq., is a beautifully situated small place, with the gardens and pleasure-ground kept in excellent order by the gardener, Mr. Kidd. There is a fine specimen of *O'rnus europæ'a*; and a large plant of the rose acacia, the branches of which are separately supported by stakes in the star manner, recommended in the *Arboretum Britannicum* (vol. ii. p. 628.), so that the tree forms a large hemispherical

mass, which, when covered with bloom, as it is every summer, must be a truly magnificent object. The grounds at Lancing would be wonderfully improved by thinning out two clumps, and substituting a wire fence for a clipped hedge which surrounds a paddock embraced by the pleasure-ground. The effect of removing the hedge would be to allow the eye to penetrate among the trees and shrubs, which, in consequence of glades of turf among them, would exhibit an indefinite picturesque boundary, adding at once beauty, variety, and apparent extent.

(*To be continued.*)

Art. III. *On the present State of Garden Architecture.* By Alexander Forsyth.

I beg leave, through the medium of your widely circulated Magazine, to point out to garden builders some of the absurdities practised therein, and regret, for the credit of British gardening, that "we gardeners" are such a long and weary way behind in our architecture. Hothouses, all over the country, have been erected, and are now being built, of a splendour and magnitude hitherto unknown in the land; and it is not to retard this praiseworthy work that I now address you, but only to caution, as a friend, those who are thus engaged "to stop and think" a little "before they further go," lest they be compelled to confess with sorrow and to their cost, when the work is completed for them, "that the builder lost his pains." I have long ago, in this Magazine, pointed out the uselessness of having a strong brick wall to support a lean-to-roofed hothouse and a lean-to-roofed shed, instead of coupling the rafters at the apex, as in cottage roofs, and thus making them both stand in their "strength alone;" and, if farther argument were deemed necessary on this head, I would invite any one to look at the extent of the apartments roofed without inner walls at the Derby railway station. Now the space lost at the apex of the roof of a hothouse is the very best in the whole house, the cream of the artificial climate, for in that particular spot the air is hot, moist, and in motion in a greater degree than in any other place in the whole house; and instead of using this fine climate, by having the trellis running parallel with every inch of the roof, the strong brick wall steps in, and, forming an acute angle, requires the trellis to be shortened in order that the sun may shine upon the barren lime-washed wall. There are, I must allow, some beautiful exceptions to this sweeping criticism, where the back wall is covered with peach trees, and a quadrant-shaped trellis occupies the front floor, for in this instance the surface of trellis exceeds the sur-

face of glass greatly: but, in ordinary instances, how commonly you see a shelf of strawberry pots right up in the corner, close to the glass; and the reason generally assigned for their occupying this awkward locality is, that the light, and especially the free air when the lights are opened, may induce them to set their fruits, which long experience has proved they will not do lower down. No wonder. There are no such quarters lower down; for the arid heat and drenching steam, as they issue "entire" from their source, no matter whether that be pipes or flues, are sufficient to injure the extremely delicate texture of the anther and stigma, without which fully and freely developed fruit cannot possibly come. And when fruit does set in the upper-shelf atmosphere, it is not the outer air that effects it (certainly not the exposing delicate blossoms, accustomed to the shade and shelter of the glass for twenty hours out of the twenty-four, to the full sun and the winter wind for a few hours in a fine day): no; but the moist and dry warm air, being better mixed as it ascends higher, forms a climate of a very different character from that which is found below; and it is in this sweet soft air of artificial spring, that blossoms, unruffled by the breeze, expand their rosy petals and impregnate fruits. The sun heat, too, received through the glass in the lower part of the house, adds wonderfully to the temperature of the top corner, and acts the more intensely, on account of the accelerated motion it acquires as it ascends, in the same way that the contrary element, frost, is felt so severely when accompanied by a brisk air; and though I may be told that strawberry plants and French-bean plants answer admirably on these top corner shelves, and cost little or nothing, since the house must be heated and otherwise treated the same, whether the shelf were there or not, yet this is by no means a sufficient compensation for the loss of so much vine trellis.

Now, in cases where such houses are already erected, I should, as a matter of course, occupy every inch of space under the glass, and, therefore, must have a top shelf, like my neighbours, and occupy it with plants for fruit or vegetables, if necessary: but I should feel sorry to see a vine trellis shortened a yard to gain a row of strawberry pots in the house, and therefore I would advise any one who has the means and the good will to build a garden and hot-houses, to have, if possible, small houses entirely devoted to the production of one species of fruit, as vineries for grapes, and strawberry houses for that desirable fruit; and I can assure them that such, if properly managed, will pay the cost of exclusive culture handsomely. I speak from experience, for I have tried both a good deal, and I have seen both tried very extensively.

Alton Towers, May 20. 1842.

Art. IV. *To connect a Greenhouse with a Library (in Effect), at the same Time that one End is built against that End of the Room that contains the Fireplace.* By J. R.

We have applied windows over fireplaces here in many instances, and have found them very convenient; and the flues also had a good draught: but we have recently employed a window over a fireplace in a very peculiar way, and one that I am certain you would be delighted with.

The room in which the alteration is made is Mr. Paxton's office, with two windows in front (the longest way of the room); these had to be of ground glass, as the walk to the front door had to pass them. The object of the alteration was to obtain a general view from the window, without the room being overlooked, and also to have a view of the entrance gate; but neither of these could be acomplished without an opening in that end of the room which contained the fireplace, and against which the end of the greenhouse was built. A window over the fireplace was therefore settled on; but a difficulty presented itself, which was, that upon certain occasions the room must not appear to have a window in the end, as the greenhouse could not be overlooked; however, with the assistance of a frame built in the wall, lines, pulleys, &c., we got over this, constructing the affair so that by pulling a seeming bell-rope, we could either have a window, mirror, or neither, over the fireplace at pleasure. The first intention was to have both a mirror and window seen at once, the former over the latter; and when the mirror was drawn down over the window at any time, the space it left was to contain a landscape exactly similar to the actual view from the window when the mirror was up. This would have been a most interesting piece of deception; but it was abandoned, because when the mirror was drawn up it was too high to be of any use, and by having both, it kept the window low: so we contented ourselves with a larger window and mirror, and to use them alternately. The shelf of the chimneypiece forms the window bottom, and on this stands a handsome frame round the opening, which serves as an architrave to the window and a frame to the mirror. Both window and mirror are hung in the manner of common sashes, and they are drawn up into a framework built in the wall by seeming bell-pulls hanging in the recesses on either side of the breastwork, and connected with ropes and pulleys. The mirror and window are each in one sheet of large plate glass, and are drawn down by little bits of brass inserted flush in the under part of the frames with an opening for the finger. When the mirror comes down it shows a frame all round; but the lower frame of the window sinks into the sill, so that the glass is level with the marble chimney shelf, thereby offering no in-

terruption to the view. The top of the opening is splayed, as well as the sides, and these are all filled in with mirrors. The floor of the room is 2 ft. above the floor of the greenhouse and general surface. There is a sliding shutter outside, coloured and trellised the same as the greenhouse walls, to prevent any appearance of a window when desired, and even the joints of this is hid by a trellis framework round the window, with a seat in the lower part to perfect the delusion.

I shall try to describe this end of the room in its present state. By the arrangement of the plants in the greenhouse, any one sitting at the library table in the room has a perfect view of the gate and the park beyond. A stranger, on entering, pays no attention to the handsome oak bookcases which occupy the recesses on each side of the breastwork; he has no eye to scan the neat but very low shell-marble chimneypiece, or the handsome Sylvester's stove within it; he is at once bewildered and perplexed with the vista of plants before him, and doubts his having entered the proper place, for these are trebled in admirable intricacy by the splayed mirrors round the window. Here he sees the splendid *R*hododéndron altaclerénse forming a background to the more delicate *L*ílium speciòsum; there the tall and stately Fúchs*ia* corymbiflòra, with its drooping flowers, taking under its protection the more humble pelargoniums. Besides these are the Araucària excélsa, myrtles, acacias, and a variety of interesting fuchsias, &c., vying with each other in richness of tint and gracefulness of form; with innumerable others of bewitching beauty, that appear like enchantment, and remind the visitor of his boyish dreams over the *Arabian Nights*, which are now realised. This is the effect which, in an instant, as if by magic, can be destroyed, leaving a room with two dull windows and a mirror over the fireplace.

Chatsworth, July 21. 1842.

Art. V. *A Mode of Ventilating Hothouses without excluding Light.* By T. Torbron.

As an effectual means of ventilation, and the direct admission of perpendicular light in glazed edifices, I beg leave to suggest that, in sliding roofs, about 2 or 2½ feet, at the upper end of the roof, should be made to tilt on hinges back to the parapet, or to run over the back wall by a continuation of the rafters. By either of these modes the lights would not lie one over the other, so as to intercept double the quantity of light usually excluded by glass.

The other sashes being made of convenient lengths, say 5 ft., for sliding freely either up or down, the trees and plants might

then receive, in their turns, the full influence of the sun, which is most essential for the perfecting of peaches, and also for the cultivation of other plants of various kinds; and it is better thus to have the means of exposure at pleasure of the trees and plants, than to take all the lights off at once.

In curvilinear roofs (not having seen one properly ventilated) I beg leave further to suggest, that, besides admitting air under the roofs and from the doors, there should, for effectual ventilation, be, at about every 10 ft., two astragals, say at 4 ft. apart, of sufficient strength to admit of ventilators to revolve on pivots or rings, so as to open either inside or outside, or both, as may be thought eligible; the width of the ventilators to be regulated as most convenient: perhaps 2 ft., divided so as to fold, would be the best.—*Bayswater, March,* 1842.

[Since this was in type, we have observed a similar article, by Mr. Torbron, in the *Gardener's Gazette* of July 23. Had Mr. Torbron, when he left the article with us, stated that he had sent a copy to another Journal, we should of course not have published it; but it is now (July 25.) too late.]

Art. VI. *On Maiden, or Virgin, Soil.* By R. Lymburn.

In the Number of the Magazine for February, Mr. Wighton had an article on the above subject, in which he takes notice of an article of mine that appeared last year on the same subject in the *Gazette,* under the signature R., from which he appeared to differ, and to which I have only now had time to reply. The difference is more in the application of the term than any thing else. Mr. Wighton has confined the term to the surface of land that has long lain uncultivated, and he seems to consider the principal benefits to arise from a crust of organic matter deposited during the time the land has lain in an uncultivated state. I have always, however, understood the term to apply to uncultivated, or untouched, soil, as the name would seem to infer, whether from land long uncultivated at the surface or trenched up from below that which has been too long in cultivation; the old effete soil being deposited in the bottom, and a fresh surface of virgin, or untouched, soil brought to the top. It is true, as Mr. Wighton says, that the organic matter deposited by the lapse of time in uncultivated soils is very beneficial; it is sometimes also in excess, and hurtful. Were the sole benefit, however, derived from the organic matter deposited during the period of rest, it would be easy to remedy this defect in the too much cultivated soil, by the addition of manures. The addition of manure, however, is found in practice not to remedy the defect; in fact, some of these old worn-out soils are rather in the other state, and have got into a black half-peaty condition, from the quantity of

undecomposed organic substances accumulated in them. This was eminently the case with the piece of nursery ground under our care for a considerable period, some years ago, as noticed in the article in the *Gazette*. There were four acres in that piece, of as fine alluvial soil as could be wished for; containing a due proportion of sand to entitle it to the name of light free soil, and yet not so much as to be hurtful; perhaps about 50 or 60 per cent of sand, besides that united chemically with the alumina and forming with it clay. It had been about forty years in cultivation as nursery ground before coming under my care; and in the most sandy parts of the grounds had become so effete or inactive, or what a Scotsman would term fuzzionless, so spent and worn out, that no manure we put on it could renovate its lost powers. The more clayey portions had not suffered so much, but were very much deteriorated also. Even another field of nursery ground on the other side of the river, though entitled to the name of clayey, and not quite so long under cultivation, had acquired a good deal of the same effete worn-out condition. The more sandy portions especially, when broke and reduced into small pieces, had, to a certain extent, the same fault as the other piece of ground. It is necessary in ground under nursery crops, especially where many seedlings are raised, to keep the surface in a very minute state of pulverisation; and, in the oldest and most worn-out piece of nursery ground, the divided particles of soil, in place of keeping in that state during the greatest part of the summer (as good soil generally does unless the rains are more than usually heavy and long continued), dissolved into powder, and assumed the state of a loose incoherent mass, in which neither capillary attraction nor atmospheric action had its proper effect; and ended in becoming, like peat soil, a nidus or receptacle for mosses, the surface getting covered with a coating of these plants, which thrive only where a vigorous growth of other plants cannot be obtained. To remedy this, we were in the habit every year of trenching a considerable portion in the winter. We trenched two spadings and two shovelings deep, burying about 1 ft. deep the black worn-out soil, and bringing to the surface a brown hazel-coloured sandy loam, which was sharp and active. The particles, though minutely pulverised, preserved nearly that condition during the greater part of the summer, especially if broken up and worked in dry weather; the soil kept in a spongy state as broken, but the minute particles preserved their coherence, and retained the moisture, heat, atmospheric air, and various substances deposited; food was retained, and chemical action promoted, and the plants of consequence grew more vigorously.

In all deep alluvial soils, this renewal by trenching will be found of immense benefit to all surface-rooted plants, where the

ground has to be minutely pulverised. In very deep soils required to be very long under cultivation, and where the expense is not so much a matter of calculation, owing to the high rent of the land, it might be beneficial to trench to the depth of three spadings and shovelings, alternately with the two. Where the subsoil is a red ferruginous clay, or a cold blue clay, the work should be done more cautiously; a little new soil only should be brought up at a time, and a plentiful sprinkling of quicklime, especially to the first sort, bestowed. Even where the subsoil is a red ferruginous gravel, it will be of benefit to turn up a portion of the iron to the action of the air: the more soluble protoxide of iron will be converted into peroxide, and become less soluble and not so dangerous; and if much sulphate of iron exists, which is soluble, and very hurtful in excess, the quicklime will be beneficial in decomposing it. Too little attention has been paid in theory to the mechanical condition of the soil. In the same field there are often very different qualities of soil, which suit one condition of the weather better than another; and the reverse takes place in other seasons. Different kinds of manure and crops are also suitable to different qualities of soil. One condition of the soil and weather may require the surface to be left as open as possible, while rolling and consolidation may be more suitable for another. Experiments in measured quantities afford a powerful and apparently accurate means of obtaining information; but, if the above statements are not attended to, very wrong conclusions may be arrived at.

The theoretical cause of the good effects following a renewal of the surface, by bringing up virgin soil, has been talked of as involved in mystery, and some unknown property in maiden soil has been sought for as the cause of its benefits; but, if we take into consideration the immense effect produced by a *proper mechanical state of the soil*, the stomach of the plant, where undigested substances are fitted for absorption, we can have little difficulty in assuming that as the principal cause. The reason why maiden soil keeps more compact in the particles when divided is, the tendency which rocks have to disintegrate, and, when again submitted to superincumbent pressure, to begin again to resume the state of stone. That the first cause is in action, we may have every day experience, by seeing the effects of moisture and heat long continued on rocks, aided by the action of the carbonic acid, oxygen, &c., of the atmosphere. We may see the solid rocks cut through to an immense depth by the action of water; and we may also see them crumbling to pieces, not less effectually though more slowly, under the ordinary operation of heat, air, and moisture. That this action continues after the pieces of rock have been brought together in a mass, and mixed

with organic matter in the form of soil, and that the further disintegration of the rock proceeds every time the soil is dug and pulverised, and exposed to the action of the air, we may also infer from observation, when we find the soil by long cultivation dissolving into a powdery incoherent mass.* We thus see the cause why long continued cultivation injures the mechanical texture of the soil, by destroying the molecular attraction of its particles. When a finely raked surface has been exposed to the weather a few weeks, by the missing of a crop, the old surface will not raise a new crop so vigorous, to sow it as it stands, even though cuffed an inch deep, as if pointed and raked anew, and a fresh surface brought up: a proof of the action of the air during that period.

The cause why resting of the soil, or trenching down the surface, has a tendency to restore its texture is, that pressure and consolidation have a tendency to unite the particles of earth again into stone. Professor Playfair long ago demonstrated the truth of this, when contending for the Huttonian theory of geology, which ascribed consolidation and immense pressure as the cause of the formation of rocks, by actually forming a piece of stone in that way. We see also in the deep consolidated clays which have been long deposited, as of the London basin, &c., that in some places, where exposed, they have been found to have become consolidated into stone before the exposure, by the pressure of the superincumbent strata. This tendency to unite again into the form of stone, in the disintegrated particles of the rock which form the soil, causes them to unite more firmly together when pressed and consolidated, being freed from the action of the air, and pressed together when at rest; the tendency to unite, though far short of that which would form stone, has yet the effect of causing the particles to adhere uniformly together, and not to dissolve so easily into a mass of loose incoherent powder, as before observed.

When we consider the necessity of keeping the soil in a proper mechanical condition, we need not wonder at the good effects produced by mending this condition. The coarse grains of sand are necessary in a certain proportion to keep the particles of alumina from adhering too closely; and, when the soil is of a rather adhesive clayey nature, immense effects have

* That it yields alkalies by disintegration, and concerning the nature of alkalies, of both of which Mr. Wighton pleads ignorance, any of the recent manuals of geology and chemistry, which may be had at very little expense, will furnish information. A tithe of the labour bestowed by him on the subject of bees, to such good purpose, would give him a fund of information on these subjects; which, in men filling such important stations, from their opportunities of observation in their every-day practice, enabling them to discover how present received theories are inconsistent with practical results, would be of immense benefit.

been produced from rotten pieces of turf or decayed straw mixed with the soil, or from having chanced to get what is called a good tid in the working, having been pulverised dry, and, consequently, keeping more open in the pores. This is one of the principal benefits, also, of farm manure, and is one reason why we may always expect this sort of manure to be more lasting in its effects than any of the very concentrated manures. The undecayed portions of the stable manure not only yield food as they decay, but, being intimately mixed with the soil, leave it full of pores by the void which their decay occasions; and by this means admit and retain heat, so necessary in promoting the chemical action of the various ingredients in the soil, and reducing them to soluble substances fit for absorption by the roots. By being full of pores, the rain is admitted; and by the pores being small, the water is retained by capillary attraction, excessive evaporation prevented, and the soil kept in a proper state as to moisture, a certain quantity of which only is needed to assist the decomposition and absorption of the food; too much or too little, an excess on either side, being both injurious. The carbonic acid, ammonia, nitric acid, and other substances contained in the air and brought down by every shower of rain, are also thus admitted into the soil, and also the oxygen and nitrogen of the air itself.

It has been denied that this last substance, namely, the nitrogen of the air, is at all useful to plants, and that the whole of the nitrogen of plants is derived by the roots, not the leaves, from ammonia alone, or, at farthest, ammonia and nitric acid. This theory of the French and German chemists, however, has not yet been confirmed by practice. It has been stated that ammonia is the sole substance of any value in manure, and tables have been furnished by which the relative value of manures is set down according to the quantity of ammonia they contain. It will follow, of course, that crops will exhaust ground according to the quantity of ammonia they extract from it. Ammonia is so mixed up with the other ingredients in manure, that it will take some time before we can decidedly talk as to the truth of the first proposition. Manures containing much ammonia do, indeed, seem most valuable, but whether altogether from the ammonia they contain, or the way it is mixed up with the other ingredients, is not so easily decided. To the last proposition, namely, that crops exhaust according to the quantity of ammonia they extract from the soil, or according to the quantity of nitrogen they contain, there seem also many corroborations. Wheat, and other crops containing much nitrogen, are very scourging exhausting crops; and a period of rest and dressings of manure are needed before any other crop will succeed well. If we follow out the theory, however, and apply it to another very

common crop in the country, namely, beans, we find that though this crop extracts from the soil about double the quantity of nitrogen, yet it by no means exhausts the soil so much; it is even by most farmers reckoned a fertiliser, and oat crops do better after beans than most other crops.* If ammonia be the sole source of nitrogen to plants, and if this be wholly got from the soil, as theorists say, how does it happen that this plant, which takes away so much nitrogen, is rather an improver than exhauster of the soil? It would appear that the nitrogen of the air is made available in some way not explained yet by theory. Apart from theory, however, the benefits derived from keeping the soil open and pervious are palpable to experience; we have seen it often double the rate of growth. It is possible to go to excess even here: too spongy peaty soils, containing too much organic matter, get acid and sour when wet; or, if drained, are so spongy that they will not retain the proper degree of moisture, and in dry seasons less porousness is required. In deep, alluvial, fertile, loamy soils, however, and in our moist climate, the more open and porous the soil can be kept the better; and this state is best maintained when fields long under cultivation are renovated periodically, by bringing up a portion of the maiden or virgin subsoil.

Art. VII. *Notice of an Alarm Bell, a Garden Scraper, and a large Sycamore.* By M. Saul.

I suppose you will have observed in the *Gardener's Chronicle* of June 11th, p. 390., the burglary at Mr. Tongue's house, Forton Cottage†; perhaps the enclosed sketch may be of interest

* Another part of the theory is, that food is beneficial to animals chiefly according to the quantity of nitrogen it contains. This seems to be corroborated by beans, which are excellent food for cattle; they thrive well both on the beans and straw, and cows give a far richer milk. We find, however, on the other hand, that some foods containing little nitrogen are very nourishing, as potatoes in this country, and maize in America, on which cattle are said to get strong, and firm in the flesh.

† The following is the paragraph alluded to. "We have received from a correspondent, an account of a burglary committed on Saturday by a party of four men, at Forton Cottage, the seat of Mr. Tongue, situated about six miles from Lancaster. The robbers, who were disguised, effected their entrance by battering down the door with the trunk of a large tree; and, after seriously ill-treating Mr. Tongue and his servants, carried off all the money and other valuables they could find. They remained a considerable time in the house, having threatened Mr. Tongue that, if he made any alarm, they would take his life; and, after regaling themselves with wine and the contents of the larder, they left the house about daybreak. An alarm was immediately afterwards raised in the neighbourhood, and information sent to the police of this city, but no trace of the thieves has yet been obtained." (*Gard. Chron.*, June 11th, p. 390.)

for the *Gardener's Magazine*, as several burglaries have of late been committed in this county, and in different other counties, causing great alarm to the inhabitants where they have been perpetrated, and the adoption of various plans for the protection of property and life.

The following plan I am inclined to think might be adopted at a very trifling expense, and would give an alarm to the neighbourhood. A slight inspection of the sketch (*fig.* 38.), which

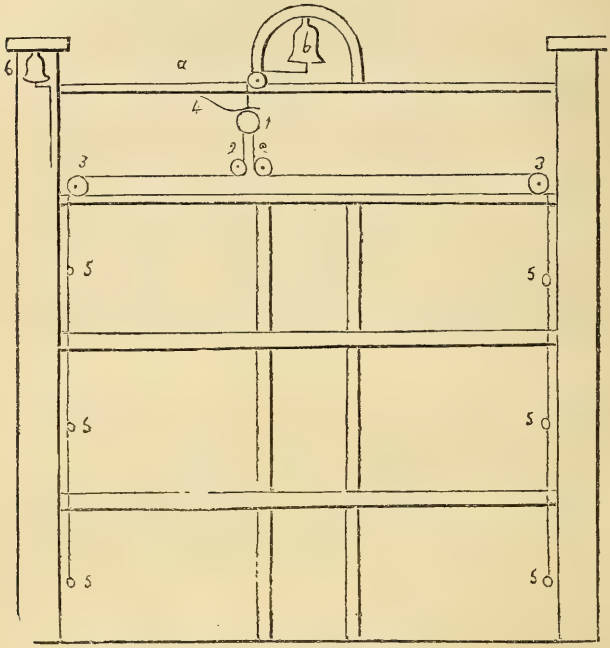

Fig. 38. *Section of a House fitted with an Alarm Bell.*

is a section of a house, will make it easily understood. *b* represents a bell fixed upon the top of the roof. A wire is to be fastened on the lower part of the tongue of the bell, and to pass over a small wheel to the ring 1. To this ring a number of wires may be fixed, which pass under the small wheels 2 2, and are carried on over the wheels 3 3, down into any of the rooms of the house, as at 5 5, &c.; so that if any person should hear any one breaking into the house, he has only to seize hold of the wire, and pull it in the same way as a room bell, which will set the tongue of the bell in motion by means of the spring 4, which is fixed under the roof-tree. It is well known that a bell worked in this way will send the sound to a considerable distance; and there can be no doubt that if Mr. Tongue had had it at the

time, the robbery would have been prevented; because, at the moment the thieves were commencing their entrance, a friend of Mr. Tongue's was passing but a very short distance from the house, and, if he had been aware of the robbers, he would have been able to muster a considerable strength in a few minutes and take some of them.

I have seen Mr. Tongue this morning, and have had some conversation with him respecting the plan of my bell. He thinks of putting one up in one of the chimneys, as I have marked at *b*, with the wire passing down the flue into his bedroom, as he does not make use of fire in it; and I think it might answer.

He has not yet been able to make out the thieves who robbed his house; they got 13*l.* 10*s.* in cash, his watch-chain, seals, and key; it so happened that the watch was gone to be cleaned. His loss, I suppose, will amount to above 30*l.* including the damage done. It was a great wonder he was not murdered, as he resisted them as long as he had strength; but what chance has one man against four villains, all armed with desperate weapons?

I have also enclosed a drawing of an improved garden scraper. (*fig.* 39.) Our ideas are more easily accomplished by the light ex-

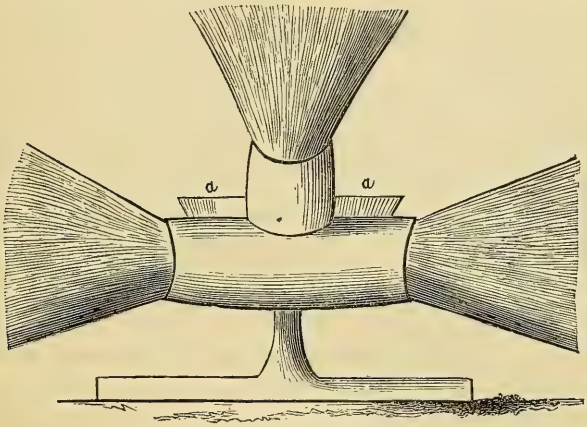

Fig. 39. *An improved Garden Scraper.*

pense we have to encounter in putting our expectations to the test by the means of cast iron. This scraper acts both as a brush and a scraper, which is a great advantage in wet weather. It is cast all in one piece, and is hollow to receive three brooms. They are made either of birch, ling, or whalebone, just the size that will press tight into the ends of the cast-iron tubes, as shown by the figure.

As soon as the shoes are scraped on the scrapers (*a*), the foot is

moved backwards and forwards on the brush, which will soon perfectly clean the shoe.

In this village churchyard there is a rather extraordinary plane tree [sycamore, *A*cer Pseùdo-*P*látanus], of a large size and completely hollow, and the jackdaws build their nests both in the main hole and in the large branches. They have their entrance into the tree through small apertures, which, I suppose, at some time have been branches broken off and decayed. The lads are not able to get at these nests; indeed very few persons are aware that this tree is hollow in the inside, as it is now in full leaf and of a handsome shape. I have no doubt if there were an opening into this tree, where the jackdaws have their nests, that I and three more men might sit in it; if you should think a rough drawing and description of it would be of interest for your Magazine, I would send it to you.

Having said so much, I must leave it to your judgment, as it is now many years since I wrote to you, having given up all business, and retired into the country to spend the remainder of my days where my forefathers did, in the neighbourhood of Garstang.

Garstang, June 14. 1842.

Art. VIII. *On draining Garden Pots.* By Robert Errington.

I beg to offer a few practical observations on a mode of draining garden pots; and as the remarks I shall make are the result of extensive practice, coupled with very close observation, they may be relied on, as far as they go, and may, I hope, prove of service to (at least) amateurs; who now, I fancy, form by no means an insignificant portion of the gardening community.

When I was a lad, all composts were subjected to a severe scrutiny by the riddle or sieve; all organic matters were scrupulously rejected, and the fine-looking residue tossed into the pot on a single ill-placed crock: the consequence was, that, after the first watering, the drainage became progressively more and more imperfect, until, finally, the mass of soil became, in many cases, a nest of worms.

These facts are now, I am aware, generally known; and the single crock of former days has given way to a series of crocks, placed with a nice hand and covered yet again, it may be, with a layer of pounded crocks. This is just as it should be: however, pounding of crocks for the thickening multitudes of plants in modern days is no joke; and as many of these plants are of a somewhat ephemeral character, in point of duration, some compromise is necessary to economise labour, without affecting, to any material degree, principles of high cultivation.

In your excellent publication, the *Suburban Horticulturist*,

a work, in my humble opinion, well indeed adapted to the end in view, and all that the age could, by any possibility, expect, you have described old tan as being prejudicial to vegetation. Now this is an error: that you should fall into slight errors occasionally, in such a work, is certainly no marvel.

I have used old tan as pot drainage for plants for some years, and find that few plants dislike it. Let me, however, speak guardedly: I have not used it (neither shall I at present) for any kind of plant which is to remain in a pot for years. We have, nevertheless, a multitude of things which are "here to-day and gone to-morrow," as far as the pot is concerned, and amongst such I scarcely know an exception.

My general mixture, as drainage for such things, is old tan, riddled quite clean, rough bone, and a little powdered sphagnum, which I always keep by me in a dry state. These materials, placed over a crock or crocks in the bottom of the pot, I have seldom known to fail; but in the great majority of cases they are highly beneficial, not only as drainage, but as food for the plant. It does not follow from this that a plant will do well in such materials; altogether, the mechanical texture of soils is the main point, and it so happens that texture and quality are almost one and the same thing.

Bone manure is a thing far better understood practically in the country here than about the metropolis, if I may judge by what the London press says about it. I have noticed much of its effects for the last twelve years, both in my own hands, and for miles around; and I consider it a wonderful manure, and one which will, in all probability, outlive guano. However, the artificial manures, which, as Dr. Lindley justly observes, "they run to the antipodes after," have had the effect of lowering the bone market, which had previously risen far too high for pockets of narrow calibre.

The Gardens, Oulton Park, June 29. 1842.

Art. IX. *The Landscape-Gardening of F. L. von Sckell of Munich.* Translated from the German for the "Gardener's Magazine."

(*Continued from* p. 268.)

XVI. *On the picturesque Grouping and Union of Trees and Shrubs.*

1. It is thus (see preceding chapter) that Nature displays the process by which she passes over from one sort of wood to another, in her primeval forests, without suffering a distinct line of separation to be visible.

But this process of nature can only be imitated by art in grounds where the woods are on a large scale and united to-

gether. It is only then that art is capable of uniting woods like nature, and of adapting detached groups and single trees of one wood, as it trenches upon another, to efface or conceal their boundary line. In small plantations, however, where the uniting groups are only from 50 ft. to 100 ft. in diameter, this cannot well take place without giving rise to confusion in the main forms, by these detached small groups, which would be injurious to the picturesque.

In these cases this union and transition can only be made to approach nature and the picturesque, by the irregular advancing or retreating outline of the groups, and their bold and deep indentations into each other.

2. But, in this cooperation of nature in conjunction with art, many other considerations must be had in view in planting grounds in the natural style, which are no less important to the landscape-gardener; these are:

(1.) The creation of beautiful forms, which would be admired by the landscape-painter.

(2.) The formation of many varied harmonising picturesque transitions among the different sorts of trees and shrubs.

(3.) The application and effect of the different shades of colour of the leaves, and of the stems and branches of the trees and shrubs.

(4.) Guarding against planting slow-growing trees behind or between those of a rapid growth, or low trees among tall ones, where they perish, leaving unsightly gaps and interruptions in the beautiful undulating line, which, even in plantations, should every where be apparent.

3. Nature expresses herself only by chance in a picturesque form; art, on the contrary, has expressly this end in view. The great intent of nature is, in general, merely to consign her plants to those places where they will be nourished and propagated, without regard to whether the trees and shrubs which are brought into contact have a picturesque effect or not; hence, it is not every scene in nature that can serve as a model for landscape-painting, or is worthy of imitation. Art, on the contrary, endeavours to attain both. If this is accomplished, as it is frequently very possible to do, she enriches her plantations, at the same time, with numerous exotic trees and shrubs; then, with the trifling advantage over nature before mentioned, she steps forward and names her creation a garden.

Beautiful forms are produced, however, in the first place, when many trees or shrubs of the same family are arranged in large masses, and for the following reasons. Trees of the same family have a greater similarity to each other than trees of different families: their growth, their forms, the form of their branches and leaves, and their colour are almost the same; consequently, they will present themselves to the eye in more

harmonious unison and more picturesque keeping, than in the opposite case.

4. This harmonious union which trees and shrubs of one family present should not, therefore, be either too arbitrarily or too often interrupted by other sorts of trees, because these beautiful, harmonious, and picturesque forms would, in a great measure, be destroyed.

For example: if, for a group of from 30 ft. to 60 ft. in diameter, from twenty to thirty different sorts of trees were selected, and these planted as they chanced to come to hand without regard to their growth or form, what landscape-painter would or could paint such a gallimaufry!

Planting was performed in this way in ancient symmetrical gardens. Whatever chance presented, whether a tree or a shrub, or of whatever species, was thrust into the hole; hence these plantations had neither picturesque keeping, nor picturesque value. This constant change destroyed all pretension to beautiful outlines; because they were continually disturbed and interrupted by other species of trees, frequently of an entirely opposite and contradictory character. From this it appears necessary, that, when it is possible, large masses of trees and shrubs should be planted with one sort, to the number of from 400 to 600 or 1,000 plants and more, according to the size of the ground*; because these, having an equal growth, form amalgamating and harmonious outlines, and also imitate nature, which usually displays itself in large bold masses.

5. What effect can be produced by a single maple, when situated solitary and alone, apart from its congeners, among trees of another species? A single tree so situated is as if lost in this heterogeneous multitude, and will often be pitied by the spectator, because it is so crowded up, and can so imperfectly display its beautiful form. This is but too well known a fact, which has often induced me, when trees so situated were worth preserving, and because they produced no effect and were scarcely seen, to have them taken up and planted in another spot where they might be more admired, or saved from an early death.

6. All sorts of trees are as different in their forms, as their value in picturesque effect is different. The broad obtuse crowns of the majestic oak, those of the beech and hornbeam, of the sweet and horse chestnuts, those of elms, limes, the common black and silver poplar, with the ash, the platanus, the common and black walnut, the tall willows, &c., have picturesque, distinct, and expressive forms. Their noble heads form picturesque groups, which now stand out in the full blaze of light, or, covered

* In small pleasure-grounds, of from eight to twelve acres in size, the groups may consist of from 100 to 200 or 300 trees or shrubs.

with shade, retreat into solemn obscurity, producing those agreeable effects of form and appearance by chiaroscuro, which are as instructive to imitative art, as they are worthy of its imitation.

7. These trees are, therefore, much preferable in form to the trembling poplar, the birch, the Italian poplar, the acacia, the negundo, the gleditschia, the celtis, the service tree, and the different sorts of pines and firs, when large groups or woods are to be formed with bold outlines, because these last-named trees are only capable of producing them in a much less degree.

8. For this reason, preference is to be given to trees with heavy foliage rather than to the fir tribe; and therefore more attention should be paid in grounds to the former than to the latter, for the following reasons.

(1.) The landscape-painter, when it is left to him, chooses the leafy foliage, rather than the needle-leaved, for his picture, as this has not so picturesque an effect as the former. The *P*ìnus *A*bies *L.*, in particular, forms a perfectly upright stem, with a pointed head, and almost horizontal side branches, which only assume a picturesque character when they have attained a great age, by the branches depending. The common fir (*P*ìnus sylvéstris *L.*) has the best effect for a picture of all the firs, because it is divided into masses, and forms an obtuse crown; it is only to be regretted that it is of a dirty grey colour; we, therefore, see many more landscapes painted with leafy foliage than with needle-leaved foliage, because the former expresses more drawing and roundness, more body and variety in form and colour, than the latter.

(2.) The fir tribe have, besides their uniform shape, a melancholy appearance, and should, therefore, not be too frequently seen in grounds, and then chiefly where cheerful scenes alternate with melancholy and solemn ones. The pine tribe, among which the *P*ìnus *S*tròbus is distinguished for its beauty and slender form, its light and airy branches, and its tender light green foliage, must therefore

(3.) Find a place in grounds, because they are evergreen; and in winter, when deciduous trees have laid aside their green costume, they supply their place, and prolong for our enjoyment the most beautiful colour in nature.*

* Besides these evergreens of the fir tribe, to which *T*áxus baccàta, and the different sorts of juniper may be added, there are also a great number of evergreen trees with leafy foliage, among which are particularly distinguished the Andrómed*a*, *A*rbutus *U*nedo and *A. A*ndráchne, *B*áccharis *h*alimifòlia, the *D*áphne, *E*uónymus americànus, the different species of *I*lex, the Kálm*ia*, Magnòl*ia* grandiflòra, *M*yrìca cerífera, *P*rùnus Laurocérasus, *P.* lusitánica, and *P.* sempervìrens, *P*ỳrus sempervìrens, *Q*uércus *I*lex, *Q. S*ùber, and *Q.* gramúntia, *R*hámnus *A*latérnus, *R.* sempervìrens, *R. l*ycioìdes, and *R. b*uxifòlia, *R*hododéndron máximum and *R.* pónticum, *T*hùja occidentàlis and *T.* orientàlis, *V*ibúrnum *cassinoì*des, and *V. T*ìnus. The rest will be found in the lists of trees and shrubs [at the end of the work], marked with a star.

(4.) When the fir tribe, arranged in thin groups of from 3, 7, 11, to 13 trees *, and planted along the sides of a road, having in the back-ground, at the distance of from 30, 40, to 50 feet from the road, a thick deciduous wood, from which the firs, so different in form, will stand out, they are displayed to great advantage, because, by their standing alone, without being mixed with or united to the deciduous wood, they form a contrast as picturesque as it is agreeable. It is therefore much better, particularly as regards harmony, keeping, and form, that the fir tribe should always have a distinct place appropriated to them, and never be mixed with deciduous trees.

9. This agreeable harmony among the forms in plantations will be greatly increased if proper attention be paid to corresponding outlines and effect of form. When those sorts of trees which have a spreading growth, and large branches and crown, and which have some resemblance in form, are brought together, such as the oak, the elm, the hornbeam, and beech, &c.; when others, again, which grow slight and conical, such as the Italian and balsam poplar, the birch, the fir (tannen), the larch, and the willow, the bird-cherry, &c., are seen in picturesque masses; when the waving transparent crowns, the acacias, the gleditschias, the service, and celtis, the willows, the aspen, the birch, the larch, the poplar, &c., are found together; when, on the other hand, attention is paid at the same time to the similarity and form of the leaves; when the broad-leaved *P*látanus is united with the maple (*A*cer *p*latanoìdes, *A*. Pseùdo-*P*látanus, and *A*. dasycárpon), and these again with the tulip tree (Liriodéndron Tulipífera), &c.; when the Spanish and horse chestnuts grow with the oak, the common maple and the white fir (*P*ìnus *P*ícea) with the yew (*T*áxus baccàta); when the oval and round-leaved sorts, the hornbeam and beech (*C*árpinus *B*étulus and *F*àgus sylvática), the elms (*U*lmus), the alder (*B*étula *A*lnus), the cherry, the buckthorn (*R*hámnus Frángula), &c., are in close proximity; and when trees and shrubs with pinnated leaves are together, such as the ash (*F*ráxinus), the walnut (*J*ùglans), the acacia, the negundo, the sumach (*R*hûs), the gleditschia, the service (*S*órbus), and the laburnum (*C*ýtisus *L*abúrnum), the *P*tèlea trifoliàta, &c.; one would soon be convinced of the advantage of this method of grouping trees and shrubs, and find it far preferable to uniting the acacia with the horsechestnut (*Æ*sculus Hippocástanum), the birch with the oak, the horsechestnut with the aspen, the yew (*T*áxus baccàta) with the catalpa (Bignòn*ia Catálpa*), the maple with the willow, or the acacia with the fir (*P*ìnus *A*bies).

* In planting single trees and groups, an uneven number should be taken, because that forms better and more natural groups.

These combinations can only produce contrasts, but no harmonious union; yet they are very interesting in grounds, and I have often applied them on that account. I have planted acacias in front of a wall of *P*ìnus *A*bies, where they stood out to the greatest advantage from this dark back-ground, and formed a striking contrast from the difference of their form; for the same reason, I have sometimes placed the narrow and white leaved willow, with the large and dark leaved maple, &c.

I do not intend to say, however, that only trees with broad truncated crowns, or those with conical pointed ones, should be placed together; or that the species with large leaves, or small leaves, or pinnated leaves, should always be grouped together. A plantation of this sort, from its uniformity, would be very tiresome to the spectator; because, when he saw an ash, he would immediately know that its companions would be the acacia, the negundo, or other pinnated-leaved trees: but there is no doubt that this method of grouping is the easiest and surest to obtain harmony of form. From this method of uniting corresponding trees and shrubs proceed all the other combinations and deviations, which may be multiplied a thousand-fold, and always different, of which, at the end of this fragment, several examples will be given.

As plantations in grounds should not only resemble nature, but should be as varied as she is, they should be made to imitate her in her freaks, in many places, by putting trees and shrubs together, without considering whether they will harmonise or not; because in grounds, as in painting, contrasts are required, which nature frequently effects, yet not always intentionally, for it is not every combination that forms a picturesque contrast, such as is required by art.

Nature also chiefly scatters her shrubs at random, which art, as we have already said, should imitate, but not too frequently. The *V*ibúrnum Lantàna may therefore sometimes be united with the rose, the *R*ùbus odoràtus with the *L*igústrum vulgàre, the *C*ŏrnus álba with *S*piræ'a *h*ypericifòlia, *C*ýtisus *L*abúrnum with *Syrínga* vulgàris, *S*ŏrbus aucupària with *P*rùnus *P*àdus, &c.; which, when placed in masses, only form contrasts, but no harmonious images. These contrasts increase the multiplicity of forms, and communicate to the whole a higher picturesque value, because they frequently interrupt the continual struggle of art to express itself in a beautiful and harmonious form, whereby repetition, and consequently uniformity, cannot always be avoided.

(*To be continued.*)

Art. X. *On the Culture of native Orchídeæ.* By A. X.

In Vol. II. of the *Gardener's Magazine*, p. 285., I gave a short outline of the treatment which had suited some of the native Orchídeæ, which I had then under cultivation. With the experience obtained in occasionally cultivating this interesting and singular tribe of plants since that time, I have still found it the best that has come under my observation. Since the former communication, I have had under cultivation, Goódyer*a* rèpens, Líster*a* cordàta, Líparis Lœsèl*ii*, O'phrys fucífera, and Gymnadènia álbida.

The three first-named species were potted in very sandy peat, using plenty of drainage in the bottoms of the pots. They were placed during summer in a cool shaded situation, and during winter were placed in a cold-frame. The Goódyer*a* has several times flowered, and also allowed of increase, and the other two flowered several seasons. The O'phrys fucífera and Gymnadènia álbida were potted in peat, loam, and sand; and were placed in the same situations as the others, both in summer and winter. The O'phrys flowered for two seasons; but I never succeeded in flowering the Gymnadènia, as it was a very small bulb when received, but was preserved for three years. I have also attempted to cultivate the rare Corallorrhìza innàta, but without success.

In commencing the cultivation of the native Orchídeæ, it is essential to their after progress, that, in collecting them from their native habitats, the bulbs should be got up carefully, and with as much of the fibres terminating the bulbs as possible. This, in most cases, must be done when they are in flower, as they are not easily recognised at other times; and, fortunately, they succeed very well when collected during the flowering season. The whole of the soil must be carefully removed from their bulbs before planting, whether they are to be potted or placed in the open ground. I have always observed that those bulbs which had been planted with a ball of earth have soon died off, apparently from the ball becoming either too compact, or else sour, from being of different ingredients from the earth in which they were planted.

Were the Horticultural Society to offer one of their higher medals for collections of native Orchídeæ that had been under cultivation for not less than two years, say, to be competed for in 1844, it is very likely that some of the excellent growers of plants around London would commence cultivating them with spirit.

B. G., Birmingham, July, 1842.

ART. XI. *Botanical, Floricultural, and Arboricultural Notices of the Kinds of Plants newly introduced into British Gardens and Plantations, or which have been originated in them; together with additional Information respecting Plants (whether old or new) already in Cultivation: the whole intended to serve as a perpetual Supplement to the "Encyclopædia of Plants," the "Hortus Britannicus," the "Hortus Lignosus," and the "Arboretum et Fruticetum Britannicum."*

Curtis's Botanical Magazine; in monthly numbers, each containing seven plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Sir William Jackson Hooker, LL.D., &c., Director of the Royal Botanic Garden, Kew.

Edwards's Botanical Register; in monthly numbers, new series, each containing six plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Dr. Lindley, Professor of Botany in the University College, London.

Maund's Botanic Garden, or Magazine of Hardy Flower Plants cultivated in Great Britain; in monthly numbers, each containing four coloured figures in one page; large paper, 1*s.* 6*d.*; small, 1*s.* Edited by B. Maund, Esq., F.L.S.

The Botanist; in monthly numbers, each containing four plates, with two pages of letterpress; 8vo; large paper, 2*s.* 6*d.*; small paper, 1*s.* 6*d.* Conducted by B. Maund, Esq., F.L.S., assisted by the Rev. J. S. Henslow, M.A., F.L.S., &c., Professor of Botany in the University of Cambridge.

Paxton's Magazine of Botany, and Register of Flowering Plants; in monthly numbers; large 8vo; 2*s.* 6*d.* each.

RANUNCULA'CEÆ

1605. AQUILE'GIA. [3919.
Skinneri Hook. Mr. Skinner's ♃ △ or ½ ap. my S.G Guatemala 1841. D co Bot. mag.

This is, perhaps, the most splendid species of columbine ever introduced, as the flowers are of a rich scarlet and green. It is most nearly allied to A. canadénsis, but is very superior in size and beauty. It appears "to be perfectly hardy, having survived the severe winter of 1840–1, in the open ground at Woburn, and flowered in great beauty during the summer and autumn of 1841." (*Bot. Mag.*, Jan.)

1629. *A*NEMO'NE [8.
rivulàris *Buch.* river ♃ △ pr 1½ jn. au W North of India 1840. S.D co Bot. reg. 1842,

"A hardy perennial, growing about 18 in. high, and requiring the same treatment as *A*nemòne *v*itifòlia, like which it suffers in winter more from moisture than from cold." It may be raised from seeds; but, as they do not flower till the second year, it is more easily propagated by dividing the root. (*Bot. Reg.*, Feb.)

1641. *H*ELLE'BORUS
orientàlis *Dec.* Eastern ♃ △ or 1 f. mr Psh Greece 1841. D. s.p Bot. reg. 1842, 24.
Synonyme: H. officinàlis *Fl. Græc.* t. 583.

This is a species of hellebore with purplish flowers, which is supposed to be the celebrated poison of the ancients. It is doubtless "hardy, although at present, on account of its great rarity, it has been kept in the greenhouse." It "requires rather a damp shady situation, with peaty soil to grow in." (*Bot. Reg.*, June.)

Nymphæàceæ.

1613. *NELU'MBIUM* 14321 speciòsum var. ròseum *Bot. Mag.* t. 3917.

Tropæolàceæ.

1148. TROPÆ'OLUM
edùle *Paxt.* eatable ☘ ⊿ or 6 mr O.G Chili 1841. s.p.l Paxt. mag. of bot. vol. ix. p. 127

"Tubers of a new tropæolum were received last year by several cultivators from Chili, and imagined the blue-flowered species till they blossomed in the present spring," when the plant proved to be T. edùle. The leaves of this species, which are divided into numerous narrow glaucous segments, distingûish it from all the other species. "The flowers (that is, the exterior of the calyx) have a deep greenish hue while in bud, and, when opened, the petals are of a very showy and bright orange colour. It is, when properly grown, a handsome plant; and will form a fine intermediate species between T. tricolòrum and brachýceras, coming into flower at nearly the same period. If the tubers be not duly covered with soil, or the pot in which they are grown be too small, or an insufficiency of water be supplied, the plant is very apt to die off in dry weather before having opened half its flowers." (*Paxt. Mag. of Bot.*, July.)

Oxalideæ.

1414. *O'*XALIS [3935.
lasiopétala *Zuc.* hairy-petaled ♂ ⊿ pr ½ jl Pk Buenos Ayres 1841. S s.p Bot. mag.

This pretty species of *O'*xalis was discovered by Mr. Tweedie in the neighbourhood of Buenos Ayres and Monte Video. The leaves are glabrous, and the flowers are of a bright pink, verging on rose colour, being produced in great abundance in a greenhouse. (*Bot. Mag.*, March.)

28249 Martiàna Zuc., Bot. Mag. 3938.

Rutàceæ.

1152. BORO'N*IA* 9326 anemonæfòlia *Paxt. Mag. of Bot.* vol. ix. p. 123.

Leguminòsæ

2837. *A*CA'CIA [3933.
platýptera *Lindl.* broad-winged ☘ ⊔ or 3 mr. ap Y Swan River 1840. C s.l.p Bot. mag.

"This beautiful acacia compensates for the absence of leaves in the quantity and rich colour of its heads of flowers." It is a greenhouse plant, and a peculiarly free flowerer. (*Bot. Mag.*, March.)

24766. DI'PTERA var. β eriòptera *Graham* downy-winged *Bot. Mag.* 3939.

3673. ZI'CHY*A*
glabràta *Lindl.* smooth ☘ ⊔ or 6 su S Swan River 1834. C l.s.p Bot. mag. 3956.
Synonyme: Kennêdy*a* glabràta *Bot. Reg.* 1838.

This species was accidentally omitted some years since in the extracts from the botanical periodicals inserted in the *Gard. Mag.*, and it is one of those now included in the new genus Zíchy*a*. It is a greenhouse climber, producing its scarlet blossoms in great abundance. (*Bot. Mag.*, July.)

MIMO'SA [1842, 33.
uruguênsis *Hook. & Arn.* Uruguay ☘ ⊔ or 2 jn. jl Pk Uruguay 1841. C l.p Bot. reg.

"A pretty greenhouse shrub, very nearly hardy." The flowers are pink, and in ball-like heads, like those of the sensitive plant. "It grows well in a mixture of light loam and leaf mould, and may be readily propagated by cuttings in the usual manner." (*Bot. Reg.*, June.)

Onagràceæ.

1188. Fúchsi*a* radìcans (see p. 178.)
Synonymes: F. integrifòlia *Cambess.*; F. pyrifòlia *Presl.* Bot. Mag. 3948.

GODE'TI*A*
albéscens *Lindl.* whitish ○ pr 1½ jn Pksh Columbia River 1841. S co Bot. reg. 1842, 9.

This is a new Californian annual, of a stiff erect habit of growth, and densely covered with leaves and pinkish flowers. It is quite hardy, and requires no other care than sowing the seeds in some place where it is not exposed to the wind; because its roots are scarcely able to keep the heavy stem erect, if the latter is much blown about. (*Bot. Reg.*, Feb.)

Philadelphàceæ.

PHILADE'LPHUS
mexicàna *Schlect.* Mexican ✱ or 2 jn W Mexico 1840. C co Bot. reg. 1842, 38*.

This plant was described by Professor Schlectendahl, in the *Linnæa*, as being the Acuilotl, or climbing aquatic of Hernandez. "This old author speaks of it as an inhabitant of wet and marshy places, creeping along the ground or scrambling up neighbouring trees; and he compares the plant, when in flower, to a musk rose." In the Hort. Soc. it is found to be the smallest of the species, "not growing more than 2 ft. high. It is subevergreen, and rather tender." It flowers in June, and is propagated by "cuttings of the half-ripened shoots." (*Bot. Reg.*, July.)

M*yrtàceæ* § *Leptospérmeæ.*

BABINGTO'N*IA* Lindl. (*Charles Babington, Esq.*, of St. John's College, Cambridge, a skilful bot.)
Camphorósmæ *Lindl.* Camphorwort ✱ ⊔ pr. 7 su Pksh Vasse River 1841. C. s.p [reg. 1842, 10. Bot.

An elegant shrub, growing near the Vasse River in Western Australia, in swampy land, and resembling *S*piræ'a frùtex or *h*ypericòìdes. It "grows well in rich brown peat and leaf mould, and flowers freely during summer from the ends of its pendent branches." It may be propagated by cuttings of the young wood "from spring to autumn." (*Bot. Reg.*, Feb.)

Passifloràceæ.

1923. PASSIFLO'RA [Paxt. mag. of bot. vol. ix. p. 51.
Middletoni*àna* Paxt. *Mr.* Middleton's ♃ ▭ pr 6 su G Pk South America 1837. C co
Synonyme: P. frà̀grans *Hort.*

This passion-flower differs from most other species of the genus, in its flowers having a delightful fragrance. It is of a luxuriant habit of growth, with robust stems, handsome shining dark green leaves, and greenish flowers dotted with pink. The ray is remarkably large and showy. It requires a temperature between that of the greenhouse and the stove, and rather a close atmosphere, with plenty of pot room for its roots. It strikes easily by cuttings. (*Paxt. Mag. of Bot.*, April.)

2193. *LOA'SA* [bot. vol. ix. p. 7.
Pentlàndi*ca* Paxt. *Mr.* Pentland's ○ or △ or 6 au S Peru 1840. S s.l Paxt. mag.

This species probably belongs to Caióphora rather than *Loàsa*, as it seems nearly allied to C. punícea, former called *Loàsa* laterítia. The difference, however, is in the seed-pod, which is not either figured or described; but which in Caióphora is twisted, and in *Loàsa* straight. The present species has large showy scarlet flowers, though it has a coarse habit of growth. It was at first kept in a greenhouse; but, on being planted out, it is found quite hardy in the open air. Some plants in Mr. Henderson's nursery being planted out into the open border, in June, 1841, and "left to nature, trailed along the ground, matted together, and composed a beautiful bed." (*Paxt. Mag. of Bot.*, Feb.)

Crassulàceæ.

3356. ECHEVE'R*IA*
ròsea *Lindl.* rosy ♃ ⊔ or 1 ap P.Y Mexico 1840. D s.p Bot. reg. 1842, 22.

This species is distinguished from E. gibbiflòra by its short compact inflorescence, and yellow flowers with rose-coloured bracts. It is a greenhouse plant, and "does best when grown in a very light house," as then the leaves, flowers, and bracts acquire brilliancy in their colours. "It strikes readily either from leaves or from cuttings, and should be grown in a light and well-drained soil." (*Bot. Reg.*, April.)

acutifòlia *Lindl.* acute-leaved ♃ ⊔ or 1 ap S.Y Mexico 1841. D s.l Bot. reg. 1842, 29.

This species is very handsome from its bright scarlet flowers and rich yellow bracts. The leaves, which end in a sharp point, are also of a brilliant green,

richly tinged with scarlet. The culture is the same as that of the E. ròsea. (*Bot. Reg.*, May.)

1472. CE'REUS 28297 Æthiops *Haw.*
Synonyme : C. cæruléscens *Pfeiff.*, Bot. Mag. 3922.

Compósitæ.

3630. PODOTHE'CA [3920.
*g*naphaliòdes *Grah.* Cudweed-like ○ p 1½ jl. au Y Swan River 1841. S co Bot. mag.

An annual with small heads of golden yellow flowers, but the stems are long and weak, and the leaves small. It appears quite hardy; and, though it has not ripened any seeds, it has been propagated by cuttings. It is a native of the Swan River. (*Bot. Mag.*, Jan.)

239. SERRA'TULA 20244 pulchélla. *Synonyme* Bot. reg. 1842, 18.

2340. CINERA'RIA Webber*iàna.*

This beautiful hybrid has flowers of "a deep rich brilliant blue," and leaves the upper side of which is a bright green, while beneath they are of a rich purple. It was raised by Mr. Smithers, gardener to Robert Williams, Esq., of Bridehead House, near Dorchester. (*Paxt. Mag. of Bot.*, July.)

*Lobel*iàceæ.

609. LOBE'L*IA* 30203 heterophýlla var. màjor *Paxt. Mag. of Bot.* vol. viii. p. 101.

Stylídeæ.

258. STYLI'DIUM [1842, 15.
Bruno*niànum* Benth. *Dr.* Brown's ⚟ ⊿ or 1 my Ro Swan River 1841. S s.p Bot. reg.

One of the prettiest stylidiums yet introduced, "remarkable for the fine bloom which overspreads all its parts, and for the whorls of leaves which surround its flower-stems." (*Bot. Reg.*, March.)

pilòsum *Lab.* hairy ⚟ ⊿ pr 1 su W Swan River 1841. S s.p.l Bot. reg. 1842, 41.
Synonyme : S. longifòlium *Rich.*; S. Díckson*i* Hort.

This species has larger flowers than any other stylidium yet introduced. It is a native of the country near the Swan River; and, in this country, it requires a greenhouse, with a soil of sandy peat, mixed with a very little loam. "It should be kept in small pots, and treated as a sub-aquatic during the growing season in summer, but must be kept rather dry during winter, and in a cool part of the greenhouse, where there is plenty of light and air. It is easily increased from seeds." (*Bot. Reg.*, July.)

Campanulàceæ.

GLOSSOCO'MIA *D. Don.* POUCHBELL. (*Glōssokomos*, a money-bag; resemblance of flowers.)
ovàta *Lindl.* ovate-*leaved* ⚟ ⊔ p 1½ jl W North of India 1839. Bot. reg. 1842, 3.
Synonymes : Codonòpis ovàta *Benth.*; Wahlenbérg*ia* Roýle*i* A. Dec.

A "hardy perennial, with spindle-shaped roots; rather pretty, much slenderer than G. lùcida, but not inclined to twine like that species, and seldom growing more than 1½ ft. high. It flourishes well in any good garden soil, and flowers in July." It is propagated by seeds. (*Bot. Reg.*, Jan.)

*Gesner*ièæ.

1702. GLOXI'N*IA* 15343 speciòsa var. macrophýlla variegàta *Hook.*, Bot. Mag. 3934.

The flowers are very large, and the veins of the leaves of a pale whitish green. (*Bot. Mag.*, April.)

1698. GE'SNER*A* [1842, 40.
longifòlia *Lindl.* long-leaved ⚟ ⊿ pr 2 jn. jl R Guatemala 1841. C s.p.l Bot. reg.

This species is remarkable for the very peculiar colour of the flowers, which are of a brick red, and curiously inflated in the middle. Its culture should be the same as that of Gloxín*ia* maculàta. (*Bot. Reg.*, July.)

NIPHÆ'A *Lindl.* Snow-wort. (*Niphos*, snow; in allusion to its spotless flowers.)
oblónga *Lindl.* oblong ⅓ ⊿ or ½ s.d W Guatemala 1841. C r.l Bot. reg. 1842, 8.

A beautiful little plant, resembling in habit some of the stemless gesneras, and remarkable as being one of the few instances known of a pure white flower in this order. It requires a heat between that of the greenhouse and the stove, and "it flowers in autumn and winter, after which the stems die off, and the plant remains in a dormant state till the following season." Of course, while the plant is in this state of rest, it should be kept warm and dry till the young stems make their appearance, when it should be repotted, and abundantly supplied with water. "It forms a great number of curious imbricated scaly buds, both on the surface and under ground, by which means it may easily be multiplied. It also strikes readily by cuttings. Any rich light soil will do for its cultivation." (*Bot. Reg.*, Jan.)

ACHIME'NES (see p. 179.) [1842, 19.
longiflòra *Dec.* long-flowered ⅓ ⊿ or 1 au. d V Guatemala 1841. C r.l Bot. reg.

A very beautiful plant, with large violet-coloured flowers. It requires a warm greenhouse, it which it will flower from August to December, its culture being exactly the same as that of the preceding species. From its great beauty, and the length of time it continues in flower, "this Achimènes longiflòra is an invaluable gift by the [Horticultural] Society to every one who has a warm greenhouse." (*Bot. Reg.*, April.)

[1842, 31.
pedunculàta *Benth.* long-stalked ⅓ ⊿ or 1 s S.Y Guatemala 1840. C r.l Bot. reg.

This plant is more like a gesnera than an achimenes, though it has "the thin soft foliage" of the latter genus, as well as the "cup-shaped disk and distinct anthers" which form its generic distinction. The culture is the same as that of the preceding species. (*Bot. Reg.*, June.)

Ericàceæ.

1339. *R*HODODE'NDRON 11023 anthopògon *Bot. Mag.* 3947.

Smithii aúreum *Paxt. Mag. of Bot.* vol. ix. p. 80.

This splendid hybrid was raised by Mr. Smith of Norbiton, Surrey, from a seedling of his own fertilised by the yellow Chinese azalea. (*Paxt. Mag. of Bot.*, May.)

1346. ARCTOSTA'PHYLOS [mag. 3927.
púngens *Humb. Bonp. et Kunth* pointed ⅓ ⊔ pr 1 f W Mexico 1839. C s.l.p Bot.

The leaves of this species are small and more acute than in general, and it has no hairs on the leaves or stems. The flowers have no particular beauty. The species is a native of Mexico, which has hitherto been kept in a greenhouse, but which will probably prove hardy. (*Bot. Mag.*, Feb.)

1347. *C*LE'THRA
quercifòlia *Lindl.* Oak-leaved ⅓ ⊔ or 10 su W Mexico 1840. L s.p Bot. reg. 1842, 23.

"A handsome evergreen greenhouse shrub, with deliciously fragrant flowers, inhabiting the neighbourhood of Jalapa in Mexico." This species was supposed by Professor Schlectendahl to be the *C.* tenuifòlia of Swartz, but Dr. Lindley considers it to be quite different. (*Bot. Reg.*, April.)

Jasmíneæ.

43. *J*ASMI'NUM
caudàtum *Wall.* long-tailed ⅓ ⊔ or 10 su W Sylhet 1838. C r.m Bot. reg. 1842, 26.

A handsome climbing species, with large clusters of snow-white flowers, which, however, are not fragrant. The leaves are of a deep green, and they are drawn out into long slender points, whence the name. "It requires the temperature of a cool stove," and a mixture of loam, leaf-mould, and rotten dung, or any rich free soil. It is propagated by cuttings struck in sand, with bottom heat. (*Bot. Reg.*, May.)

Convolvulàceæ.

MI'N*A* La Llave et Lexarza. (In honour of *Don Francisco Xavier Mina*, a Mexican minister.)
lobàta *La Llave et Lex.* lobed ○ or 6 su R.Y Mexico 1841. S co Bot. reg. 1842, 24.

This curious plant, when out of flower, exactly resembles an Ipomœ'a or *C*onvólvulus; though the flowers, taken separately, have not the slightest resemblance to those of another genus of the order. They are racemose, "erect, and arranged almost in the scorpioid manner of a borage;" while, taken separately, the flowers resemble those of some kinds of heath, except in their colour, which is at first rich crimson or scarlet, changing to orange, and afterwards to pale yellow, as the flowers expand. The whole plant is extremely beautiful; and it is said to be cultivated by the Mexicans for the purposes of decoration. (*Bot. Reg.*, April.)

Boragíneæ.

435. *C*YNOGLO'SSUM [Bot. reg. 1842, 14.
*a*nchusoides *Lindl.* Anchusa-like ♃ △ cu 1 my P.B Cashmere or Thibet 1840. S co

In general appearance this plant resembles an *A*nchùsa, but its fruit is that of a *C*ynoglóssum. It is "a hardy perennial, growing well in rich garden soil, and flowering freely in July and August. It is easily increased from seeds sown in the ordinary way, but the plants will not flower before the second season. (*Bot. Reg.*, March.)

Solàneæ.

591. *S*OLA'NUM 4847 Balbis*ii* var. bipinnàta *Bot. Mag.* 3954.

482. BRUGMA'NS*IA* [mag. of bot. vol. ix. p. 3.
floribúnda *Hort.* many-flowered ♃ ▭ or 1 jn. jl O South America. 1838. C l.s.p Paxt.

This very showy species "is a small evergreen shrub, seemingly ranging from 1 ft. to 2 ft. high, branching freely, having very handsome foliage, and bearing a profusion of deep orange-coloured blossoms," which are produced on a long raceme, and continue opening in succession for several weeks. It is a stove plant, and should be grown in a compost of rich loam and heath mould. It is increased by cuttings, which must be struck in sand, with bottom heat; but which, like the plant itself, are of very slow growth. (*Paxt. Mag. of Bot.*, Feb.)

Scrophularíneæ.

1783. *M*I'MULUS 30296 ròseus var. Maclain*iànus* Bot. Mag. 3924.

This variety or hybrid was raised by Mr. Maclain, florist, Harold's Cross, near Dublin, and it differs from the other splendid hybrids and varieties raised from *M.* ròseus in having a ring of very dark crimson round the throat. (*Bot. Mag.*, Feb.)

1789. DIGITA'LIS 15932 lùtea var. fucàta *Bot. Mag.* 3925.

1797. COLU'MNE*A* [vol. ix. p. 31.
Schiede*àna* Paxt. Schiede's ♃ ▭ m or ½ su O Mexíco 1840. C s.p Paxt. mag. of bot.

This plant, "in its natural habitat, is said to grow on old trees," and its stems are pendent or trailing. It should be grown, like some of the *O*rchidàceæ, in a basket or pot hung from the roof; or, if in a pot, it should have "plenty of room for its roots, a moderately nourishing soil, and a barrel-shaped trellis to sustain its branches." (*Paxt. Mag. of Bot.*, March.)

65. CALCEOLA'RIA Standish*ii* Paxt. Mag. of Bot. vol. ix. p. 75.

This is a very handsome hybrid calceolaria, raised by Mr. John Standish, nurseryman, of Bagshot, Surrey. (*Paxt. Mag. of Bot.*, May.)

Verbenàceæ.

1752. CLERODE'NDRON [7; Paxt. mag. of bot. vol. ix.
spléndens *G. Don* splendid ♄ ▭ or 10 jn S Sierra Leone 1839. C s.p Bot. reg. 1842,

The flowers of this splendid stove climber are of as brilliant a scarlet as those of *V*erbèna *Melíndres*, and they are produced in great abundance. The

leaves are of a deep rich green. It requires great heat and moisture while in a growing state, and a season of rest after flowering. The root should be shaded from the sun, or the plant will be above 3 ft. high. (*Bot. Reg.*, Feb.; and *Paxt. Mag. of Bot.*, June.)

Primulaceæ.

LYSIMA'CHIA [Bot. reg. 1842, 6.
487 lobelioides Lindl. Lobelia-like £ △ pr 1 jl. au. s W North of India 1840. D co

A pretty little perennial suitable for rockwork, which will grow freely in any good garden soil, and which is increased by seeds or division of the root. (*Bot. Reg.*, Jan.)

Laurineæ.

1226. LAU'RUS 28958 bullàta *Burch.*
Synonyme: OREODA'PHNE *Nees Von Esenbeck* (Mountain Laurel) bullàta *Bot. Mag.* 3931.

Coniferæ.

2693. THU'JA filifórmis *Lodd.*, Bot. Reg. 1842, 20. (See *Hort. Brit.* p. 677.)

Dr. Lindley is decidedly of opinion that this plant is distinct from the *T.* péndula of Lambert. (*Bot. Reg.*, April.)

Orchidaceæ.

TRICHO'SMA *Lindl.* HAIR ORCHIS. (*Thrix*, hair, and *kosmos*, ornament.)
suàvis *Lindl.* sweet £ ▽ pr 1 su W.Y East Indies 1840. D p.r.w Bot. reg. 1842, 21.
Synonyme: Cœlógyne coronària *B. R. M.* 1841, 178.

This plant Dr. Lindley at first supposed to be a Cœlógyne, and as such he published it in the Miscellany of the *Bot. Reg.* for 1841; but he now finds it to be a distinct genus. It was found growing upon trees in the Chirra district of the Khoseea hills, and requires the usual treatment of East India epiphytes. (*Bot. Reg.*, April.)

2540. ONCI'DIUM
22681 pùbes var. flavéscens *Bot. Mag.* 3926.
sphacelàtum *Lindl.* scorched £ ▽ or 2 Y Br Mexico 1840. D p.r.w Bot. reg. 1842, 30.

One of the numerous species of Oncídium nearly allied to O. refléxum. (*Bot. Reg.*, May.)

longifòlium *Lindl.* long-leaved £ ▽ or 3 Y.B Mexico 1841. D p.r.w Bot. reg. 1842, 4.

"Under the name of Oncídium Cebollàta many very different species exist in our gardens, among which the finest is that now figured, which, although it has the foliage of that species, is really very different, forming dense panicles, 3 ft. long, of very large and showy yellow and brown flowers. Its leaves are often 3 ft. long, and hang down or spread upon the ground, instead of standing stiff and erect." (*Bot. Reg.*, Jan.)

2553. CATTLE'YA [1842, 1.
granulòsa *Lindl.* granular-*lipped* £ ▽ or 1 W.G Guatemala 1841 D p.r.w Bot. reg.

This singular species has olive-green sepals and petals, spotted with brown; but the lip is white, stained in the middle with orange spotted with crimson. "The high temperature and excessive moisture which suit so well the Indian dendrobiums are most injurious to this cattleya. A night temperature of 55° in winter and 60° in summer is quite high enough for it; and, by planting it in well drained turfy peat, and keeping it rather dry when not growing, it will be found one of the easiest to manage. (*Bot. Reg.*, Jan.)

OTOCHI'LUS *Lindl.* (*Ous*, *ōtos*, an ear, and *cheilos*, a lip; little ear-like appendages at base of lip.)
fúsca *Lindl.* brownish £ ▽ cu W.B Nepal 1840. D p.r.w Bot. mag. 3921.

"A very singular but by no means showy epiphyte, an inhabitant of the trunks of trees in Nepal." (*Bot. Mag.*, Jan.)

2530. CATASE'TUM.
abrúptum *Hook.* blunt-*lipped* £ ▽ cu 1 G.Y Brazil 1841. D p.r.w Bot. mag. 3929.

Nearly allied to C. lùcidum. (*Bot. Mag.*, March.)

Wailèsii Hook. Mr. Wailes's £ ▽ cu 1 G Honduras 1840. D p.r.w Bot. mag. 3937.

This is a very curious species, from the anther case, which, instead of being

carried out into a very long point or beak, is singularly short and flattened. (*Bot. Mag.*, April.)

3524. CIRRHOPE'TALUM
Medùsæ Lindl. Medusa's *head* ⚥ ⊿ cu ½ Ysh Sincapore 1840. D p.r.w Bot. reg. 1842, [12.

A very singular plant, which requires a stove and moist heat. (*Bot. Reg.*, Feb.)

2537. MAXILLA'RIA
cruénta *Lindl.* bloody ⚥ ⊿ or 1 Y.C Guatemala 1841. D p.r.w Bot. reg. 1842, 13.
Synonyme: *M.* Skinneri Hort.

A very showy species, very nearly allied to M. aromática, and which is often called M. Skínneri in gardens, though it is not the plant so called by Mr. Bateman. (*Bot. Reg.*, March.)

2580. CYPRIPE'DIUM
barbàtum bearded ♃ ⊿ or ½ su Va Mount Ophir 1840. D s.l Bot. reg. 1842, 17.

A very curious and beautiful species; "the purple hairy shining warts which border the upper edge of its petals distinguish it immediately from C. venústum and C. purpùreum, which are most like it." (*Bot. Reg.*, March.)

2554. EPIDE'NDRUM
cinnabarìnum *Lindl.* cinnabar-coloured ⚥ ⊿ or 1 my C Pernambuco 1841. D p.r.w [Bot. reg. 1842, 25.

A splendid species, which requires the usual treatment of the genus. (*Bot. Reg.*, May.)

phœníceum *Lindl.* purple ⚥ ⊿ or ½ su P. Ro Cuba 1840. D p.r.w Paxt. mag. of bot. [vol. ix. p. 97.

A very beautiful plant, with large racemes of purple and rose-coloured flowers. (*Paxt. Mag. of Bot.*, June.)

raníferum *Lindl.* frog-bearing ⚥ ⊿ cu ½ ... G.B Mexico 1841. D p.r.w Bot. reg. [1842, 42.

This species resembles E. nùtans, but is handsomer, "in consequence of the rich purplish-brown spots with which the sepals and petals are profusely decorated." (*Bot. Reg.*, July.)

2559. E'RIA
polyùra *Lindl.* many-tailed ⚥ ⊿ ½ o W Manilla 1840. D p.r.w Bot. reg. 1842, 32.

A very graceful species, "producing from the sides of long leafy stems a profusion of delicate tails of flowers, each nearly 6 in. long." The flowers resemble those of E. floribúnda. (*Bot. Reg.*, June.)

CŒ'LIA
Bauerà*na* Lindl. *Mr.* Bauer's ⚥ ⊿ pr ½ f W West Indies and Mexico ... D p.r.w Bot. [reg. 1842, 36.

The flowers of this plant, though "white and inconspicuous," are remarkable for their fragrance. It requires a cool stove, where "it grows fast, and is easily multiplied." (*Bot. Reg.*, June.)

ARUNDI'NA
dénsa *Lindl.* dense-*flowered* ⚥ ⊿ or 1 Sincapore 1842. D p.r.w Bot. reg. 1842, 38.

A very fine genus of orchideous plants, which, in structure, are "near Phaius, from which they differ in the want of a spur to the lip, and in the column not being at all extended at the base into a foot." (*Bot. Reg.*, July.)

HOULLE'T*IA* (see p. 180.)
Brocklehurstà*na* Brong. *Mr.* Brocklehurst's ⚥ ⊿ or 2 su B.Y Brazil 1841. D p.r.w [Paxt. mag. of bot. vol. ix. p. 49.

A very showy species, approaching very near to Maxillària Warreà*na*, and requiring similar treatment. (*Paxt. Mag. of Bot.*, April.)

Scitamíneæ.

GASTROCHI'LUS *Wall.* (*Gastēr*, abdomen, and *cheilos*, a lip; larger lip of corolla inflated.)
pulchérrima *Wall.* prettiest ♃ ▭ or 1 au C.B East Indies 1841. D co Bot. mag. 3930.

A showy stove plant, with very handsome and graceful blossoms. (*Bot. Mag.*, March.)

Irídeæ.

142. I'RIS
bícolor *Hort.* two-coloured ♃ △ or 1 my Y.P ... ... O co Paxt. mag. of bot. vol. ix.

A very beautiful plant, the flowers of which, however, last only a day. (*Paxt. Mag. of Gard.*, March.)

HYDROTÆ'NIA *Lindl.* WATER-BAND. (*Hudōr*, water, and *tainia*, a band; mark on petals.)
melèagris *Lindl.* spotted ♃ [△] or 1 my Va Mexico 1838. O s.p Bot. reg. 1842, 39.

A very curious plant, which looks like "the flower of a Fritillària on the stem of a Tigrídia." (*Bot. Reg.*, July.)

*Amaryllí*deæ.

975. HABRA'NTHUS [and Paxt. mag. of bot. vol. ix.
pratênsis *Herb.* meadow ♃ [△] or 1 my S.Y South Chili 1840. O 1 Bot. reg. 1842, 35;

A very handsome stove species of Habránthus, with rich scarlet flowers. (*Bot. Reg.*, June; *Paxt. Mag. of Bot.*, July.)

Liliàceæ.

1053. ORNITHO'GALUM [28.
divaricàtum *Lindl.* spreading ♃ △ pr 2 jl. au W California 1841. O co Bot. reg. 1842,

A very elegant species, with long drooping panicles of white flowers. (*Bot. Reg.*, May.)

Art. XII. *On cultivating the Grape in a Greenhouse.* By S. O.

I was highly pleased with the article on the vine by N. M. T., in the April Number of the *Gardener's Magazine:* the first paragraph, in particular, contains truths which cannot be disputed. I think, if gardeners would give the details of their practice in forcing, and the results, whether satisfactory or not, instead of writing long articles on what they please to call the best methods, and what ought to be done to produce good crops of fruit, their communications would be of much greater value. As I have met with extraordinary success in cultivating the grape, in a greenhouse which is devoted to plants, during the winter, for nearly twenty years, the details of my practice may not be unacceptable to some of your readers.

This being my first communication to any of the gardening periodicals, after having followed my profession upwards of two score years, will, I hope, screen me from the imputation of writing for other purposes than for the information of a large class of gardeners.

Twenty years ago I arrived at my present situation; I found the vines in a very weak state, and with only a few grapes near the top of the house. The soil in which they were growing was black and of a very friable texture. The border next the house was 5 ft. wide, then came a gravel walk 6 ft. wide, and on the other side was the lawn. By the weakness of the vines, I fancied they wanted renovating at the root. On examination the following spring, I found some of the roots dead, but others had passed through the walk; I therefore opened a trench on the grass, the length of the house, 2 ft. deep and 10 ft. wide, which I filled up with equal parts of fresh loam and old mortar

rubbish; I then pruned the vines to one half of their length, and during the summer I preserved every shoot I could get near the bottom, sloping them according to their strength. In the autumn I made fires to assist the ripening of the wood. The following season I had a fair crop of very fine fruit, and excellent young wood from the lower to the upper part of the house.

I shall now give the details of my general mode of management. My mode of pruning differs, in some degree, from that of modern practitioners. In old wood, I frequently leave spurs with five or six buds, and sometimes more. I do not cut to any prescribed distance from the main stem, but to a good plump bud; when they break, the weak and superfluous ones are rubbed off. I, however, carefully preserve any young shoots, if well placed at the lower part of the vines, whether weak or not; this I do to furnish me with good shoots the following season, which I lay in at full length, and am thus enabled to take out a few of the old branches every year, so that I never have any more than four or five years old. At the time the vines begin to break, I make a gentle fire in the flue, and commence syringing: I continue to do so several times every fine day until the vines are in bloom; I then discontinue it, but keep the floor of the house constantly wet. When the fruit is set, I give the vines one good washing to cleanse them from the dead blossoms; after this, I never wet them over head, but keep the atmosphere of the house very moist, by throwing down large quantities of water every clear warm day, until the berries begin to change colour, when I discontinue it. I also syringe the plants over head every afternoon during warm weather, and close about three o'clock. At the time the vines are in bloom, I give very little air and more fire heat. At no period of the swelling of the fruit do I give air at the lower part of the house, but the upper part I open early, to let out the stagnant air, which I believe to be very essential. I stop the shoots at two joints above the fruit, and never allow more than two bunches to remain on each shoot, rarely more than one. I commence thinning as soon as the fruit is set: in doing this the greatest care is necessary. I am very careful not to handle the bunches, or rub them with my head; I first cut the berries from the centre of the bunch, and afterwards so many from the outside as to form a handsome one; I do this at two or three several times, as I find excessive thinning at once does mischief. The grapes I cultivate are the Black Hamburgh, Black Frontignan, and White Sweetwater; and I will venture to affirm few cultivators have met with the invariable success I have, both for quantity and quality of the fruit. Many gentlemen and gardeners of experience have declared they never before saw the like.

Before I close this communication, I should mention that the plants beneath the vines are liable to be very much drawn in the spring; therefore, if it is convenient, they should be removed to a cold-pit, there to remain until the weather will permit their being placed in their summer quarters.

Middlesex, June, 1842.

Art. XIII. *On the Causes of the Rust on Grapes.* By X.

Having this season witnessed the rust on grapes more than I ever did before, perhaps a few remarks thereon may not be without their use. Much has been said on the subject, but I cannot convince myself that either the accidental touching of the berries with the hair, or with perspiring hands in thinning, has so much to do with it as is generally supposed.

A neighbour of mine having two graperies has nearly the whole of a good crop of fruit more or less affected with rust, the cause of which, in my opinion, is his over-partiality to moisture; the atmosphere being constantly saturated. It is generally understood that a moist heat, at certain stages of the growth of the vine, and at particular times of the day, is highly beneficial. My own practice is, on no account to use the syringe after the bloom has begun to expand, and ever after that has taken place to take care that the temperature is not much raised by sun heat in the morning previously to giving air, as in my opinion the rust in a great measure owes its origin to the action of the sun upon the moisture which has been condensed on the fruit.

Another reason, I think, may also be assigned. Most gardeners are aware that, in thinning the berries (and more particularly if they are large), the fluid contained in the stalk of the berries causes a chemical action on the scissors, the result of which is a black moisture on their points; and if this moisture is not frequently rubbed off, it accumulates all over the blades; and I make no doubt that scissors in this state touching any of the berries will cause them to rust. In examining the bunch so affected, it is frequently found that berries which the hair could not come in contact with are as badly rusted as those which are more exposed. I, of course, do not approve of touching them with the hands or hair, but I cannot but believe that rust is the result of one or both of the above-mentioned causes.

Hertfordshire, June 7. 1842.

Art. XIV. *On the Instinct of Bees.* By J. Wighton.

The instinct of bees, like that of some other insects, is great, but in some cases this seems to be exaggerated. Huber, for

instance, speaking of the way they defend the entrances to their hive, says: "The works which the bees had established were of various formations; some resembled the bastions of our citadel's gateway, marked by walls in front, opening on the face of those of the second row, while they did not correspond with the apertures of the first row; in a third, a series of intersecting arcades permitted free egress to the bees, which prevented the entrance of their enemies." He further observes, that "a period arrives when these galleries are no longer of use to the bees. At the time that their harvest is abundant, their hive excessively populous, they demolish the gateways which had been erected in the hour of danger."

Although this comes from one who is sometimes styled the prince of bee-keepers, and may seem very plausible, I have little hesitation in saying it is founded on false premises. I consider that the barricading referred to is not erected by the bees with any view of defence; in truth, they do not erect it at all, but it is merely raised by a bit of their combs, or some of the materials used in their formation, dropping close to their doorway: the passages cut through by the bees makes it to differ in appearance from that which happens to fall on other parts of the floor.

Bees certainly possess great instinct and courage in defending the entrance to their hive, but I never knew an instance of their trying to reduce it; on the contrary, for example, when their entrance has been reduced with a view of keeping out intruders, especially wasps, the inmates often endeavour to enlarge it; in doing so they use great force, more than one might be led to think they possessed. It may be worthy of remark, that, though much has been said on the industry of the honey-bee, its industry falls short when compared with that of the wasp. The latter, from the time it begins its nest alone, toils from morning till late in the evening. As the progeny come forth, they do the same also; nay, during the latter part of summer they work night and day, and the egress and ingress to and from their nest at times surpass those of a colony of bees whose numbers are infinitely greater. In cold weather the more tender habits of bees may account for this, but not for their lack of industry, and loitering at the entrance of their hive, at times when wasps are searching for food to rear their brood in every hole and corner. The idleness referred to arises, in a great degree, from the way in which bees increase fresh colonies; that is, it frequently happens, especially before the first swarm leaves the parent stock, that a great part of the bees cease working, though the weather be warm, as previously noticed, as if unwilling to add store to a home they are about to quit. The great industry of a fresh colony of bees bears out this assertion. It may be asked, what causes the irregular idleness

in bees, I mean their clustering at their doorways, which sometimes lasts only a day or two, and at other times a week or two. This does not arise from any unwillingness in the bees to quit, for they seem anxious to be gone to commence work elsewhere, nor altogether from the state of the weather, but more from the unwillingness of their queen, who will not lead off the swarm until the drones are come forth, and her successor or successors are in a forward state. The way that the latter are hatched accounts for the more irregular clustering or idleness previous to after-swarms.

I may remark that I hardly know enough of entomology to distinguish one species of wasp from another, still I think that the name of *V*éspa vulgàris would be better applied to the one which builds in the ground, common all over the country, than to the rare one, in some parts, which builds its nest on a bough of a tree. I hope what I have said on the wasp's industry (it matters not what kind they be, even though hornets) will not lead any one to think, for a moment, I wish to encourage them. I know too well the mischief they do. It is a pity that the wealthy do not give more encouragement towards the destruction of their nests; or, what is better, set a small trifle, as some do, on the heads of wasps during the month of May; these being queens, each of course begins a nest. If this were more practised, much fruit might be saved, and gardeners have less vexation.

Cossey Hall Gardens, June 28. 1842.

REVIEWS.

Art. I. *Transactions of the Horticultural Society of London.* Second Series. Vol. II. Part V. 4to. London, 1840.

(*Continued from* p. 125.)

42. *On Heating by Hot Water.* By John Rogers, Junior, Esq., F.R.S., H. S. (Read April 21. 1840.)

The great attention which Mr. Rogers has paid to this subject is well known to all our readers, and the present article may be considered as a summary of his experience. After noticing the various expedients which have been adopted for heating plant structures during the last twenty years, he concludes that—

"On the whole, there appears no doubt that the circulation of hot water in iron pipes is the best means hitherto devised for this purpose. Its peculiar advantages are the uniformity and durability of the heat so communicated, and its perfect and equable distribution to all parts of the building. It is moreover capable of effecting a considerable economy of fuel; but on this head its advantages are not so great as is commonly supposed, and depend much upon the construction of the apparatus. Where this is well constructed and well managed, the saving of fuel may amount to 25 per cent over well-constructed and well-managed flues; but, in a large proportion of the apparatus now in use, it will be found that the consumption of fuel greatly exceeds that of common furnaces.

"This remark applies not merely to the earlier apparatus, where the power was inadequate to the work required, but even to the best-constructed modern ones; and the waste of fuel arises from a misunderstanding of the nature of a hot-water apparatus, and from an attempt to make it do that which, if it be properly constructed, it is impossible that it should do.

"It is a great desideratum with gardeners, as far at least as my experience goes, to get up heat in a short time; and their ordinary test of the excellence of a hot-water apparatus is, how speedily they can get the water to boil. Where an apparatus is properly constructed, this can seldom be effected without a most extravagant waste of fuel. The water in a hot-water apparatus, constructed on the most perfect principles, will take as many hours to heat to the boiling point, as the pipes which contain it are inches in diameter, and it will also cool in the same ratio. Four-inch pipes will accordingly take four hours to reach the temperature of 200°; and they can be heated to the boiling point in one hour, only by the consumption of four times as much fuel as would suffice if properly applied, or in fact, allowing for the waste of heat by the chimney, which increases under such circumstances very rapidly, five or six times as much fuel as is really necessary will be consumed by a gardener zealous of the honour of his apparatus. It is of course possible, by having a furnace and boiler excessively large in comparison with the pipes, to construct an apparatus with four-inch pipes which shall boil in an hour; but the necessary consequence will be that such a furnace would burn during every hour of the night four times as much fuel as can possibly be effective in heating the building to which it is applied.

"If a house is to be heated rapidly, the pipes should be of the smallest diameter which is consistent with a free circulation; but it must be borne in mind that such pipes will also cool with equal rapidity; and, if the heat is to be maintained through the night, the furnace must be so constructed as to contain a large quantity of fuel, but only to allow of a very slow consumption, much after the manner of Dr. Arnott's stove. Now such a furnace, though theoretically very easy, and practically not very difficult of construction, requires an almost scientific nicety of management not to be expected from common gardeners. There are, moreover, several objections to small pipes, one of the most material of which is this, that the motion of water within them being retarded by friction in a much greater degree than in large pipes, they can never be brought to so high a mean temperature. So that, under similar circumstances of pressure, &c., 200 ft. of one-inch pipe could never be made to produce the same effect as 50 ft. of four-inch, though their surfaces would be nearly equal; besides which, the original expense of the one-inch pipe would be nearly three times that of the four-inch.

"A little consideration will enable us to determine whether such rapid communication of heat be really essential to the efficiency of a heating apparatus. In hothouses, where permanent heat is required, it is evidently unnecessary. The only place where it may be desirable is in buildings where occasional heat only is employed. Now if any one will take the trouble to note hourly the variations of the thermometer by night, in weather in which frost is so severe as to be dangerous, they will find that, instead of a sudden jump of 10° or 20°, the thermometer begins to fall slowly an hour before sunset, somewhat more rapidly afterwards, and continues falling steadily till about 11 P. M. After that time it falls still more slowly till 3 or 4 A. M., by which time it will have almost reached its minimum. Its variation will be something like 3° or 4° per hour for the first four hours, after that about 1° per hour for the next two or three, and then from $\frac{1}{2}$ to $\frac{1}{3}$ of a degree till it has reached its minimum. Now it is evident that to meet this variation, supposing the temperature of the house to range exactly with outer air, an apparatus which occupies three or four hours in reaching its maximum would be much more accurately adapted to the emergency than one which could be heated in an hour. But we may observe that, except in iron-roofed houses, the temperature within the house does not keep pace with that of outer air, but falls much more slowly, owing to the specific heat contained in the

objects within the building, which is gradually transmitted by the roof, so that, in fact, the necessity for rapid heating, even in greenhouses, is really less than at first sight appears.

"The real desideratum is a furnace so constructed that it shall contain fuel enough to supply the pipes with as much heat as they can radiate during the night, and which may be depended upon for burning steadily and perfectly whatever fuel is put into it. Not with that accurate precision requisite where the temperature of the house depends upon the exact amount of combustion per hour, but sufficiently slowly to allow the water to absorb the greatest possible portion of the heat generated. With such an apparatus, the fire being once effectually lighted, the gardener need be under no apprehension that the heat during the night will prove insufficient, though it may be several hours before the pipes attain their maximum temperature.

"I have dwelt somewhat at large on this point, because it is one on which much mistake exists, and under this misapprehension the best apparatus may be condemned as defective, and a very imperfect one preferred and adopted in its stead; that which is commonly adopted as a criterion of excellence being really a proof of defective construction.

"There can be on the whole no doubt that three-inch or four-inch pipes are exceedingly preferable to smaller ones, where economy of fuel and uniform adjustment of the temperature for several hours are the primary objects. Where ornament or great economy of space is important, and economy of fuel is not much considered, smaller pipes may be employed: but, where rapid heating is considered essential, I believe it will be found best to have recourse to the old expedient of brick flues; and their attendant inconveniences must be considered as the price paid for this advantage, real or imaginary. The most perfect construction of these has been so fully canvassed in the earlier volumes of the *Horticultural Transactions*, that it is unnecessary here to enlarge upon it.

"The next point to be noticed is the absolute amount of heat produced by any hot-water apparatus, which depends upon the proportion between the surface of pipe and surface of external glass in the building. The laws both of cooling by the glass and of radiation from the pipes have been so ably and accurately treated by Mr. Charles Hood in his most valuable treatise on hot-water apparatus, that there is now nothing to desire on this head. An apparatus may be adjusted with the most minute accuracy to the work required of it. Formerly the most preposterous blunders were committed on this point. Almost all the earlier apparatus are incompetent to the work required of them, the quantity of pipe being utterly insufficient to produce the heat desired, while, the boiler being large and of very defective construction, a vast quantity of fuel was burnt to waste: the gardener finding his heat deficient naturally stokes up his fire and throws on fuel in the hope of increasing it; but the only result of his labour is the more rapid destruction of the boiler itself. Until the publication of Mr. Hood's work above-mentioned, the principle of circulation in hot-water apparatus was very little understood, most erroneous notions prevailed on the subject; and, where the principles were unknown and opportunities of experiment comparatively few, it was not to be wondered that practice was very defective. It must, however, be observed, that, if the earlier apparatus were mostly deficient in the quantity of pipe employed, many of those more recently erected err in the opposite extreme. The error arises not from any defect in the data or in the calculations, but from assuming, as the minimum of external air, a temperature which very rarely occurs in this country, and which lasts for so very short a time that no building has time to cool down to a corresponding temperature. The gardener is generally consulted as to the heat he requires, and if he states, as he probably may do, that he wishes to keep his greenhouse at 50° and his stove at 65° when outer air is 5° or 0°, the apparatus is constructed accordingly, and will of course be found excessive in power; a power of 30° for greenhouses and of 45° for hothouses will, I believe, be found ample under any circumstances in England; the only

possible exception is in the case of forcing-houses for very early grapes; and it is very doubtful whether, even here, any good would be attained by greater power. I am aware that it is urged that it is always easy to work an apparatus below its power, and that such an arrangement is economical of fuel; and within certain limits this is undoubtedly true: but, if the quantity of pipe materially exceeds what is necessary, the only means of keeping the house at a moderate temperature is by leaving the furnace door open, and a very great waste, instead of any economy of fuel, necessarily results. The simplest remedy for this defect is to encase some portion of the pipes either with sand or sawdust, which prevents the heat from escaping into the house, by diminishing the radiating surface.

"The next point which requires notice is the expediency of heating several houses from the same boiler. Now to this arrangement there is not the slightest objection, provided the same number or extent of houses is always to be heated at the same time; that is to say, several hothouses, all which require permanent heat, but different temperatures, may be advantageously heated from one boiler. In like manner, a range of greenhouses always requiring heat at the same time, to exclude part, may be worked from one boiler, though different degrees of heat are required in them; and even if one of these sometimes requires, as it probably would, a slight degree of heat when the others need none, this may be arranged without difficulty or inconvenience: but serious inconvenience will arise from any attempt to heat two buildings, in one of which occasional and in the other permanent heat is required; and this inconvenience will be great in proportion to the size of the buildings, especially, if, as is generally the case, the hothouse is small and the greenhouses or pits more extensive. The same inconvenience will also be felt if two vineries, one to be forced at a later period than the other, are heated from one boiler. The reason is briefly this, that the capacity of the furnace for fuel, the area of its bars or its consuming power, and the boiler surface or absorbing power, are all calculated with reference to a certain quantity of pipe, by urging the fire to its utmost power, which is consistent with a proper duration of its heat, the pipes to which it is ordinarily attached are heated to their maximum, and the maximum heat is produced as required in the building. If at this time an additional extent of duty is laid on to the boiler, by opening the sluices which connect it with the pipes of a greenhouse or pits, the temperature of the ordinary service pipes is reduced, and the hothouse receives a diminished quantity of heat just when it requires most. On the other hand, if the common boiler be constructed of a size and power adequate to the double service, it will, when applied to the hothouse only, constantly overheat it, and this effect can be prevented only by throwing open the furnace door and allowing the fuel to burn to waste; for, be it observed, it is the area of the furnace bars which regulates the consumption of fuel. It is true that by means of dampers and skilful management some remedy may be found for these evils, but nevertheless they will exist to a greater or less extent, and the arrangement above-mentioned should never willingly be adopted.

"The different temperature of stoves, to be heated from the same boiler, may be regulated with the most philosophical accuracy, by allotting to each house quantities of pipe bearing a different proportion to their respective surfaces of glass; the difference thus established will be maintained for all temperatures, unless accidental cirucmstances of exposure to wind, or imperfect glazing, should cause a variation, and the general heat of all may be regulated by attention to one fire.

"Closely connected with the subject of heating is the providing an adequate degree of moisture in the atmosphere heated; indeed it is upon this, above every thing else, that the perfection or imperfection of an artificial climate depends; and it is by no means one of the least advantages of hot water pipes, that they do not, like brick flues, dry the atmosphere by absorbing its moisture. But this negative advantage falls far short of what is necessary. The air of all buildings artificially heated is dried by condensation upon the

glass, and by the continued escape, through open laps or crevices, of saturated or moist air, whose place is supplied by cold and dry air. To imitate nature, it is therefore necessary to provide a constant supply of moisture, equal to the waste by these two causes. The means adopted to supply moisture to the atmosphere is by sprinkling the floor and the plants, and by troughs upon the heating pipes. Sprinkling the floor is a very imperfect and inefficient expedient, the greater part of the moisture so bestowed sinks into the earth, and very little indeed finds its way to the atmosphere of the house; for the air in contact with the floor of a house is generally nearly saturated, having lost its capacity for moisture by losing its heat, and it is only when it has reached the pipes, and been again heated, that it becomes capable of taking up moisture, and in this thirsty state it generally has to seek its moisture among the plants.

"The most effectual mode of producing a moist atmosphere is by considerable surfaces of water above the level of the pipes, which surfaces ought always to exceed by a few degrees the mean temperature of the house. The troughs commonly employed are objectionable only in as far as they are much too small, and becoming quickly empty afford a very temporary supply. To be really efficient, such troughs ought to be at least 1 ft. in width by 5 or 6 inches in depth, and they should extend the whole length of the house, affording something like 1 square foot of water surface for every 15 square feet of glass in the roof. In orchidaceous houses, and those destined to the cultivation of tropical plants, a still greater surface of water is desirable, and for this purpose slate cisterns, fixed immediately over the heating-pipes, as broad as the front shelves, and from 1 ft. to 15 in. deep, may be advantageously employed. Their temperature will always exceed that of the house by a few degrees, and the great surface affords an abundant though gradual supply of moisture: they act also as partial reservoirs of heat, and afford the only efficient means of cultivating the beautiful but much neglected tribe of stove aquatics. The culture of these plants has become almost extinct, solely, I believe, on account of an almost universal failure in managing them, and this failure has entirely resulted from the improper construction and position of the cisterns in which they are grown. In the few houses where cisterns are introduced, they are generally provided more for ornament than use; the position in which they are placed, and the materials of which they are constructed, forbid their being warmed, and in fact the temperature of the water contained in them is always some degrees below that of the house. Under these circumstances, no tender aquatics will flourish: but if the cisterns be placed above the pipes, as here recommended, and formed of slate, their temperature will always by a few degrees exceed the mean temperature of the house, and, if their situation be light enough, stove aquatics will flourish in them in great perfection.

"It may be observed that this arrangement meets the necessity of the case with exceeding accuracy, for condensation is greatest, and consequently the atmosphere is most rapidly dried, when external air is coldest, and a great artificial heat is maintained; and at this very time the increased heat of the pipes increases the evaporation from the cisterns. But, to insure this result, the cisterns employed must be above the level of the heating pipes, and, if possible, directly over them.

"The foregoing suggestions are intended to convey a few brief and practical hints to those who possess or may be about to erect hot-water apparatus. For more minute details, the work of Mr. C. Hood, above referred to, may be most advantageously consulted. Ample information will there be found on a subject which is far more extensive, and which involves much more of scientific research and calculation, than is generally supposed; and, to those who may take the trouble to consult it, it will be no longer a matter of surprise that the earlier essays in heating by hot water were frequently unsuccessful."

(*To be continued.*)

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Delphi'nium *sibíricum plèno and* D. *Barlòwii*.—Although all the delphiniums are showy and worthy of cultivation, still the *D.* sibíricum plèno and *D.* Barlòwii are truly splendid. The propagation of these two plants does not seem to be so well understood as it ought to be, otherwise they would be seen oftener and more abundantly in gardens, where their beauty often causes the expression to be used, " I wish I had more of them." The proper time for dividing these two sorts is in April, when the young shoots have appeared, and are about two or three inches long above ground. They may then be taken up, and every shoot carefully separated with a knife, leaving, if possible, some portion of the roots attached. These must be carefully planted in good rich soil, and each will flower much finer the same season, than the old plant would have done if left undisturbed. To divide them in autumn or spring, before they commence growing, is nearly certain to weaken the plants much, and even sometimes destroys them altogether.—*A. X. Birmingham, July*, 1842.

New Slate Cap, as a Substitute for Ridge Tiles, &c.—We have received the " Particulars and price of North's patent slate-capped ridge and hip, sold and shipped at Port Penrhyn, Bangor, North Wales. The patent ridge is [said to be] an improvement on slate saddle ridge ; it is bolder in appearance, and does not require cement or putty ; it is preferable to lead, being secure against high wind ; avoids the damage occasioned by hoisting and dressing lead upon a slated roof, and needs no wood roll. Price complete, 1*s.* 6*d.* per foot running, including screws, plates, and holes drilled. Packed in parcels of four 3 ft. lengths, weight 112 lbs., for 12 ft. running of ridge, including the fastenings and package." — *July*, 1842. [Slate is now sawn by machinery, and made into such a variety of articles, that we are surprised it is not used more than it is, in gardening, as a substitute for gravel and flagstone in walks and paths, and for wood, cast iron, and lead, in cisterns.]

To destroy the Turnip Fly.— A correspondent of the *Mark Lane Express* says : " I have great pleasure in communicating to my brother-farmers, through the medium of your valuable paper, that I have discovered that *gas-lime*, sown upon turnips before their coming up, is a sure preventive against the ravages of the fly. When gas-lime cannot be obtained, gas tar, reduced with common lime, may be successfully applied between the drills, carefully avoiding the plants. A mixture of twenty pounds of sulphur with a ton of lime (which will not injure the plant) may be sown upon two acres, which will also produce a beneficial effect." (*Camb. Chron. and Journ.*, June 11. 1842.)

Art. II. *Foreign Notices.*

NORTH AMERICA.

Large Mahogany Logs. — Two logs of Mansanilla mahogany were sold in New York, in February last, for 1265 dollars, at the rate of 165 dollars per foot. The two logs were only one quarter of the tree from which they were cut : another quarter was sold for 1200 dollars. The whole tree, according to these rates, was worth, in the New York market, very near 5000 dollars. — *J. M. Philadelphia, June* 12. 1842.

[About the year 1819, the following appeared in an English paper :—" The largest and finest log of mahogany ever imported into this country was sold by auction at the docks in Liverpool. It was purchased by James Hodgson for 375*l.*, and afterwards sold by him for 525*l.* ; and, if it opened well, was

supposed to be worth about 1000*l.* If sawn into veneers, it was computed that the cost of labour in the process would be 750*l.* The weight at the king's beam was 6 tons 13 cwt.]

Art. III. *Retrospective Criticism.*

On the Use of Quassia in destroying the Scale Insect. — At the time the June Number of the *Gardener's Magazine* came to hand, I had by me a paragraph, headed as above, intended for your inspection; but as your correspondent E. O., at p. 307. of the current volume, has brought before the public an easy and effectual means of destroying aphides, in the form of an application of quassia chips in decoction, and also made there very similar observations to my own, I will not here say more than that, in addition to his experiments in this particular, I can, from my own made last autumn, assert that it is effectual in destroying also another race of plant pests, viz. the scale insect (Aspidiòtus sp.), probably the whole of the genus; but my experiments have been directed more particularly against that species which infests succulents, especially the genera Mesembryánthemum, A'picra, Hawórth*ia*, &c.

My mode of application differs from that of your correspondent, the decoction being brushed carefully and entirely over the plants infected, instead of being applied with a syringe. Many of the scale insects will, at the time it is applied, fall from the plant, simply from being dislodged by the brush (which should be soft rather than otherwise, to avoid, as far as possible, bruising the plant), but the greater portion of them will remain on the plant for some time; they will, however, on examination a few days after the application, be found to be lifeless; these will, in the end, dry up, and scale off.

With your correspondent I believe also that quassia renders the plant, at least for a time, obnoxious rather than agreeable to these invaders.

I had, until the middle of May last, thought that my first washing, which was given last autumn had entirely eradicated the scale, and so, I believe, it did effectually destroy the then existing generation: but I find now that a new race, all of about equal size, and in all probability of equal age, appear upon my plants thus previously cleansed, which shows that a single washing is not sufficient to entirely subdue the scale for a year, unless applied in June or July instead of the autumn; in which case, I should say, one washing yearly would be sufficient, and in all probability would, in a few years, entirely extirpate them.

However anxious we may feel to impart any knowledge we may gain from practice, or from intimacy with the effects of certain articles in destroying or even retarding the increase of any enemies to plants, still I think it but our duty to caution the young gardener against trusting too much to prescribed remedies, and recommend him to practise diligently the old cure of picking off vermin (some kinds of which, I cannot but say, are better formed for the practice than others, as the mealy bug (Cóccus Adónidum *Linn.*), and some of the larger species of scale insect) from the plants with his fingers, or any other means that his ingenuity may suggest, as being better suited for the purpose; taking care, at the same time, not to crush the insects on the leaves, &c., of the plants, as they almost without exception, injure and disfigure the plant; and he may rest assured that he will keep them in subjection. I would nevertheless wish him, should his mind be so disposed, to enjoy the assistance of any such remedies as he may think fit; and also let him proceed, without restriction, with enquiries and experiments that he may consider likely to turn out in any way beneficial to his profession, and doubtless, in many instances, good will come from it. — *W. H. B. Oxford, June* 3. 1842.

On Worming in Corn. — In the February Number of the Magazine, you have copied from the *Cambridge Chronicle* an account of a field of corn which was

very much destroyed by maggots, aggravated by the ground being heaved by frost; and that the vermin were effectually destroyed by rolling. It is likely, however, had the field been properly examined, that most of the damage should have been ascribed to the heaving by frost. In dry springs like the present we hear most of worming; the complaint has been general in this quarter, this season, of a bad braird of oats, and it has been generally ascribed to worming, without any examination. The larva of the jenny nettles is the most plentiful in this quarter under the name of cut-worm; and any plants it cuts are above ground, not below. When ground is worked wet or in the time of frost, it is thrown together in large lumps; though smoothed afterwards on the surface, large apertures are left below, which, unless there is much rain to wash down the particles of soil and feed the roots, must cause them to fail if drought sets in; and the plant will wither and die for want of moisture, though the roots may not have been injured at all by vermin. If the ground is too spongy and open from heaving by frost, or from its mechanical condition naturally, dry weather will have the effect of injuring there also, and we need not wonder at the good effect of rolling. That vermin of the sort abound more or less in many fields, and do a great deal of damage, I have no doubt, but I think no great proportion of what they usually get credit for; and I doubt much if a roller will have much effect on maggots buried 1 in. to 3 in. below the surface, as they always are during the day, and come to the surface only at night. They form part and portion of the mass of the soil, and may be squeezed a little further down in the soft yielding earth, without much harm being done to them. Though some near the surface may suffer, I question if rolling will ever extirpate them and clear a field. It has been said that the grub or cut-worm never comes above ground, but if searched for with a candle, at night, they will then be found at the surface. It has been said they cut the root, not tops; but I have always found the plants cut exactly at the surface of the ground. — *R. Lymburn. June* 3. 1842.

Cuckoo's Eggs in the Nest of a Hedge-Sparrow. — In reference to p. 257. and in corroboration of the general opinion that the cuckoo lays its egg in the nest of the hedge-sparrow, and also that the eggs or young of the last-mentioned bird are probably ejected, I beg to inform you that some years ago a nest in the garden of Newhouse, near Downton, Wilts, on which a hedge-sparrow was sitting, attracted attention from the circumstance of its containing one very large egg only. The young was hatched, and was seen daily fed by the sparrow, until it became so large as to spread over the nest. As the young bird was then ascertained to be a cuckoo, it was taken by the young ladies of the family, from the supposition that it would ultimately kill its foster-parent. The cuckoo was kept in a cage for some months, when in the following autumn it escaped. — *Geo. Matcham. Newhouse, near Downton, July*, 1842.

The Subscribers to Douglas's Monument. (p. 296. to 301., and p. 384.) — In p. 300., and also in p. 384., for "Mr. Smith in a letter from Worcester, 6*l.* 0*s.* 6*d.*," read "Mr. Smith in a letter from Cirencester, by Mr. Ker of Fairford Park, 6*l.* 0*s.* 6*d.*" No subscriptions whatever, we believe, were sent by Mr. Smith of Worcester. — *Cond.*

Art. IV. *Queries and Answers.*

The Raspberry Grub.—Mr. Gibson's query is thus answered by Mr. Westwood, from whom a paper on the subject, illustrated by engravings, will appear in our next Number:—The grubs which are found in the white central part of the fruit of the raspberry are those of Bytùrus tomentòsus, a small oval beetle ($\frac{1}{8}$ in. long), entirely clothed with deep ochreous, or slaty yellowish, short pubescence, and having clavate antennæ. It may probably be the Sílpha

testàcea of Linnæus. The perfect insects appear in the spring, when the whitethorn is in flower, which they frequent in great quantities. They afterwards go to the raspberry when it is in flower, and the female deposits her eggs in the embryo fruit. When the grub is full grown (at the time when the fruit is just beginning to decay), it falls to the ground, into which it burrows, and becomes a pupa resting till the next spring. — *J. O. Westwood. Hammersmith, June* 27. 1842.

The Florets of Centaurèa *moschàta sensitive* (?).—I have remarked here, on repeated trials, that the florets of the disk in Centaurèa moschàta, or common sweet sultan, are completely sensitive, continuing to move spontaneously long after the finger has been removed. Can you inform me if this be a distinguishing character of the species in general, or merely the effect of a tropical climate? — *A. B. Patna, East Indies, March* 31. 1842.

Hanging Bells in Trees. — The following answer to a correspondent is from a manufacturer of bells well acquainted with the subject: — "In answer to J. D., respecting hanging bells in trees, to be moved by wind, I think it would have a very pretty effect; for even those that are hung round the necks of sheep, which are not tuned, are in general very much liked. Were they properly tuned they would have a much more harmonious sound. I am much surprised that bells are not used on the grounds of the nobility and gentry, and I have no doubt they would be used, if they knew the effects they would produce, and where they were to be procured. They could be fitted up to play by machinery any tunes required; or to ring changes: the works could be moved by a small stream of water, or by weights. If musical bells were placed on the top of a building in a turret, they would have to be moved by weights; if they were to be moved by water, an erection could be made on purpose. I believe that most persons that would like to have such bells think they would be very expensive, as they think they must have large bells to produce a deep tone; but that is not the case, as the same depth of tone can be produced from much smaller bells, but of course not so loud. — *J. F. Drury, Musical Bell Manufacturer, Red Lion Street, Clerkenwell. July,* 1842."

Growing the Pine-Apple without Bottom Heat.—In the *Gardener's Magazine* for 1840, p. 240., it is stated that in the gardens at Kingsbury there are some fine pine-apple plants which never had any bottom heat, and that nothing could exceed their vigour and healthy appearance. Having commenced the cultivation of a few plants of this fine fruit, on a principle in some respects similar to that of the late Mr. Knight, I feel much interested in anything relating to the method which appears to have been so successfully followed by that gentleman. If this should meet the eye of Mr. Beaton, perhaps he will be good enough to communicate his mode of culture. — *A Subscriber. Winton, May* 25. 1842.

Grafting the Apple on the Willow. — I see that you have got a very intelligent correspondent, N. M. T., residing in the neighbourhood of Folkstone. I have had some conversation with a most respectable inhabitant of that place, concerning the deterioration of the common apples grown in the Folkstone orchards, which, he said, was noticed and lamented by all the apple-eaters in that quarter, and attributed to the cupidity of the nurserymen in that corner of the county, who, to get their young trees fit for sale as soon as possible, graft the apple upon the rapid-growing willow! I of course doubted whether such a feat was practicable; but, after consulting with his neighbours, he reassures me that such is a fact. Perhaps your correspondent above alluded to can set us right on this curious matter. — *J. Main. Elm Terrace, Fulham Road, Chelsea.* [Our correspondent, N. M. T., will probably be able to inform us of the origin of such an absurd report, which cannot have arisen at Folkstone without some local cause, which it is at all events desirable to know.]

THE

GARDENER'S MAGAZINE,

SEPTEMBER, 1842.

ORIGINAL COMMUNICATIONS.

ART. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the CONDUCTOR.

(*Continued from* p. 390.)

JULY 30. to August 1. — Corehouse; Lord Corehouse. This is decidedly the grandest place on the banks of the Clyde, embracing, as it does, a very extensive reach of the river, including the celebrated Falls of the Clyde, and the Bonnington Falls. The beauty of Corehouse is also increased by the extent and magnificence of the plantations on the Bonnington side of the river, which, to a stranger, seem as much a part of the Corehouse estate as if they belonged to it; indeed, these two estates seem formed to lend a mutual effect to each other.

The Corehouse estate extends considerably into the interior, on its own side of the river; and, as the surface is beautifully varied, it affords fine situations for planting, and also a number of little rills and waterfalls, which, in some places, leap from rock to rock, down steep declivities several hundred feet in height above the level of the Clyde, into which they fall. The rills, the wooded banks of the river, in some places consisting of steep rocks and in others of smooth turf, and the grand waterfall of Corra Lin, constitute the principal natural features of the place; and we shall hereafter see that they have been greatly improved by art.

The entrance lodge to Corehouse is close to the Bridge of Lanark; and the approach road is upwards of a mile in length, along the banks of the river, but so much above it as only at intervals to show the water. The line of road, which, in respect to its surface, is always nearly level, in regard to its direction is beautifully varied by natural and artificial woody scenery, by

views extending into the interior to where the distant hills belonging to the estate are crowned with thriving plantations, and by views across the river to the village of New Lanark. Here are the extensive cotton-mills where the celebrated Robert Owen first tried his philanthropic experiments. We scarcely know any thing finer, in the way of appropriated scenery, than the effect of the plantations about New Lanark, and thence to Bonnington, as seen from the approach to Corehouse, and the grounds about the house; and the appearance of the grounds and woods of Corehouse is doubtless equally effective, as seen from the opposite side of the river.

The house is in the old English domestic manner of Mr. Blore; simple, grand, and with an elevated terrace on three sides. The interior contains apartments, large, lofty, and well-arranged, opening into a spacious hall. There is none of that confused appearance sometimes found in modern Gothic houses, which are often crowded with turrets, bell-towers, and chimney-tops, without; and traversed by narrow passages, and over-done with Gothic cornices and other Gothic ornaments, within. Mr. Blore has the happy art of giving a certain elegance of proportion to the different parts of his buildings, in consequence of which there are plain spaces, giving by contrast its full effect to every moulding and ornament. Take, for example, a stack of chimneys. When the mouldings at the base, and on the top or capital, are brought too close together by the shortness of the intermediate shaft, the effect is crowded, lumpish, and, in every point of view, the reverse of elegant: but lengthen the shaft to a certain extent, determinable by the feeling dictated by an artistic eye, and elegance is at once produced; for elegance is the effect of proportions more slender than what are usual, executed in a material which conveys the idea of as much strength as is contained in a much larger mass, or, at all events, of amply sufficient strength.

The rocky banks of the Clyde, and the dells, dingles, and rocky steep-sided chasms containing the tributary rills which we have mentioned, being all more or less clothed with natural wood, and, consequently, all eminently picturesque and varied, what can the proprietor of such a place as Corehouse have to do, in the way of forming or improving ornamental scenery, seeing that nature has done so much? Is he to content himself with building a house, laying out roads and walks, forming a kitchen-garden and a flower-garden, and cultivating a farm? There are, probably, some persons who would be satisfied with doing these things, but there are not many. The most beautiful scenes in nature do not give full satisfaction to the mind, unless we can, in some way or other, associate them with self. If we can do nothing else, we can point out their defects or beauties to a

companion; we can describe them in a letter to a friend, or in a book; we can depict them by sketches; or, if they are our own property, we can alter or improve them. Now, the grand source of instruction to the landscape-gardener or the amateur of improved scenery, which is to be derived from the study of Corehouse, is the manner in which the natural woods, rocks, and rills have been improved by artificial planting, thinning, contracting, expanding, smoothing, concealing, and displaying. Great skill has doubtless been shown in the disposition of plantations on hills and slopes in the interior of the estate that were before naked, and also in admitting or shutting out the views on the opposite side of the river; but these are comparatively every-day operations, both in a tame and in a picturesque country. We shall shortly enumerate the leading features which would improve such scenery, and which have been added to it at Corehouse.

Walks, seats, bridges, and other rustic buildings; which facilitate the means of inspection and enjoyment.

Opening up beautiful views, and excluding offensive or uninteresting objects; which heighten enjoyment.

Thinning out unhealthy or unsightly undergrowths and ill-shaped trees, and forming glades of smooth turf; which will produce spots contrasting well with places where the undergrowth is vigorous and dense.

Removing the undergrowths altogether, and leaving only the timber trees, smoothing the surface below so as to admit of its being mown; which will change a wood to a grove.

Where the natural wood is entirely coppice, allowing some of the plants here and there to assume the character of trees, taking care not to cut these down when the coppice is being felled; which will change the coppice into a wood.

Rocks, where they occur, may be improved by removing soil or bushes so as to display them more fully or to greater advantage; or, if every part of the rock be already shown in such a manner as to give the idea that only a portion of rock exists, then a part may be concealed by ground or bushes so as to give the idea of continuation. The great art in this case is to indicate stratification, for, unless this be done, rock-work, whether natural or artificial, may be mistaken for a part of an old wall, or, more probably, for a heap of land stones.

Waterfalls, and rills expanded into pools, may be shown more fully, or increased or diminished, on the same general principle as rocks; but it is absolutely necessary that whoever attempts this kind of improvement should have the eye of an artist. Indeed, this remark will apply with almost equal force in the case of improving rocks. One of the finest features in the

grounds at Corehouse is Corra burn, situated in an improved glen with a succession of waterfalls; the steep banks richly clothed with rhododendrons and other evergreens alternating with smooth lawn, and the whole overhung with lofty spreading oaks and Scotch elms.

All these improvements, and others of a similar kind, may be effected without the addition of new plants; but the greatest addition to natural woody scenery consists in introducing, among the native plants, such exotic kinds of trees and shrubs, and especially evergreens, as are suitable to the soil and locality. Hence the immense improvement that has been made in natural woods by the introduction of rhododendrons, common and Portugal laurels, mahonias, box, holly, junipers, and similar evergreens, as substitutes, in part or wholly, for the native undergrowths, which are chiefly deciduous. It is not an easy matter to introduce plants of deciduous trees and shrubs, of any kind, into natural woods or plantations already advanced so far as to be 20 or 30 feet in height, because young deciduous plants require much more light than young evergreens: but deciduous trees may frequently be budded standard high on trees already growing there; for example, in every part of the country there are common thorns, sycamores, oaks, elms, and ashes, and on these some scores of kinds might be budded or grafted. At all events, this might be done with upwards of sixty distinct sorts of thorn, plants of which can be purchased from the nurserymen, or cuttings obtained from the Horticultural Society; and nothing can be more ornamental on the outskirts of a plantation, whether when they are in blossom, in May, June, and July, or in fruit, red, black, green, or yellow, from July to Christmas.

All the natural woods at Corehouse abound in wild herbaceous plants; and in early spring the primrose, and afterwards the wild hyacinth, the stellaria, and the foxglove, form fine masses of colour: but the effect of the numerous wild plants here has been increased, to a degree which the botanist alone can value, by planting and sowing among them many kinds of perennials and annuals, including the hardier bulbs.

The artificial plantations, formed where no trees grew before, have made extraordinary progress, in consequence of the soil being naturally good and being deeply trenched; but, like most others in this part of the country, they have not been sufficiently thinned out and pruned.

We cannot pretend to describe any part of Corehouse in detail, though, from the kind hospitality of the proprietor, we had an opportunity of looking over the grounds for two days; but the extent of the walks and the variety of the scenery are so great, that to do so would require either a longer period, or the

assistance of notes and sketches to refresh the memory. We left Corehouse; and the kind and most intelligent family of Lord Corehouse, with deep regret, and can only console ourselves by hoping that, at some future time, we may have an opportunity of visiting both again.

We were sorry to observe, by a Railroad Report then just issued from parliament, that a line of road is projected to pass through the estate of Corehouse, between the house and the stable offices. Fortunately there is little chance of this line being carried into execution, otherwise it would completely destroy Corehouse as a country residence.

Corehouse to Peebles. Mr. Cree, the nurseryman at Lanark, described to us some immense silver firs, planted by Lord Hyndford, which had lately been cut down on a neighbouring estate, and were the largest, he thinks, in Scotland; and he recommended us to visit Carstairs, where, having seen it in 1804, we were aware that there were many fine old trees. Time, however, would not permit, and besides it was Sunday; so we passed on to Biggar, noticing some curious branchy-headed larches in the hedge-rows near Hyndford Bridge, and that the pasture fields were covered with weeds, chiefly ragwort, ripening their seeds. Worse farming we did not see in any part of Scotland, though here and there we found preparations for thorough draining.

Biggar. Mr. Cree's mode of pruning trees we have already done justice to in p. 34.; and, as it is now being very generally discussed in the gardening newspapers, and apparently as generally approved of, we hope it will soon be adopted in all plantations the object of which is to have as much of the timber produce as possible in a straight trunk. We call this mode of pruning Mr. Cree's, without enquiring whether something like it may not have been practised by Mr. Billington or others, because Mr. Cree first reduced it to a regular system. It must not be forgotten, that where ornament is the object, or, in other words, where trees are to be encouraged to assume their natural shapes, neither Mr. Cree's mode of pruning, nor any other of a similar nature, should be adopted with young trees. We do not mean by this that ornamental trees are never to be touched with the knife or the saw: on the contrary, all dead branches we would cut off close to the bole; when a tree offered a partial exclusion of a desirable view, we would cut off part of its branches; when it showed all branch and no stem, appearing like a gigantic shrub, we would confer dignity on its expression by showing part of the trunk; and, above all, when it stood near a building, we would, if necessary, remove branches in such a manner as to improve its effect as part of the group to which it belonged, to prevent it from obscuring too much of the house as

seen from without, and too much of the exterior scenery as seen from within. The question, in these and similar cases, that we should ask ourselves is: Supposing the tree, and the landscape or group of which it forms a part, were sketches on paper, instead of realities, how should we improve them?

We cannot leave Biggar without expressing our regret that Mr. Cree is not more generally employed. If some of the principal proprietors throughout the country would employ Mr. Cree to inspect their young plantations two or three times a year, the cost to them would be a mere trifle, for Mr. Cree only charges half a guinea a day; while the benefit to the proprietor, directly by the improvement of his plantations, and indirectly by the knowledge gained by his forester, would be great in proportion to the extent of his plantations.

New Posso; Sir John Nasmyth, Bart. If we imagine a valley in the direction of east and west, with a narrow lake along the bottom, and the hills on each side gradually rising from the level of the water to the height of 600 or 800 feet, we shall form a general idea of the kind of scenery of which the house of New Posso forms a part. The house is placed about a third of the way up the slope which forms the south side of the valley, and of course looks to the north. There is scarcely another house to be seen but itself. The profound impression of melancholy produced by the scenery is not easily conceived by those who have not felt it: but it arises from the want of human habitations, or any thing like a village, for some miles before you arrive at the entrance gate; from the public road being evidently one not much frequented; and from the hill facing the north, in consequence of which the house and grounds are in direct shade, or in reflected light, great part of the day. Great part of the slope being naked, or only covered by young plantations, the eye readily measures it from the base to the summit; and at the top of the hill there are an ancient parish church and burying-ground, long since disused for any other purpose than as the family mausoleum. Down the hill-side runs a small clear stream, with occasional waterfalls and lateral expansions into pools, which forms a fine guide to a beautiful walk, winding and climbing along its banks till it terminates at the mausoleum. There are extensive old woods both to the right and left of the house, and many fine old ashes, beeches, oaks, sycamores, Scotch firs, larches, and acacias, some of which, through the kindness of Sir John Nasmyth and Mr. Lawson, have been figured and described in the *Arboretum Britannicum.* Along the brook and in a number of other places, masses of rhododendrons, with other evergreens and foreign shrubs, have been planted; and are already beginning to give a rich effect, and to counteract that naked, wild, and solitary appearance which is

the natural expression of the place. Among the young trees in these masses we observed some thriving plants of *P*ìnus Larício, *P. Cémbra*, and Irish yew; but, on the whole, there is a great want of different species both of trees and shrubs. We found, however, a plant of *C*ratæ`gus *t*anacetifòlia Cels*iàna*, the only one which we saw in Scotland. These grounds are admirably adapted for planting an arboretum, including a pinetum; for the soil is dry and sandy, and the declivity is such as to prevent all risk from stagnant air, whether cold or moist. Large masses of plantation, to connect the woods on the right side of the house with those on the left, and to prevent the eye from measuring the ground from the base of the hill to the summit; as complete an arboretum as the climate will admit of; and a waterfall of 50 or 60 feet in height, to be seen from the windows of the house, and to drive away melancholy by its noise, appear to us the grand improvements which the place wants.

The house has undergone a thorough renovation, and also the mausoleum; and these, the walks, and the plantations, show a desire to do every thing substantially and in good taste. In short, though we had not the pleasure of finding Sir John Nasmyth at home, every thing that we saw convinced us that his reputation for good taste as a professional landscape-gardener is well merited.

A very interesting description of New Posso, as it existed in 1715, will be found in our *Arboretum*, vol. i. p. 93. Whoever recollects it will probably wish to know whether we saw the greenhouse, which was at that time the glory of Tweeddale, and over which was inscribed, in conspicuous characters, alluding to the flowers within, "Solomon in all his glory was not arrayed like one of these." We did see it, and found within, hung up on the back wall, the old flower-stem of the first agave that flowered in Scotland, in what year we do not recollect. The greenhouse is placed, as was the custom formerly, in the kitchen-garden; and near it are a fine specimen of *A*cer monspessulànum, and a venerable old robinia.

The architectural alterations and improvements at New Posso have been designed by Mr. Burns, and executed, under his direction, in a neat and most substantial manner. The terraced gardens are at present without flowers, as the family has not resided there for two or three years; but, when they are properly planted, the place will appear much more cheerful and habitable.

We passed Stobbo Castle, and arrived at Peebles late in the evening, but with sufficient light to obliterate the impressions which the town and the scenery around had made on us in 1804. It was then a poor place, surrounded by a naked hilly country; but these hills are now covered with thriving plantations.

August 2.—Peebles to Melrose. The country is beautifully varied by hills, some of which are wooded, and others cultivated, and exhibiting fields of turnips, and barley or wheat, to the very summits.

Traquair. We went through that curious old place, Traquair, where the kitchen-garden walls are 18 ft. high, and were coped with turf now bearing a rich crop of grass and weeds, the seeds of which were nearly ready for being distributed over the garden by the winds. In this garden were excellent crops, particularly of strawberries, but we did not find the gardener at home. In the herb ground we found elecampane, lovage, horehound, and a number of other herbs formerly cultivated in all gardens, but now generally neglected. Traquair House has nothing modern about it, not even a full-sized sash window, and the main entrance has no gravelled road up to it; as, till lately, was the case at Knowle in Kent, and, by imitation of old places, at Fonthill Abbey. There is a grand terrace on the other front, and the main body of the house is flanked by square pavilions. Altogether it is a great curiosity as a gentleman's residence; and it was not without difficulty that we obtained liberty to drive up to it, the Earl of Traquair being from home.

Abbotsford; Sir Walter Scott, Bart. So much has been said of this celebrated place, that we shall pass it over with scarcely any remarks. Sir Walter Scott's taste was antiquarian rather than artistic, and he has produced such a building and gardens as might have been expected from his peculiar partialities, and his facilities for obtaining fragments of antiquity. The house is a curious piece of patchwork, but such as must have afforded great satisfaction to its gifted proprietor in forming it. We could not get access to the gardens, which, we were told, were planted with potatoes, nor to any part of the place that could be considered as ornamental scenery.

The roads in this part of the country are excellent, and the scenery a fine combination of the beautiful picturesque, and agricultural cultivation. Some of the hills are conical, and ploughed over the very summits; others are crowned with wood, which, in some cases, stretches down their sides, in masses and hedge-row strips, till it reaches the margin of a river, or the verge of a meadow. There is every appearance of prosperity and comfort; but the bands of women seen hoeing turnips reminded us that all was not as it ought to be, and as we trust it will be in another generation; for we cannot think that, in a state of high civilisation, women will continue to be employed in field work. We arrived at Melrose in time to see the ruins of the abbey with good daylight, and we remained among them till it was quite dark.

(*To be continued.*)

ART. II. *Notes on Gardens near Lancing, concluded.* By the CONDUCTOR.

(*Continued from* p. 392.)

THE Garden of Mr. Sharp, the blacksmith, at Lancing, contains a good collection of fruit-trees, especially apples and pears. Mr. Sharp is enthusiastically attached to the culture of fruits; as a proof of which, we found he had got Myatt's new strawberries, and the Van Mons Leon le Clerc pear. He has seventy fig trees; and among these one bearing a small green fig of exquisite flavour, but the tree is not a good bearer. The white Marseilles he has had as large as an orange. The garden is on chalk, sloping to the south-east; and so early, that some strawberries were now (May 25th) ready to gather. On an old cottage, near Mr. Sharp's house, is a vine which was brought seventy years ago from Bordeaux; it has large berries and bunches, not good to eat, but making excellent wine, even when the berries are not ripe. It might be worth enquiring after by those who are planting vineyards. Mr. Sharp's garden is surrounded by high brick walls, covered with admirably trained trees, and every part of the interior was in the highest order and keeping. It is his own property; and as he is blessed with health and a taste for its cultivation, and has a wife and family with a comfortable house, we regard him as having within his reach all the elements of happiness, which we hope he will long live to enjoy.

We glanced at several other places in this neighbourhood, and were recommended by Mr. Kidd to visit Offington, Lewis Daubuz, Esq., where there is a good collection of *Orchídeæ*; Northbrook, David Lyon, Esq., a finely wooded extensive place; and some others which we hope to see on some future occasion, for at present we had barely time to visit the Miller's Tomb on Heydown Hill.

The Miller's Tomb is placed on the east side of Heydown Hill, a high chalk hill covered with beautiful smooth turf, from about half-way up to the very summit. The tomb stands near a hedge and a group of trees, about two thirds up the hill side. The summit of the hill is conical, and from it there is a complete panoramic view of the surrounding country, bounded on the south by the sea. The miller's windmill stood on this summit, and around it are still visible the remains of an entrenchment which once enclosed a Roman encampment. The miller lived in a cottage at a short distance from his tomb, and this cottage has lately been rebuilt, and is now occupied by his aged sister-in-law and her daughter, Miss Oliver, to whom we are indebted for the following particulars. John Oliver, the miller, was remarkably fond of the spot where the

tomb is placed, and with the permission of his landlord, with whom he was on the most friendly terms, he built a summer-house there, and afterwards the tomb, an oblong square, 12 ft. by 6 ft. and 4 ft. high, brick on the sides, stone at the two ends, covered with a stone slab, and surrounded by an iron railing. In the summer-house the miller used to delight to sit and muse on the distant prospect, with his tomb in the foreground; and even after he became blind with age, which was several years before his death, he was led there every day by a little girl who read to him, and acted as his nurse. The tomb was built nearly thirty years before the miller died; and he, as some other men have done, had his coffin made about the same time; he had it placed on castors, and it was nightly wheeled under his bed, and brought out again in the morning. Being in very good circumstances, he left 20*l.* a year to keep the tomb and the summer-house in repair; but having left the funds which were to produce this sum in the hands of his grand-daughter, though this lady is said to have 300*l.* a year of her own, yet not one farthing of the 20*l.* has been expended on the summer-house or the tomb. In consequence of this neglect for upwards of forty-nine years, the summer-house is so completely destroyed, that not even a single brick remains; while the tomb, as will hereafter appear, is in such a state of dilapidation, that the whole of the inscription on it cannot be read. We purposely avoid giving the name of this lady, in the hopes that she will yet do her duty.

When the miller died, the clergyman of the parish could not, consistently with his profession, read the burial-service over the body; but he was kind enough not to interfere in the matter, and the service was read in a distinct and audible voice, as Miss Oliver informed us, by the little girl who had led the miller about, in the presence of between 2000 and 3000 people who had assembled on the hill round the tomb. The little girl, whose name was ——, has been dead some years.

The following is a copy of the inscriptions on the tomb: —

On the Top.

FOR THE RECEPTION OF THE BODY OF

JOHN OLIVER,

WHEN DECEASED BY THE WILL OF GOD.

GRANTED BY WILLIAM WESTBROOK RICHARDSON, ESQ., 1766.

For as in Adam all die, even so in Christ shall all be made alive.—*Cor.*, xiii. 22.

The law was given by Moses, but grace and truth came by Jesus Christ; that whosoever believeth in him should not perish, but have eternal life.—*John*, i. 17.

On one Side.

Why should my fancy any one offend,
What's good or ill on it does not depend?
'Tis at my own expense, except the land,
A generous grant, on which my tomb doth stand.
This is the only spot that I have chose,
Wherein to take my lasting long repose;
Here in the death my body lieth down,
You'll say 'tis not in consecrated ground.
I grant the same: but where'er shall we find
The spot that e'er can purify the mind,
Or to the body any lustre give?
This more depends on what a life we live:
For when the trumpet shall begin to sound,
'T will not avail us where the body's found.
Blessed are they, and all that may,
Full in the Lord and Saviour die:
Their bodies wait redemption's day,
And sleep in peace where'er they lie.

On one End.

The fear of God is the beginning of wisdom; but to keep his commandments is holiness to the Lord.

[Figures of Death and Time.]

Death, why so fast? pray stop your hand,
And let my glass run out its sand:
As neither death nor time will stay,
Let us improve the present day.
Why start you at that skeleton?
'T is your own picture that you shun:
Alive, it did resemble thee,
And thou, when dead, like it shall be.
Though Death will have its will with fate,
Yet still old Time prolongs the date,
Till all the measure I shall fill of breath
That is allotted me by fate.
And when that's done, then Time and Death
. . . [Last line illegible.] . . .

On the other Side.

IN MEMORY OF

JOHN OLIVER, Miller,

WHO DEPARTED THIS LIFE THE 22D APRIL, 1793, AGED 84 YEARS.

On the other End are some texts from the Burial Service.

Art. III. *Dinbur Castle, its Gardens and its Gardeners.* By Peter Mackenzie.

When you were in Scotland last year, I believe your limited stay prevented you from visiting places in that country where, perhaps, you would have found something to commend, and

much to condemn. I am sorry you did not find it convenient to call at Dinbur Castle, not on account of its combination of ancient and modern architecture. There you would have seen some of the remains of feudal times, such as the spot where the "wooden bastile" stood, or where the Juggs hung on the gallows tree, the iron-studded gate, the portcullis, and the remains of the old drawbridge, or

> "The battled towers, the donjon keep,
> The loophole grates where captives weep,
> The flanking walls that round it sweep."

Or, perhaps, you would have been better pleased with the more elegant display of Grecian architecture. There is many a Doric column with its guttæ, metope, triglyph, mutule, corona, &c. Also the work of the sculptor is displayed on the arms of the family; the supporters upholding the escutcheon with stone chains dangling by their sides, and the crest and the scroll, are done in a very tasteful manner: but, leaving the castle, we may proceed to the gardens.

The kitchen-garden is nearly a century old, an irregular piece of ground, enclosed by an unfinished wall, part of it without coping, and the teeth of time making inroads upon the bricks and mortar. There are old fruit trees in it that bear good crops, and broad grass walks considerably raised above the borders. Little attention had been observed in levelling the surface; there are small hills and valleys in it; and here and there large blocks of whinstone rocks rear their heads above the ground, so that the gardeners may have lessons in geology along with their botanical studies, when they are cultivating fruits and vegetables. In the flower-garden there are remains of the time when Adam and Eve were cut in yew, Cain's cradle in box, and the Tower of Babel in variegated holly; in another part, the modern system of flower-gardening is practised; in this manner combining the past and the present. The undulating nature of the surface prevents the eye from resting on the whole at once, and from the crests of the waves some beautiful views are obtained. On the bosom of a wooded hill is seen the white foam of the cataract, and at intervals would be heard its sound dying upon the ear; the waters rushing with headlong fury into the sequestered valley, and there forming the "music-making stream;" bursting from the glen, it winds in graceful turns among the rich pasture, and becomes the "low-voiced river; moving slowly along, it joins the briny waters of the Forth. Turning in another direction are beheld the perpendicular columns of basaltic rocks, the debris covered with blackthorn, hazel, and mountain ash, and their summit crowned with dark firs; and in the distance are the peaked mountains, at one time covered with clouds and tempests, and at another time pavilioned in

glory. In the study of God's works there is no end to their variety, although they were sought after by minds enlightened as the sun when he spreadeth his light upon a thousand hills. But we are lingering by the way, and must hasten from viewing the meadows and the woods, and the low valleys, and the musical warblers singing by silver fountains, and the pleasing combinations of classic architecture, and go to a place where we intend remaining for a little time, although it is seldom visited by those who delight in admiring the wonders of nature and art; the place I mean is the gardener's bothy.

The bothy is commonly a little lonely shed placed on the north side of the north wall of the kitchen-garden; that small apartment has often to be kitchen, breakfast-room, dining-room, parlour, bed-room, dressing-room, and study, for men that deserve better accommodation. If a little of the money that is spent upon dog-kennels were employed in erecting decent habitations for journeymen gardeners, gentlemen would receive a higher rate of interest for money laid out in such a way, than they do from much of their wealth that is sent out in other directions.

But some young men will not be hindered from pursuing after knowledge, though difficulties should attend it. In the bothy at Dinbur Castle gardens, some time ago, there were four young lads, whose exertions to obtain useful knowledge may be worth recording, and perhaps their example may be worthy of imitation by others placed in similar circumstances.

Sandy MacAlpine, the foreman of the gardens, was at one time intended to be something else than a gardener, and was kept longer at school than boys are generally kept; but, like many a novice, he forgot to strengthen his muscles when he was endeavouring to inform his mind. Close application in the study of Latin and Greek, and one season at college, gave him every appearance of a blanched student. He found his health undermining rapidly; he was advised to try something else; he chose the occupation of a gardener, and his health recovered; but, instead of leaving it when he got better, he continued to love his employment.

Colin Forbes was another inmate of the bothy at the time we refer to. He was a stout active young man; the spade appeared as light in his hands as if it had been a child's toy, and he could use it to good purpose: he did not, however, forget the education he received in his early days; he was fond of mathematical studies, and liked well to talk about square roots and cube roots, equations, involution of quantities, circles, angles, pyramids, cylinders, cones, polygons, &c.

Walter Glenesk, another of the four, when alone, occupied his time differently from any of the rest: he was in love with the

study of natural history. He made himself pretty well acquainted with the botanical systems of Linnæus and Jussieu: but he did not stop there; he acquired a knowledge of Cuvier's system of geology, Jameson's system of mineralogy, and an outline of zoology. Leach's *Arrangement of Insects* came in his way, and from it he gained some knowledge of entomology: the *Elements of Conchology*, by Brown, made him acquainted with the Linnæan arrangement of shells, also the description of the genera, and the explanation of terms used in the science of conchology. Often would he wander along the sea-beach collecting razor-shells, cockles, muscles, oysters, &c.

The last of the four was Bauldy Black: he differed from all the rest; he did not pretend to be a book-learned man, but, for strength of body, he would match with any of his comrades; he was a good-natured lad, and took things very easy. He lost his father when he was young, and he had nothing but hard work before, and few opportunities for improving his mind. However, he had formed a love for the fiddle, and with it he used to chase away dull care, but his music was not at all times acceptable to those who lived with him.

When they were at work together, it would be difficult to tell which was the best workman: when mowing, for instance, they would keep time as regularly as if they had been rowing a four-oared boat, and seldom had much to cut in the "hacking"; but when they were relieved from their labour, and every one at liberty to choose for himself, then the bent of their minds would be discovered. One would, perhaps, be reading Virgil or Homer, another would be working some proposition in Simson's Euclid, and another endeavouring to make out the name of an unknown plant. When in the midst of their studies, Bauldy would take down his fiddle, and give them some lively Scotch airs to cheer on their philosophic spirits; but the Georgics were soon shut, Euclid laid aside, while Lindley, Loudon, or Smith, was locked up in a trunk, and all wished the crambophagus and his fiddle out of their hearing. Sometimes they got what they wished for, for Bauldy did not always confine himself and his music to the bothy. Often would he go courting the lasses, and with the young women he was a great favourite: he never appeared so happy as when he got a few young men and women collected in a small apartment; then would he dance, sing, and play, for hours in a winter's night.

One night when Bauldy was absent, Sandy MacAlpine said that something might be done that would better them all, and might be the means of turning Bauldy from his thoughtlessness, and make him more attentive in seeking after professional knowledge. He believed that they were not acting right to-

wards one another, each one confining his knowledge to himself, like misers hoarding their treasures, neither benefiting themselves nor others so much as they might do: he believed that if they were to exchange knowledge with one another all would be gainers; and quoted the words of Lord Brougham, when he said, "It may easily be demonstrated that there is an advantage in learning, both for the usefulness and the pleasure of it; there is something positively agreeable to all men, to all at least whose nature is not most grovelling and base, in gaining knowledge for its own sake." The other two heard Sandy's proposal with delight, but did not know how to proceed in order to accomplish their object; they agreed to inform their master of their design, and ask his advice and assistance.

Sandy was appointed to make known what they intended to do; he did so the first opportunity he had; their master was glad to hear of their good intentions to each other, and promised to further them with all the assistance in his power. He was a man well advanced in life; he had studied men and manners in a way somewhat different from that recommended by Lord Chesterfield; he was well acquainted with the various branches of his profession, and could turn his acquired knowledge to good account in practice. He promised to meet with his young men on an early evening, and make arrangements for their future advances in knowledge; and also to read, by way of introduction, a short essay on certain points which are necessary for young gardeners to know and practise. I will say, what has already been said by an eminent author, that "I will never undervalue the pursuits of science and literature, or the diffusion of general knowledge. Far from me be such a purpose! Most unfeignedly do I rejoice in the advancement of such knowledge, and in the success of all the means for its universal communication by which our age, and especially our country, are distinguished. I have no sympathy with the apprehensions of those who are tremblingly jealous of the spread of information. There is ground for congratulation, not for despondency, in the prevailing thirst for knowledge, and in the zealous desire on the part of those who are in possession of it to gratify that thirst. By all means let it be quenched to the uttermost."

West Plean, July 27. 1842.

Art. IV. *On the different Uses of Moss in the Cultivation of Plants.* By M. Heicke.

(Translated from the *Garten Zeitung.*)

That plants planted in damp moss, instead of earth, live and grow is a fact not new, and moreover one that is easily explained;

for the moisture of this material is sufficient for the early nourishment of the plant, until it obtains stronger nourishment from being transplanted, and its porosity admits the influence of the atmosphere to penetrate to the lowest roots.

From these data, care being taken that the ball of moss in which a plant has rooted firmly adheres together, in such a manner as that it may be taken out and transplanted like the ball out of a flower-pot, without disturbing the vegetation, I made use of moss in the following instances with success.

I. *With the Stock-Gillyflower.*

I made two beds; a regular flower-bed, in which the young stocks were planted as usual, and a nursery. This occupied a retired spot only exposed to the morning sun, to save the trouble of shading the young plants after transplantation. The ground was prepared in the usual manner by digging and raking.

Holes were then made with rather a thick dibble at the distance of from 4 in. to 6 in., and widened as much as possible at top, by repeatedly turning round the dibble. Then in each hole a good handful of damp moss, as it came fresh from the wood or the meadow, was firmly pressed in. After all the holes were so prepared, the hole for the plant was made in the middle of the ball of moss. The young stocks were then planted in these holes: the plant was held in the middle of the hole, which was about 2 in. wide, and fine light mould, prepared for the purpose, thrown round the roots till the plant stood firm; then they were watered in the usual manner. They required no shading, owing to the situation chosen for them; and grew well, rivalling those in the flower-bed.

As soon as the double and single flowers showed themselves in both beds, the single ones were weeded out of the flower-bed, and the double ones from the nursery, with their balls, put in their place. If, in any of the transplanted plants, a root had escaped from the ball of moss, protection from the sun was of service for some days; but if that were not the case they required none. Those which were transplanted grew as well as those that were not transplanted, and yielded the rare advantage of a bloom with double flowers only, which in point of beauty could not be surpassed.

It scarcely requires to be mentioned, that, in the course of the summer; the roots of the plants transplanted with the balls of moss penetrated into the surrounding ground.

Watering with diluted cow-dung which had been left to stagnate for several weeks, and was applied to the plants in dull weather, was latterly found beneficial.

My rather slow gardener planted one forenoon, including the preparation of the ground with the moss, 480 plants in the nursery, observing the order of planting above-mentioned. So much for any objection as to the tediousness of the operation.

II. *With the Winter Stock-Gilliflower.*

The object I had in view was to raise plants that would show flower earlier than in the usual way, so that they might be earlier potted off. Early planting, and consequently the proper growth attained by the winter stock, are the chief considerations for their keeping well through the winter. I proceeded in the following manner: —

As the weather became milder, so that I was not afraid of the frost penetrating a cold-frame, I prepared one with an understratum of about 1 ft. of leaves and weeds, as actual bottom heat is injurious to the young stocks. The fine mould laid over it was, as before observed, dibbled for the plants, and balls of moss put in the holes. In order to economise space, they were made so close together as almost to touch each other, and were but the size of the fist, as they were only for transplanting the young plants. When holes had been made in the moss balls, they were filled with earth suitable for the stocks, and two stock seeds were put into each hole. As soon as the plants had grown a little, the weaker one was pulled up. Whether there was not a greater probability of this being double than the stronger one, I cannot venture to say.

When they had attained the proper size for transplanting, they were, as usual, planted out in the open air, but with the moss balls.

The following were the results of this method of cultivation: —

1. I completely attained the object I had in view, viz. that the flower showed itself early; indeed too completely, for my winter stocks bloomed, for the most part, at the same time as my summer stocks, which was not intended, but which could easily be avoided by sowing later. Unfortunately, I cannot state the day on which I sowed the seed.

This early appearance of the flower is readily explained. 1st, Because the plant was not disturbed when it was first transplanted; therefore the blossom-buds would show themselves as much earlier, as the duration of the sickly period after transplanting in the usual manner would have lasted, and retarded the progress of vegetation. 2d, In the loose mass a number of hair roots, instead of the usual turnip [fusiform] roots, had been

formed, which, as is well known, tend to produce flower, while the turnip roots produce wood.

2. These delicate roots could be easier got into the pots than the stronger ones, which are difficult to be got in, and yet cannot be dispensed with. They also greatly accelerated the growth.

3. The loose moss round the stem entirely prevented the rotting of the stem, which so often occurs.

I shall, therefore, make use of this method in future.

III. *In raising early Beans.*

In the same manner (as II.) I planted a frame, 3½ ft. square, with early beans, in moss, which were afterwards planted out, in mild weather, in the open ground, and filled two beds, each about 24 ft. long and 3½ ft. broad. The foundation of moss seemed to suit them particularly, for they grew and bore more luxuriantly than all that were planted in the ground.

To bring them to fruit very early, I have planted now, January, beans in moss, in a box in a moderately warm house; and I shall transplant the young plants afterwards, when it is somewhat milder, into a cold-bed, protected by glass and coverings, as a warm-bed, which I should prefer for them, is not at my command.

IV. *Melons*

raised in the same manner, and afterwards planted out in the open ground, grew very luxuriantly, and put out shoots in a few weeks, when the cold wet summer of last year unfortunately killed them.

V. *Cauliflowers*

raised in this way, produced very fine heads; but the year was, on the whole, very favourable, and the holes they were planted in were filled with dung. The facility of transplantation enabled me to plant the young plants, with the moss balls, for some weeks in the shade; and, by being placed in this situation, to preserve them from the devastations of the earth-flea-beetle (Háltica *Fab.*), which dislikes the shade, till the leaves had become hard, and, consequently, unfit for their food.

I suppose that, as the young plants, by being transplanted in this way, do not become sickly, they are less exposed to the ravages of insects, which, as is well known, attack sickly plants in preference. Even in more unfavourable seasons, the undisturbed vegetation, and the exuberant formation of hair roots, already noticed, might produce a greater tendency to fructification.

VI. *Young Vine Shoots, Rose Shoots, and other Sorts of Shrubs,*

about the middle of June, were cut, in the same way as carnations for layering, to the next node, and the part so cut laid in the earth, in a ball of moss, near the mother plant. In the course of a few weeks they had rooted, and the same summer were fit to be transplanted, with the ball of moss, to their destination.

VII. *For grafting Apricots and Peaches.*

In the spring, young trees, with their roots packed in large bundles of moss, were laid in the ground, in the shade, till vegetation began. They were then put in close to the parent plant, and a twig inarched upon each of them. They soon grew together, could be separated, and the same summer were planted out as standards.

VIII. *For round-headed* [*or Parasol*] *Acacias.* [R. *Pseùd-Acàcia umbraculífera* Dec. *Encyc. of Trees and Shrubs*, p. 234.]

These are very difficult to raise in open ground, because the branches are either too dry, or the sap already in motion while the wild stock is still dormant. I surrounded the roots of a common acacia, of from one to two years old, with moss balls, and brought them into vegetation early in the year, in a cold greenhouse. They were then grafted with freshly cut, and therefore perfectly healthy, twigs of Robín*ia* Pseùd-*Acàcia* umbraculífera *Dec.*, and succeeded well. They were hardened by degrees, and afterwards, on the part between the root and the graft, towards the top of the stem of the common acacia, they were inarched in the crown, and were kept in the moist balls of moss surrounding their roots till they grew, when watering was discontinued, and the wild stock died off by degrees.

Although tedious, this method appears, at the same time, desirable, when it happens that on any particular spot a common acacia, already grown, is to be transformed into a round-headed one, for it is certain the price of round-headed acacias is also at all times so considerable as to render thetrouble worth while.

Should it be found, as I suppose, that cuttings of R. Pseùd-*Acàcia* umbraculífera *Dec.* can be struck (about midsummer I did not succeed; it might do better in spring, in beds from which the air is excluded), these might be used for inarching, thus saving previous grafting; the cuttings could be planted, early in the year, in moss balls filled with sand.

All the above experiments were made during the past year. They are sufficient at present to justify the experiment, to direct attention to it, and to induce a greater application of moss to useful purposes. In this respect I have in view the following experiments: —

1. Raising turnip-rooted celery in moss balls. In my soil it throws out, instead of a single large turnip, a small one with many strong roots, but useless for cooking. I hope, from the porosity of the moss, to produce many hair roots, and also a large turnip.

2. A flower-bed filled with flowering plants from spring till late in the autumn. How unsightly, for instance, when, in the conspicuous beds on a lawn, the hyacinths, tulips, anemones, *P*hlóx vérna, and other early flowers, must stand till summer before they can be transplanted without being spoiled! If they were growing in moss balls, they might be removed, without injury, immediately after flowering, to make room for other flowering plants.

3. A more enlarged application to the culture of other early vegetables, such as peas, gourds, the cabbage tribe, and others.

Acken, near Magdeburg, January 29. 1842.

Art. V. *On a Mode of procuring Sand for striking Cuttings.* By D.

Having derived much information from the perusal of the *Gardener's Magazine*, and as one good turn deserves another, I have endeavoured to snatch a few minutes to communicate a few remarks for the good of others, if good it may be to them. I have at various times read with pleasure the methods of propagation which are there recorded, and most of them I have tried; but, as my own plan is more simple than most of them, and equally successful, perhaps you will give it insertion.

I have usually found that where cuttings could be kept regularly moist, and at a temperature consistent with the nature of the cuttings, together with a proper material to strike in, success was nearly certain. Most people agree that sand is the best material; but sand varies very much in different places, and I have been so situated as to find it difficult to obtain at all. But as necessity is the mother of invention, so it was with me, and now, if I can obtain sand at all, I soon make it what I want. If I cannot dig it or buy it, I can generally sweep it up after a heavy shower. In the first place, I sift it through a sieve

about as coarse as a common cinder sieve: what this sieve stops in sifting is thrown away, as it consists of stones of unequal size. It is next passed through a finer sieve in a tub of water: all that stops this time, being free from dirt, in consequence of the washing, is used for drainings for large pots. It is then passed through a still finer sieve in water, and all that stops in this sieve is used to drain smaller pots. After this it is well washed through a very fine sieve, and all that is stopped by this sieve serves to drain the smallest-sized pots; and, by putting a piece of tile or broken pot over the hole, and just covering it with the draining-stones according to the size of the pot used, it forms the best drainage I am acquainted with. The sand is then used to strike in, by placing a piece of tile or pot over the hole, and then filling the pot with the sand, which, being cleansed from dirt, will never retain more moisture than is necessary for the cuttings, and, when wanted to pot off, the cuttings are much more easily shaken from such sand, than from that which has not been washed.

If it is intended to keep the cuttings in the same pot after they are struck, then the pot must be drained in the usual way with the tile and stones, and partly filled with suitable soil; but, if they are to be potted off when rooted, nothing but the sand is necessary, and, though they may be often watered, no more water will stay long in the sand than will be required. I ought to have said that when I use only sand I make it very firm.

I enclose a small quantity of the sand prepared from the garden walks.

[The sand received is quite free from soil, and consists of yellow particles, a number of them quite bright and shining, like particles of quartz.]

August 13. 1842.

Art. VI. *Notice of a new Dahlia Stake invented by Mr. Saul.* By M. Saul.

The engraving (*fig.* 40.) shows a stake formed of cast iron and wire, which will serve as a protector both to the plant and flowers of the dahlia. The lower parts of the protector (a, *b b*, and *c c*,) are all cast together. At *c c* there are three pieces of wire shown, which are put into the moulding-box before the metal is poured in, so that, when it is poured into the mould, the ends of the wire are so placed that the metal closes round them and makes them secure, as shown at *c c*. The pieces of wire *d d* are put in after this part is cast, by drilling holes through

the casting. The advantage of these wires is, that they will bend any way to suit the line of the branches and flowers. B moves like the tube of a telescope out of A, and may be set to any height by means of a thumb-screw shown at *e*. This tube is made of half-inch gas-piping, for the purpose of receiving the top (C), also of cast iron; and the wires shown in it are secured into it in the same manner as into the ends (*c c*). There is a piece of strong wire in the under side, for fitting into the end of the pipe, as shown at *g* by the dotted lines, so that the top is easily taken off and put on. To this top a number of flowers may be tied, and prevented from rubbing against each other. The moving branch (D) upon the tube B is secured by a screw, as shown at *f*; by this means the branches of the stake will turn round up to the side of the branches of the plant, which will be just the reverse to the branches *c c*. Any number of these moving branches may be put upon the tube B, as may be required by the height of the plant. The wires in this branch are secured into it in the same manner as in the other branch. The end of this protector, at *a*, is put into the ground to a sufficient depth to make it secure.

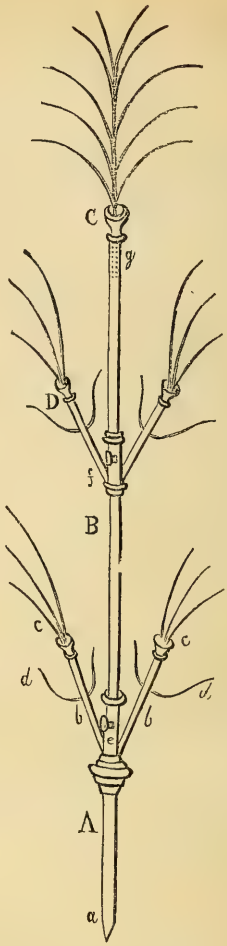

Fig. 40. *Improved Dahlia Stake.*

A protector might be made with a wooden upright axis, with cast-iron branches to put on it, which would move, and might be secured by screws in the same manner as in the iron stake.

Fort Green Cottage, Garstang, July 31. 1842.

Art. VII. *What constitutes a Florist's Flower?* By W. A. M.

Florist's Flowers differ from wild flowers and border flowers in being so entirely changed by culture as no longer to resemble their original type. All plants are not capable of being so

changed, though usually every individual of the same species varies slightly from its brethren. Among trees, for instance, some will have an erect manner of growth, while others, of precisely the same kind, will assume a drooping habit; and among herbaceous plants the colours of the flowers will often materially differ, and some even show a disposition to become double. The more variable a plant is in a state of nature, the more readily will it become changed by the different modes of cultivation practised on it, though many plants scarcely differ under any circumstances; and, as a general rule, fewer annuals become changed than perennials, and fewer ligneous plants than herbaceous. The early floriculturists considered as florist's flowers changed herbaceous plants only; but florists of the present day admit not only suffruticose plants, as pelargoniums and some calceolarias, but also shrubs, as roses and camellias.

Flowers, to constitute florist's flowers, must become subservient to certain laws, the chief of which is form. The outline of every florist's flower should be circular, or as nearly so as possible, as may be readily perceived by drawing the outline of the most esteemed tulips, carnations, pansies, &c. A change of the form of the flower, however, is not generally the first departure from nature in a plant, but is rather the result of culture or accident: a departure from the usual colour of the flower, or normal habit of the plant, is, however, by no means unusual; and the former constitutes, in conjunction with form, the chief merits of florist's flowers. Let us examine, for example, the flower of the wild carnation. In a state of nature, we shall commonly find it varying from flesh colour, rarely white, to dark crimson; and the outline, instead of being circular, ten-angled: but, by cultivation, the flower becomes much increased in size; the stamens are metamorphosed into petals, rendering it what is called double; by which means, and by the enlargement of the original or guard petals, the angles are filled up, and the outline rendered circular; the ground colour also changes to pure white, striped with crimson, scarlet, pink, or purple, in which case it is called a carnation; or with a white or yellow ground, dotted and edged with red, purple, or scarlet, it is termed a picotee. The flower, however, is not the only part that undergoes a change; the whole plant has also departed from the original type; it has become much more vigorous, with leaves broader and blunter than in the species. The great distinction, however, between native species and accidental varieties is, the incapability of the latter of perpetuating themselves; for, should they produce seed, the greater portion of the plants raised therefrom will be in a transition stage to the original stock: the true way, therefore, to increase or perpetuate varieties is only to raise seedlings from the most decidedly marked vari-

ations, and to remove them from the immediate neighbourhood of the original species, to which they always have a tendency more or less to retreat. The carnation is a familiar example of this, for the pure white ground colour of many varieties gradually becomes flushed with pink, and ultimately changes to dark crimson, which, in most cases, defies all the art of the florist to change again to white. Vegetable physiologists are undecided as to the causes of these variations, but the most generally received opinion among florists is, that, in the case of the carnation, the running back to the original colour of the species is occasioned by the application of too powerful stimulants in the cultivation.

The changes and varieties in the colours of flowers are innumerable, and constitute, as we have before said, one of the chief charms of florist's flowers. No cause is assigned, but there appear to exist certain fixed laws by which colour is affected; as the carnation, which in its pristine state is crimson, becomes, by cultivation, white, slate-coloured, and dull yellow, but never blue, and seldom bright yellow; and the dahlia includes varieties of almost every shade of colour, except blue.

Besides changes in form and colour, florist's flowers undergo transmutations of various organs; for instance, in order to render carnations and pinks double a multiplication of petals takes place, and the stamens are expanded and become petaloid; the rose is rendered double by a multiplication of petals; and the anemone by a regular series of transformations of all the organs, from the sepals to the pistil.

Florist's flowers, of late years, have been very much improved by cross-impregnation, not only between varieties of the same species, but also between two distinct kinds. Had not *V*iola tricolor been crossed with *V.* altàica and others, our gardens would never have been decorated with large round heartseases of every imaginable hue and combination of colours. Cross-impregnation, in addition to altering the properties of the flower, occasions a considerable change in the habits of plants; thus the large fine flowers that are produced on tall diffusive-growing plants may, by careful hybridisation, be produced on dwarf thickset plants; and bright-coloured flowers without a dark spot to relieve them, may have the spot given them by carefully crossing them with some allied spotted kinds. Now that the theory of hybridisation is so well understood, a vast untrodden plain lies open to the florist, which, in the course of a few years, will doubtless be productive of many unexpected novelties; new races will be springing up every day, and the already numerous varieties of plants increased ten-fold. As proof of this, we have only to look at the numbers of new roses and calceolarias that are brought into notice every season. A

few years since we should have looked in vain for those large and fine varieties of calceolarias exhibited every year by Mr. Green at the horticultural exhibitions; and, had any florist predicted such changes, he would have been considered by his brethren as nothing more nor less than a madman.

Varieties are often produced, however, without reference to the circumstances above-mentioned, though they constitute the principles on which florist's flowers are produced. The other causes which often produce variations from the normal type of species are, climate, exposure, heat, cold, and winds; but the effects resulting from these circumstances are rarely of long duration when the individual is removed from the influence of one of them; and, consequently, they cannot be considered when treating of florist's flowers, and the reasons for their changes.

Canterbury, July, 1842.

Art. VIII. *On the Construction of Melon, Pine, and Plant Pits, with Details, &c., and general Remarks.* By J. R.

As you yourself first impressed me with the wholesome lesson of never considering myself incompetent to the investigation of any likely subject, you must not now be surprised at finding me treating of one so much out of my line. But the fact, that, in many gentlemen's gardens, while the show and fruiting-houses are complete and perfect in every respect, the pits are sadly neglected, has often struck me, and forcibly reminded me of the condition of the lower classes; for I look upon those fine houses as being equally dependent upon the humble pits for their grandeur, as the aristocracy are for their trappings of state upon the industrious and laborious part of the community. Then, let the proud and mighty conservatory, with its borrowed plumes, listen to the simple story of the construction of the pit. Let the gay and gaudy greenhouse suffer its more humble supporter to enjoy a passing glance from the public eye: and, while the extensive peach-house (with its majestic occupant, stretching his sinewy limbs over an immense space) must not despise its lowly neighbour, the luxuriant vinery, with its luscious grapes, and glowing in all the pride of use and beauty, should reverence its foster-mother, the pit. In fact, to neglect the pit is sheer ingratitude; and as bad as a breach of the fifth commandment.

I shall at once discard the tottering shattered frames of rotten wood, and come direct to the substantial pit of bricks and mortar. I have no pretensions as to the management of pits, only as to building them. Where ground is liable to be flooded, as is frequently the case here, the pits must only be sunk 12 or 15 inches below the general surface, and a drain made along the centre, of brick

on edge, with bricks flat crosswise covering it; but in ordinary high and dry situations they should always be sunk 2 or 3 feet below the general surface, and a cavity also cut that depth for the linings, which will better retain the heat and be more convenient for working.

Fig. 41. is a section of a cucumber and melon pit, sunk 2 ft.

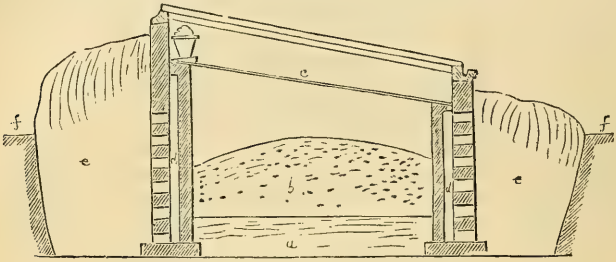

Fig. 41. *Section of a Cucumber and Melon Pit.*

6 in. below the surface. Of course where such pits are built, the length will depend on the demand for the produce. The front and back walls are built in the pigeon-hole manner, of the height shown, and a vacuity is left between them and the brick-on-edge divisions. I have shown a trellis in this section resting on the bricks covering the vacuities, on which the fruit is to rest, to keep it from lying on the soil in the general way. In the section, *a* is filled in with rough wood, on which is placed a layer of dung to prevent the soil (*b*) from falling through; or it might be filled in with rough rubble stone, built in the Cyclopean fashion, with air vacuities, as being more durable. *c* is the trellis; *d*, the vacuity; *e*, the linings, and *f*, the ground level. A stone shelf may be placed over the vacuity at the back part, for holding strawberries in fruit, or similar productions requiring plenty of air, as shown. The lights are at an angle of 12° to the horizon. In addition to melons and cucumbers, a pit such as this, with the trellis removed and the earth filled up higher, would be very suitable for the growth of early potatoes, sea-kale, asparagus, &c. I am told, by first-rate practical gardeners, that this sort of pit is of the best possible construction for the purpose intended.

Fig. 42. is a pine-pit, in which are shown the rough wood or rubble, soil, pigeon-holes, linings, level of ground, &c. This pit is suitable either for growing pines in their first stages or fruiting state. In the back part of this pit, I should also have a shelf of wood, supported by small iron brackets, for holding pots containing vines or other plants, as shown. The upright lines within the walls represent piers under each alternate rafter, formed by transverse bricks, to strengthen the walls, as they are built of only 4½ brick. This pit being necessarily larger, and

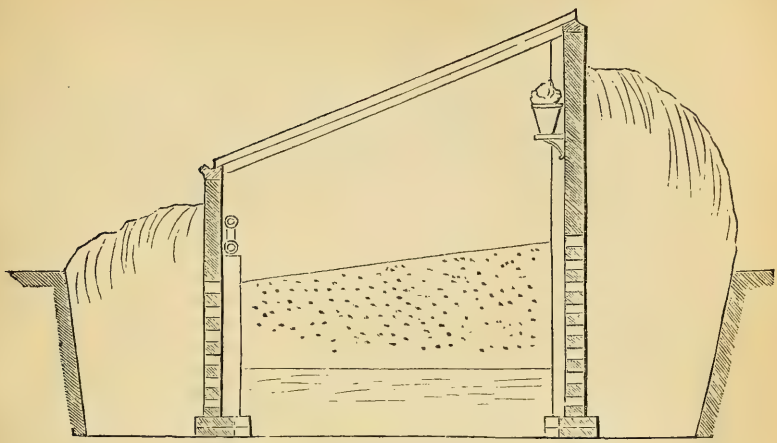

Fig. 42. *Section of a Pine-Pit.*

having a greater volume of air between the soil and glass, is to be heated by hot water when it is necessary. A pit so large will seldom be over-heated, and therefore no vacuity is shown within the walls; but, should it at any time become so, the lining must be prised back with a stick, to admit cooling air to the walls. One of Rogers's conical boilers is shown in the plan, *fig.* 43., as also the pipes (*g*), flue (*h*), and chimney (*i*); the piers are shown at *k*, and those of the front wall support the pipes, as expressed in the section. The lights on this pit are at an angle of 23° to the

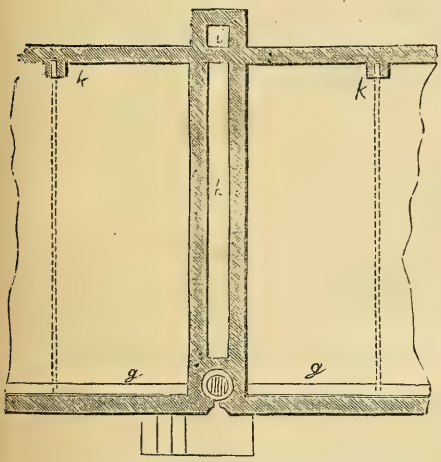

Fig. 43. *Plan of Part of a Pine-Pit, showing Rogers's Boiler and Pipes.*

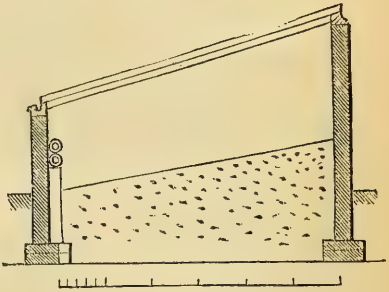

Fig. 44. *Section of a Plant-Pit.*

horizon, which is considered to be the most suitable angle for the purpose.

Fig. 44. is a plant-pit, sunk 18 in. into the ground, and filled

in with suitable material. It may either be heated by hot-air flues or hot water, and the pipes supported on 4½-inch piers, as in the pine-pit. The roof is at an angle of 18° to the horizon. I am thus particular in stating that the degrees are taken from the level, because gardeners, in general, reckon from the upright, which is decidedly wrong; because it makes this paradox, that, the lower the pitch, the greater the number of degrees, and vice versâ; or, the greater the pitch in reality, the less the number of degrees in name. This last pit, with the interior altered, would be very suitable for vines, &c., in their first and second stage, and likewise for early strawberries, &c. I would not wholly abandon from the forcing department wooden frames; for one or two, suitable to the lights of other pits, might be useful to meet contingencies, and for forcing early common things, such as mushrooms, lettuce, radishes, &c.: but good substantial brick pits are the best for plants of importance, and the cheapest in the long run. *Fig.* 45. is one of the lights of the plant-pit; *fig.* 46., a section of the bearer and lights; *fig.* 47., upper view of bearer, dove-tailed into the plating; *fig.* 48., a section of the

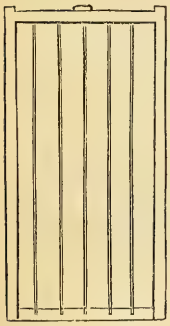

Fig. 45. *One of the Lights of the Plant-Pit, fig.* 44.

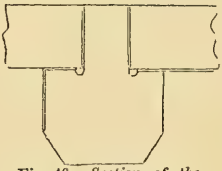

Fig. 46. *Section of the Bearer and Lights.*

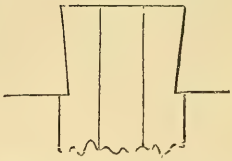

Fig. 47. *Upper View of Sash-Bearer, dovetailed into the Wall-Plate.*

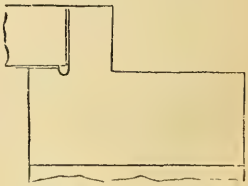

Fig. 48. *Section of the End Plate of the Plant-Pit.*

Fig. 49. *Section of the Sash-Bar.*

end plate, &c.; and *fig.* 49. a section of the bar. These four latter figures are quarter the full size, and are given here that gardeners may have their pits built without any further drawings. When the lights are longer than *fig.* 45., they should have an iron strengthening rod across the bars; and they should measure exactly 3 ft. 5¼ in. wide (for then each space will admit of 6-inch glass), 1½ in. thick, and the styles 2 in. wide at top and sides, and 3 in. at the bottom. The plates should be made of chestnut, the bearers of Memel timber, and the lights of red deal.

An idea has just occurred to me, with regard to airing pits, which I here offer as a hint to be improved on. We frequently see flower-pots, pieces of wood, &c., put under frames to hold

them up, but these are, at best, very clumsy affairs; and since I find the practice of raising the frames at the sides, instead of lengthwise, to be gaining ground, one cannot reach to the middle, when the pits are wide, to insert the props. Now, I thought of an iron rod to raise all the frames at once, and to the same angle; in the manner of a filleted window-blind or the luffer-boarding of a stable window. For this purpose I would have a hook (*l*, *fig.* 50.) fixed to the middle of both sides of each

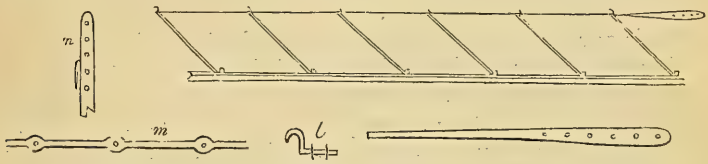

Fig. 50. *A Mode of simultaneously raising the Sashes of a Pit for Ventilation.*

frame, and holes in the flat part of the iron rod *m*, to catch on these; the ends of the rod having a series of holes to graduate the height; and, when drawn along, to be fixed with a staple to an upright stanchion (*n*) placed at each end of the pit. When the lights were to be raised the reverse way, it would be only hooking on the rod to the opposite sides of the frames. By this simple contrivance the frames may all be raised at once, and to a pitch that the glass may receive the rays of the morning and evening sun perpendicularly, while it catches that of the midday sun at an angle of incidence. It would, however, require more than the strength of one man to draw the rod; and I throw out the hint that it may be improved upon, and in order that some young gardener may contrive a simple method of working it.

There are other sorts of pits that may be found necessary, but these here given embody the elements of the whole, and they may be varied in width or height, by intelligent gardeners, so as to suit for any sort of succession pits. I have the sanction of the best practical gardeners, in saying that common hotbeds, with air chambers or vaults underneath, and with air tubes from them to adjacent mushroom beds, &c., are quite useless; and the same parties, after the experience of years, look upon those figured in the foregoing paper as being both as simple and as perfect as they can be made, according to the present best known methods of raising and forcing, &c.

Having now endeavoured to show the means by which the amelioration of the humble pit may be effected, I shall suffer the conservatory and greenhouse to resume their claims upon public attention, and to go on rejoicing in all the splendour of their gay and beautiful furniture; trusting that they will always bear in mind (which all grateful show houses, as well as persons,

should do) the humble beings by which they were raised to, and are now sustained in, their present grandeur.

Chatsworth, July 20. 1842.

Art. IX. *Desultory Notes on planting Timber Trees in Scotland.* By Scotus.

As planting in Scotland has, during the last twenty years, been carried on pretty extensively, it may not be uninteresting to some of your numerous readers south of the Tweed, to peruse a few desultory notes on the subject, which I am able to make from practice and observation. I need not say that, during the above period, the principal tree employed has been larch, and that it has been planted in masses, clumps, and belts, or, as we denominate the latter here, stripes. The Scottish lairds have not been slow to follow the instruction of their forefathers, "Be aye stickin' in a tree, Jock; it will be growin' when ye're sleepin':" but they have done no more than stick in the tree; at least nine tenths of them have, after said operation, never "fashed" themselves about the matter; and the consequences are truly distressing, as I shall more particularly advert to in the sequel. The benefits derived from the numerous plantations that are now seen every where in the Highlands of the Lowlands (if I may use such an expression) are very considerable; and on this subject your readers will find some interesting observations in the *Quarterly Journal of Agriculture*, by Mr. Jackson of Pennicuick.

As above stated, our plantations are in masses, clumps, or belts. The first of these is almost the only form in which we can pretend to any thing approaching to the picturesque; for here the fence of the plantation may be entirely or nearly kept out of sight, while in the two latter modes this is almost impossible. If a plantation is made for beauty and profit, as regards wood, the mass is certainly the most desirable; but the clump and the belt are by no means destitute either of beauty or usefulness: indeed, as regards the latter quality, I will venture to say that in many districts the country has been benefited 50 or 100 per cent, by the numerous belts stretching their protecting arms around what are now lowly green pastures, but before the encircling stripe was formed were barren heathy uplands. Clumps and stripes of plantation, too, come within the limits of many a one who cannot give land for a mass; and, if a little persuasion would induce proprietors to carry this most useful improvement a little further, one object of this epistle will be gained. There is an error which a great many proprietors fall into, in forming belts of plantation, namely, that of making them too narrow. This is a short-sighted policy, and arises often from

their listening too much to their tenants, who usually grudge every morsel of land taken off the farm for this purpose. It is the custom here, in agricultural leases, to reserve to the landlord power to take from the farm what land he may wish for planting, upon his allowing to the tenant a deduction from his rent for it, as the same shall be fixed by arbitration. No sooner does the landlord declare his intention of planting, say a clump, than the tenant declares it to be "the very soul of the farm," while to other people it looks like a very ordinary bit of land or if a belt along the foot of the hill, around the ring fence of the farm, is proposed, the answer is, "It's an unco gude bit for the sheep:" and, if the landlord boldly goes on to take the bit of land, the arbiters lay on the tawse smartly in fixing the deduction of rent in consequence, so that the landlord gets disgusted, and the planting is abandoned. Instead of this course, let the landlord, before the end of a lease, consider the matter well, and stake off his land for his plantation, and he will find that what is taken off makes a wonderfully small diminution, if any, in the sum offered for the farm. So much for the time when a plantation ought to be made.

Our severest blasts of wind here are from the south-west and west, as may be seen from our trees bending to the east. Our belts therefore, as far as practicable, run from north to south, and from north-west to south-east, though this is of course varied by situation and convenience. They ought never to be less than sixty yards wide; and, if twenty or forty more yards can be added to their width, the shelter will not only be greater, and the wood better, but they will look much handsomer; and, if they are wide enough to allow a roadway along the centre of the belt, it will be found a great advantage, both in giving access to the wood for carting, when it is of a size fit for useful purposes, and also when it is young, in affording facilities of inspecting the wood with a view to thinning, which, alas! is so much neglected. Most proprietors know the advantage of a march fence; they would, in many cases, find it greatly to their benefit and not much more expensive to have a march stripe, for which each coterminous proprietor should give forty or fifty yards, having a road in the centre along the actual line of march, or it might be more convenient if the stripe were for so much of its length on one man's land and so much on the other. By this latter mode, each would be able to thin his own wood to his liking; and this is of greater consequence in a stripe than in almost any other form of plantation, and in stripes is almost always neglected. There is a passage in your *Suburban Gardener*, p. 470., as to thinning, which ought to be hung up over the mantel-pieces of our Scottish lairds. I do not think I could name ten plantations in the South of Scotland where the trees are sufficiently thinned;

and the reason you always get for its not being done is, "Oh the trees are of no use as wood, and they make excellent shelter." Now, in the first place, what is the use of planting thick? It may be said the trees shelter one another; this is a mistake as regards young trees, for by the time a tree is big enough to afford shelter, his neighbour is as large, and can give as much shelter as he can: then the expense of thinning, when the trees are worthless, is considerable, and it requires a bold hand to cut down a fine thriving tree. I would say therefore, if you have not courage to thin (though I am rather an advocate for thick planting), plant sparingly. In belts it is peculiarly necessary to thin. A belt is planted for shelter; and for twenty years perhaps, though that is the utmost limit, a belt, planted as thickly as it is generally planted, will form a good shelter, but after that period the shelter becomes less and less. The trees come to be without a single branch on the stem for ten feet upwards at least; they are unhealthy, their roots being choked; the wind makes fearful havoc among them; and, at the end of the second twenty years, there will be but a few stragglers left to tell the melancholy fate of their departed brethren: and, observe, these stragglers are on the outside of the belt, and possibly on the most exposed side; but where they have had a little more justice in point of room, and got accustomed to the blast. But, if a belt is thinned so that the lateral branches barely touch one another, the tree becomes feathered nearly to the ground, and a dense mass of foliage or branches remains to arrest the progress of the wind, and the desired shelter is gained. The trees, though not so tall, are healthy and in a more natural state; their roots have room; and they stand their ground amid the winter storms, which with us are neither few nor far between.

A great objection to planting being carried on more extensively than it has hitherto been is the great expense of enclosing. In pastoral countries "a dry stane dike" is almost necessary. Your English readers, or some of them, may require to be told that this is a wall built of stones without mortar. It is generally about 4½ or 5 feet high, and costs from 6*s.* to 13*s.* per rood of 18½ ft. This, as above stated, is the most expensive part of the plantation, but one of the most important; if good durable stone is to be had in the immediate neighbourhood, in spite of the heavy outlay, it is the cheapest, the most durable, and satisfactory fence, in the long run. But a great many plantations have been made with no other fence than a ditch and turf wall, or as we call them "feal dikes," with a single railing of paling along the top. This is a cheap fence and is put up, paling included, for about 1*s.* 6*d.* per rood. The cost will scarcely be a year's interest of the outlay on a stone dike; but it requires constant attention, as cattle are apt to rub it down,

and sundry other misfortunes to happen to it. However, with a very moderate degree of care, it will answer, and in many situations has answered, all the purposes of the stone dike, and, so far as appearances go, it is much prettier to look at. I do not approve of sowing whins on these dikes; for, unless they are regularly switched, they spread into the adjoining fields, and become a great nuisance, and are often destroyed by frost.

Drainage.— Draining is requisite in a plantation, which also is much neglected: by draining, I mean particularly surface drains; these can be made at a very small cost; about a penny a rood for the ordinary sheep drains, which they resemble, 20 in. wide at top, 14 in. at bottom, and about 12 in. deep. The benefit of these drains is immense, in drying the ground, and it is worthy of attention to observe that along the line of drain, upon the stuff thrown out, the trees beat their neighbours; and you can often follow out the line of drain, by looking along the tops of the young trees, which, in the above situation, are so much more vigorous than their neighbours, that they sometimes resemble a hedge on a bare part of the plantation.

If a stone dike is made, there ought to be, in about every hundred yards, a set of steps, forming a stile, for crossing into the plantation. This will be found a great saving to the wall, if sportsmen and their dogs are in the habit occasionally of following game into it, for both man and dog will prefer the easiest point for getting over the fence, and they will not pull down a stone or two, every time they pass, to the danger of their legs, and the detriment of the fence. Young plantations are a great shelter for hares, and, if it is wished to give them access, let pens or conduits, 12 in. by 9 in., be made also, every 100 or 200 yards, in the dike. Neither these, nor the stiles, will add a sixpence to the original contract price of the dike. Let these pens or conduits, however, be shut up in autumn, whenever the corn is cut; as, when the hares lie in the plantation, and feed out of it, they are easily snared on the runs leading to the pens. The pens for the hares should be opened about the beginning of March, and the keeper should look sharp to them. Any gate to the plantation should be boarded, so as to prevent hares passing in or out; for, if this is not done, it is the poacher's harvest field with his net. During the months of October to March, inclusive, the hares will take the dike at any part, when they wish access, but the young ones are not able to do it. The pens are useful also for young partridges and pheasants passing to and from the cover.

Edinburgh, July 1842.

REVIEWS.

Art. I. *Illustrationes Plantarum Orientalium; ou Choix de Plantes nouvelles, ou peu connues, de l'Asie Occidentale.* Par M. le Comte Jaubert, Membre de la Chambre des Députés, et M. Ed. Spach, Aide-Naturaliste au Muséum d'Histoire Naturelle de Paris. *Ouvrage accompagné d'une Carte géographique nouvelle, en 4 feuilles, par M. le Colonel Lapie, contenant les principaux Itinéraires des Voyageurs Botanistes, depuis le* 16e *Siècle jusqu' à nos Jours.* A Selection of new or rare Plants from Western Asia, &c. A la Librairie Encyclopédique de Roret, Rue Hautefeuille, No. 10. bis. Livraisons I. et II. Paris, 1842.

In order to give an idea of what the reader may expect from this work, we give a translation of the preface.

"I will explain the circumstances which gave rise to this work, and the plan of its execution. Imbued, from my earliest youth, with a lively taste for the study of plants, I explored the South of France, the Alps, the Pyrenees, Australia, and Italy, successively and several times over; at first in company with the unfortunate Jacquemont, whose premature death is deplored by science, and afterwards alone, without interfering with the contribution I made to the *Flora of the Centre of France*, published by my friend, M. Boreau, director of the botanic garden at Angers.* Since 1819, scarcely a year has elapsed that I have not made a botanical excursion. The flora of the Mediterranean had particularly occupied my attention, and my researches there had given me an intense desire to pursue my studies towards the East. In the spring of 1839, I resolved, at last, to put this idea into execution. I had the good fortune to join M. Charles Texier, whose splendid archæological labours in Asia Minor have been so justly appreciated, and who was then setting out on his fourth expedition. It was impossible to find a more certain guide, or a more agreeable companion, for the journey, in every respect. We saw, in company with each other, that portion of Asia Minor which comprehends Smyrna and Ephesus, the valley of the Meander, Geyra and Mount Cadmus in ancient Caria, ancient Phrygia, the chain of the Olympus of Bithynia, Broussa, Nicea, Nicomedia, and Constantinople.

"My health, which was affected by the climate, prevented me exploring further; but, although I could only accomplish a part of the task I had imposed on myself, nevertheless, devoted as I was exclusively to botanising, and furnished with all the ostensible means of making a rich collection, I have brought back a great number of interesting plants, among which there are some new ones. I was proceeding to publish these plants, when I was unexpectedly called to the ministry of public works. This infidelity to botany was not to be of long duration. As soon as I regained my liberty, my first thought was to resume my intention of publishing. To proceed with any advantage to science it was necessary to examine the collections brought from the same countries by preceding travellers, in the rich herbariums of the museum, of my honourable colleague M. B. Delessert, and of several other distinguished men of science. As my labour advanced, the horizon extended before me; and as the desire of studying the flora of the Mediterranean had led me into Asia Minor, I was, in the same manner, induced, by the intimate relation that exists between the vegetation I had just explored and that of the whole of Western Asia, to make myself master of the general features which

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* 2 vols. in 8vo. Roret, Paris, 1840. The types of the species described in the *Flora of the Centre of France* have been deposited by M. Saul, our fellow-labourer, and myself, at Bourges, in the museum of the department.

characterise this vast region. I found myself surrounded with an immense quantity of materials, either imperfectly known, or entirely inedited. Collections which appeared exhausted furnished me, every instant, with objects worthy of being brought to light. Who would believe, for example, that, among the works of Tournefort on the East, there is still matter to be gleaned after Desfontaines and so many others? Of this, however, I have been convinced in examining the herbarium of this great naturalist, his manuscripts, and the original drawings of his intelligent artist, Aubriet, which were communicated to me by the kindness of M. A. de Jussieu.

"Among recent collections there are none more complete than those of Aucher-Eloy, who died at Ispahan in 1838, a true martyr to science, after ten years of travels almost entirely devoted to the region of which I have been speaking. The principal part, containing more especially the unique specimens, is deposited in the museum, and has been arranged by M. A. Brongniart: the rest is distributed in different herbariums in Paris and abroad. In Paris, M. Delessert, M. Webb, author of the *Natural History of the Canary Islands*, M. Maille, and myself possess a considerable part of it. The importance of the discoveries of this intrepid traveller may be judged of by reading the volumes of *Prodromus Systematis universalis Regni vegetabilis* of DeCandolle, which appeared in 1836. The widow of Aucher-Eloy, whom I had the honour of visiting at Constantinople, intrusted me with her husband's MSS., among which are his Journal of 1835, and that of 1837 and 1838, both remarkable for the variety of observations they contain, even out of the pale of botany: they may bear a comparison, if not in a literary point of view, at least for the interest which is attached to those perilous travels, with the letters of Jacquemont written from India. I propose, with the authority of Mme. Eloy, to make it the subject of a separate publication, after having arranged the manuscript; accompanying it with notes to elucidate the botanical notices interspersed throughout, and giving figures of the plants themselves.

"Thus, instead of limiting myself to the plants of the East which I gathered myself, I have been led to make known, by descriptions and engravings, certainly not *all* the unnoticed or little known species of Western Asia (this would be a gigantic enterprise in point of labour and expense), but at least an extensive selection of those species, reserving the power of giving more or less extension to my plan according to circumstances. It is a sort of elastic frame which I am going to open for one of the finest divisions of botanical geography, and as a resort which I propose for the researches of the learned who have already, or may yet have occasion to be engaged there. I have been informed that M. Boissier of Geneva, author of the *Botanical Journey into the South of Spain*, has begun, almost at the same time as myself, to investigate the plants of Aucher-Eloy, but no one has as yet thought of giving engravings of them. The public cannot be otherwise than benefited by these simultaneous efforts.

"The nature of my selection excludes, for the present at least, all idea of a systematic order by families and genera. It will not be prudent, or even possible, till after a long acquaintance with the plants of this region, and of all the works bearing on it, to think of offering to the public a methodic enumeration, a sort of flora of Western Asia: we must only aim at this object. If I cannot attain it, I shall at least have contributed to prepare for others the accomplishment of a work which is much wanted in a scientific point of view.

"Once engaged in this career, I soon found that my single powers were not sufficient for a work of such extent. I was therefore obliged to secure the assistance of a man of science who was already of some authority; and I was fortunate enough to obtain that of M. Spach, assistant naturalist at the museum, well known by works evincing sound criticism, and by his co-operation with M. de Mirbel in the most delicate researches of vegetable physiology.

We have, therefore, undertaken this work in concert, to which I shall devote all my leisure.

"The region we are about to examine comprehends all Asia Minor, Armenia, Georgia, to the summits of the chain of the Caucasus; a part of Persia, to the great Salt Deserts, and to the frontier of Belouchistan; lastly, Moscat and Zemen, which are to be the subject of a separate publication begun by M. Decaisne.

"In all ages, the irresistible attraction of Europe towards the East, to which history and politics bear testimony, has also had its effect on botanical travellers. The following enumeration will give an idea of what they have done, and of the resources they have prepared for us. The French have been the most active, and this has been an additional motive for confirming me in my undertaking. I was of opinion that, by attaching myself to a branch of the human sciences in which the French have excelled, I was contributing, within the limits of my means, to the honour of my country.

"The first of this series is a Frenchman, Pierre Belon, a native of Mons, about the year 1546.

"From 1573 to 1575, Rauwolf of Augsburg explored Palestine, Syria, and Mesopotamia: his narrative is written in 1583. The systematic catalogue of his plants was not published till 1755, by Gronovius, at Leyden.

"In 1615, Bachelier brought to France the horsechestnut, on his return from the Levant.

"Our immortal Tournefort, one of the great reformers of botany, and the accomplished model of travellers, travelled over Georgia, Armenia, and the North of Asia Minor, in 1700, by order of Louis XIV.

"Sherard, English consul at Smyrna in 1702, lived there for a considerable time, and made several excursions in the neighbouring provinces.

"In 1728, Buxbaum published the result of his travels in Armenia, and several other countries of the Levant.

"In 1738, the work of Shaw, the botanist and antiquary, appeared.

"Guilandin is nearly about the same period.

"In 1749, Hasselquist, the disciple of Linnæus, explored the neighbourhood of Smyrna, Palestine, and Syria.

"Towards 1761, Forskal, the companion of Niebuhr in Arabia, touched at Constantinople and Smyrna.

"Sestini, in 1779, described part of the ancient Bithynia, and the peninsula of Cyzicus; in 1781–82, and 1787, he visited almost all Turkey, and advanced as far as Bassora.

"In 1784, Michaux, who at a later period brought into France the materials for the *Flora of North America*, proceeded to Aleppo, under the auspices of Lemonnier, and explored several provinces of Turkey and Persia, including Ghilan.

"Sibthorp, in 1786–87, and 1794, herborised Mount Olympus twice, proceeded along the coast of Asia Minor, and stopped at the islands, particularly at Cyprus.

"Labillardière, in 1787, made a tour in Syria.

"In 1792, Olivier and Bruguière were sent into Turkey and Persia, on a scientific mission, by the Executive Provisionary Council, in which Monge and Rollaud presided: they remained six years.

More recently, when the love of the natural sciences has become greatly extended, Dumont d'Urville, Bélanger, Botta, Bové, Dubois, Ravergie, Coquebert de Montbret*, and particularly Aucher-Eloy, all Frenchmen; Webb, Rüppel, Schimper, Fleischer, Kotschy, and Ehrenberg, have explored our

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* M. Webb, who is in possession of the plants of Coquebert de Montbret, has had the kindness to place them at my disposal.

region in every direction, and accumulated in their herbariums the plants of the East. The expedition of Col. Chesney on the Euphrates and Tigris, opening new routes to English enterprise, has also not been without its advantage to botany.

"For the Caucasian district alone, the Germans and the Russians, following in the train of military expeditions, have, for the last twenty years, rendered incalculable services to botany. I will only name, at present, Bieberstein, Szovits, C. A. Meyer, and Hohenacker. A notice of their labours, as well as of those which belong to the last age, may be seen in the essay of M. Trautvetter, entitled *Grundriss einer Geschichte der Botanik in Bezug auf Russland* (Sketch of a History of Botany with regard to Russia), extracted from the Memoirs of the Academy of St. Petersburg.

"In establishing, as it were, the foundation of a flora of Western Asia, it was indispensable to add to our *Illustrationes* a geographical chart of this region, tracing out the principal itineraries of botanical travellers. I have noted them down myself, with the greatest care, from all the documents which I have been able to procure: that of Michaux is extracted from the inedited collection of manuscripts of botanists which forms part of the gallery of M. B. Delessert. These travels have supplied me with valuable information, not only as to the localities mentioned in the herbals, and the habitat of plants, but also on the deficiencies in geography itself. The grand works of M. Texier on Asia Minor, Armenia, and Persia, and the beautiful general map of Persia on which Col. Lapie has been engaged for a length of time, will throw great light on these countries; but they have both agreed, till their important labours are published, to lend their aid in the construction of a particular map to answer our purpose. All the itineraries of M. Texier are also marked; so that it will serve as an index map to his *Atlas*. We have thought it advisable to add the itineraries of Corancez, and of my colleague, M. Léon de la Borde, both Frenchmen, but not botanists, no less on account of the individual merit of the works, than of their connexion with the travels of M. Texier.

"We have been careful to mark on the chart all the authentic indications which we have been able to procure of the heights of places above the level of the sea. Many of these indications are from the barometrical observations of M. Texier, revised by Col. Delcros, who has been of the utmost assistance to us in this part of our labour. We are confident that our chart will be of great assistance to botanists, whether in facilitating the classification of the localities in herbals, or in calling their attention to points still unexplored; we even hope that it will be adopted by all travellers, whatever may be the object of their researches.

"Cte. Jaubert, *Member of the Chamber of Deputies.*

"*Paris, Feb.* 1. 1842."

Liv. I. contains descriptions and figures of Texièra *glastifòlia Jaub. et Spach* (Peltària *glastifòlia Dec.*), Boerhaàv*ia* orientàlis *J. et S.*, Syrenópsis stylòsa *J. et S.*; all cruciferous plants. Silène echinàta *Otth.*, Tùnica brachypétala *J. et S.*, Dichoglóttis tubulòsa *J. et S.*; all silenaceous plants. *S*èdum cariénse *J. et S.*; Crassulàceæ. Jaubért*ia* Aúcheri *Guillem.*; *R*ubiàceæ. *Valeriàna* alliariæfòlia *Vahl; Valeriàneæ.* Acróphilon *P*ìcris *J. et S.*; Synanthèreæ.

Liv. II. contains Hetoróchroa minuart*iòìdes* J. et S.; H. spergulæfòlia *J. et S.*; Silèneæ. *A*bies orientàlis *Poir.* (a repetition of Mr. Lambert's figure, with some slight variations, as the authors acknowledge in a note). Campýlopus cerastiòìdes *Spach*, *H*ypéricum origanifòlium *Willd.*, *H.* Tournefòrt*ii* J. et S., *H.* Jaubért*ii* Spach, *H. p*tarmicæfòlium *Spach*, *H.* adenótrichum *Spach*, *H.* rupéstre *J. et S.*, *H.* nànum *Poir.*, *H. a*nagallidiòìdes *J. et S.*; all rubiaceous plants.

Art. II. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

Algæ Maris Mediterranei et Adriatici, Observationes in Diagnosin Specierum et Dispositionem Generum. Auctore Jacobo G. Agardh. The Algæ of the Mediterranean and Adriatic Seas, &c. 8vo, pp. 157. Paris, 1842.

Eighty-three genera and two hundred and ninety three species are described, with their synonymes, habitats, and every other desirable particular. They are arranged under the following six tribes: — Ceramièæ, Cryptonèmeæ, Chondrièæ, Rhodomèleæ, Sphærococcórdeæ, and Delesseriècæ.

Remarks on the Management, or rather the Mis-Management, of Woods, Plantations, and Hedge-row Timber. By J. West, Land-Agent, &c. &c., North Collingham, Newark, Notts. 8vo, pp. 128. Newark and London, 1842.

In looking over this work for an extract to quote, we were glad to find the following: —

"My own experience, as well as that of many others whom I have consulted, convinces me that the notion, which so extensively prevails, as to the injurious effects of pruning, is *decidedly incorrect.* It may have had its origin in the evidence of injury to timber, which has been furnished by *injudicious pruning;* and thus what would have else been universally seen to be necessary has come to be almost universally condemned: but this is a common error, and has been too often shown to render it necessary for me to expose it here. Some very valuable observations on pruning have been published by Mr. Main, in his excellent little work, entitled 'The Forest Planter and Pruner's Assistant.' At p. 53. the following paragraph occurs: — 'But the only part of a woodman's duty which does not appear to be well defined, or at least not generally agreed upon by practical men, is relative to the necessity of carefully pruning and managing the trees during the first fifteen or twenty years of their growth.'

"I quote the last member of the above with entire approbation; that is, so far as the necessity for pruning is recognised in it; and I further think that the reasons which are given by Mr. Main for pruning, and the manner in which he has illustrated his principle — the clear and satisfactory way in which he has treated the whole subject — entitle him to the confidence, and to the thanks, of all who are interested in the growth of trees." (p. 89.)

"Mr. Main's is an able and lucid examination of the question of pruning, and, to my thinking, most fully and satisfactorily settles it. He shows that when pruning is properly done, and when it is commenced *early* enough, and so managed as to secure the desired result in fifteen or twenty years, it may not only be done with safety, and without material injury to the timber, but that no other plan or practice will answer so well. This he clearly proves upon scientific data, familiarly illustrated by numerous plates, and confirmed by practical statements." (p. 92.)

"Every considerable estate ought to have a person upon it, whose attention shall *exclusively* be devoted to the supervision of the woods, plantations, and hedge-rows, &c. He should be a *well-educated* and an intelligent man; and should be so *well paid for his services,* as to feel that his employer has a moral claim upon him, for the entire devotion of his *mind,* as well as his physical powers, to the efficient discharge of his duties." (p. 118.)

There is a good deal of useful matter in this book, but it would be greatly improved by infusing into it the system of Mr. Billington and Mr. Cree, as well as that of Mr. Main. The great advantage of Cree's system is, that it is reduced to a rule as plain as the simplest rule in arithmetic. We recommend Mr. West to consult what is written on Mr. Cree's system in the current volume of this magazine, and in that for 1841. The systems of Mr. Billington

and of Mr. Main are essentially the same as that of Mr. Cree; but both these authors have stopped short of giving the rule of practice, which Mr. Cree has done, and in such a manner as to reduce scientific pruning to the highest degree of simplicity.

Illustrations and Descriptions of Kilpeck Church, Herefordshire; with an Essay on Ecclesiastical Design. By G. R. Lewis, Esq., Author of various Works. Folio, pp. 40, and 28 plates. London, 1842.

We noticed Parts II. and III. of this work in our preceding volume, p. 627.: it is now completed, and forms a very handsome folio, illustrated by beautiful engravings. The last of these, which is a folding plate, gives a splendid view of Kilpeck, from Dipper's Moor.

The church of Kilpeck stands at the distance of about eight miles from Hereford, on the road to Abergavenny. It appears to have been founded in 1104, and given to the Abbey of Gloucester by the lord of Kilpeck Castle. After passing through many hands it was sold to John Symonds, Esq., a few years ago. Being in a very retired part of the country it has been but little visited by strangers; and hence the great value of the present work, depicting it in all its details, to antiquarians and architects. Even the gardener may derive some hints from it for the formation of flower-borders and antique flower-knots, as we hope to show by and by, but not till we have completed the *Suburban Horticulturist.*

The Practice of making and repairing Roads; of constructing Footpaths, Fences, and Drains: also, a Method of comparing Roads, with reference to the Power of Draught required; with Practical Observations, intended to simplify the Mode of estimating Earth-work in Cuttings and Embankments. By Thomas Hughes, Esq., Civil Engineer. 8vo, pp. 108. London, 1838.

This is a judicious practical work, the contents of which will be understood by the following headings to the chapters: —

Observations on the Necessity for a general Improvement of the common Roads. — On the Method of improving an existing Road. The Figure or Profile which should be given to the Bed and Surface. Forming the Foot-path and Fences. — On the Improvement of Roads by means of pitching the Bottom with Stones placed on Edge, as adopted by Mr. Telford on the London and Holyhead Road. — On the Improvement of the Highgate Arch-way Road, by means of a Concrete Foundation, composed of Gravel and Cement. — On the Use of Concrete composed of Gravel and Lime, as a Foundation for Roads in places where pitching Stones cannot be procured. — On the Drainage of Roads. — On the Means of comparing different Roads, and of estimating the Effect of Inclinations, and the other Causes producing Resistance to Motion. — On the Method of estimating the Prices of Earth-work, and other Kinds of Labour necessary in the Improvement and Repair of Roads.

A Treatise on the principal Mathematical Drawing-Instruments employed by the Engineer, Architect, and Surveyor. By F. W. Simms, Civil Engineer and Surveyor, &c. &c. Large 12mo, pp. 92, with numerous woodcuts. London, 1837. 2*s.* 6*d.*

A useful little work for young gardeners who are teaching themselves to draw plans.

The Ninth Annual Report of the Royal Cornwall Polytechnic Society. 8vo, pp. 166, with several plates. Falmouth and London, 1841.

Among the various meteorological registers given in the present volume is one for 1841, from observations made at Pencarrow, by our correspondent Mr. Corbett, gardener there. The following are the headings of his table, and the observations which follow it; both may be useful to gardeners keeping registers: —

1841.	Average of Barometer.	Average of Temperature.	TEMPERATURE.		Average Degree of Dryness at 10 o'clock each Day.	Average Quantity Water held in solution by the Atmosphere, per cubic ft.	Rain.
			Mean Maximum.	Mean Minimum.			
						Grains.	Inches.

"The instruments are placed on a small table, near the centre of the garden, fully exposed to the weather, without being sheltered or shaded by trees or buildings. This table is about 3 ft. above the surface of the ground, and quite level; the rain-gauge, hygrometer, and evaporating basin, stand upon it; and the two register thermometers are suspended from the edge, on the north side of the table, fully exposed to the air; but, being a little below the edge of the table, the rays of the sun are broken by it.

"The hottest day for the year was the 29th of April, when the thermometer reached 80°, and the 25th of May was nearly the same; the coldest night was on the 7th of January, viz. 12°.

"The observations were made at seven o'clock every morning, when the thermometers are adjusted, and the rain measured and booked for the day before; that is to say, all the rain that falls between seven o'clock on Monday morning and seven o'clock on Tuesday morning is booked for Monday; and the lowest point to which the minimum thermometer reached (as booked on the seventh of January) probably actually happened early on the morning of the eighth."

Report to Her Majesty's principal Secretary of State for the Home Department, from the Poor Law Commissioners, on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain, with Appendices. Presented to both Houses of Parliament, by Command of Her Majesty, July, 1841. 8vo, pp. 457, with forty plates. London, 1842.

This Report contains an immense mass of important information on the state of the labouring population in almost every part of Great Britain, condensed and arranged, with great judgement, by the secretary of the Commission, E. Chadwick, Esq. Every country gentleman, every clergyman, and especially every magistrate, ought to possess a copy of this work; some idea of the contents of which may be formed from the following headings: —

I. General Condition of the Residences of the labouring Classes, where Disease is found to be the most prevalent.—II. Public Arrangements, external to the Residences, by which the sanitary Condition of the labouring Population is affected. Drainage. Town Drainage of Streets and Houses. Instances of the Effects on the public Health of the Neglect of Town Drainage. Comparative Mortality in two similar Towns, one drained, the other undrained. Street and Road cleansing. Road Pavements. House cleansing, as connected with Street cleansing and Sewerage. Supplies of Water. Sanitary Effect of Land Drainage. — III. Circumstances chiefly in the internal Economy and bad Ventilation of Places of Work; Workmen's Lodging-houses, Dwellings, and the domestic Habits affecting the Health of the labouring Classes. Bad Ventilation and overcrowding private Houses. The Want of separate Apartments and overcrowding of private Dwellings. Domestic Mismanagement a predisposing Cause of Disease.—IV. Comparative Chances of Life in different Classes of the Community.—V. Pecuniary Burdens created by the Neglect of sanitary Measures. — VI. Evidence of the Effects of preventive Measures in raising the Standard of Health and the Chances of Life. Costs to Tenants and Owners of the public Measures for Drainage, Cleansing, and the Supplies of Water, as com-

pared with the Cost of Sickness. Employers' Influence on the Health of Work-people, by Means of improved Habitations. The Employers' Influence on the Health of Work-people. Effects of public Walks and Gardens on the Health and Morals of the lower Classes of the Population. —VII. Recognised Principles of Legislation and State of the existing Law for the Protection of the public Health. General State of the Law for the Protection of the public Health. State of the special Authorities for reclaiming the Execution of the Laws for the Protection of the public Health. State of the Local executive Authorities for the Erection and Maintenance of Drains and other Works for the Protection of the public Health. Boards of Health, or public Officers for the Prevention of Disease. — VIII. Common Lodging-houses the Means of propagating Disease and Vice. — IX. Recapitulation of Conclusions.

In the appendix is an article by the Reverend Thomas Whateley, of Cookham, Berks, on small Farm Allotments, which that gentleman entirely disapproves of, as tending to produce desultory habits in the labourer. We wish that, in this article, the distinction had been pointed out between cottage or small farm allotments, and cottage gardens, which, when not larger than $\frac{1}{8}$ or $\frac{1}{6}$ of an acre, as we recommend, can never interfere with the occupier's duty as a labourer or mechanic. Many persons denominate cottage allotments those small portions of ground in ploughed fields, not above $\frac{1}{10}$ or $\frac{1}{12}$ of an acre, which are sometimes let to cottagers to grow potatoes and vegetables. No one will deny that these add much to the comfort of the cottager, though, as we have shown in the *Supplement to the Encyclopædia of Cottage Architecture*, they are far inferior, in this respect, to a garden round the cottage. Still we should be sorry to see these allotments withheld when nothing better can be obtained, and it is this fear that has induced us to point out the difference between the cottage allotments of Mr. Whateley, and those usually denominated such.

The Dictionary of the Arts, Sciences, and Manufactures, illustrated with Eleven Hundred Engravings. By G. Francis, F. L. S., Author of "The Analysis of British Ferns," "The Little English Flora," "The Grammar of Botany," &c. 8vo. London, 1842.

This is a remarkably cheap book, having come out in $1\frac{1}{2}$*d.* numbers, and the entire volume costing only 12*s.* The nature of the work will be fully understood by the following extract from the preface: —

"The attention of the author of this *Dictionary of Arts and Sciences* has been directed to three objects. — The first, to explain briefly, but plainly, all the terms used in architecture, civil engineering, practical mechanics, manufacturing processes, the mathematics, the fine arts, and the experimental sciences. The second, to give the origin, properties, and application of all chemical substances; and the third, to record and describe all the apparatus and machines employed in natural philosophy; and also those numerous inventions and contrivances of a mechanical nature, which our periodicals and galleries of art abound with, but which are known comparatively to a very few persons, though often of the most essential value to the community; illustrating each article with woodcuts, wherever such could in any way whatever lead to the better understanding of the subject."

Art. III. *Literary Notices.*

Sowerby's Illustrated Catalogue of British Plants, arranged according to the natural orders, with references to Lindley, Smith, Hooker, &c., will be commenced Nov. 1st, and be continued in monthly numbers.

The Gardener and Practical Florist will appear on Sept. 3d, and be continued weekly.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

The vital Membrane of a dicotyledonous Stem. — What is here and elsewhere advanced by us, in opposition to what we have respectfully called the Knightian creed, but which, with equal justice, we might have called the DeCandollean, or Poiteauian, &c., cannot be well understood by our readers, unless we make the following declaration.

We believe that the vital or living membrane of a dicotyledonous stem is a distinct organ, from whence all other growth proceeds: it is the origin of every annual layer of wood, and of every layer of liber. It has three very visible states of existence during the growing season; first, as a thin gum or mucilage; next, of a thicker consistence in summer, when it receives the name of cambium; and, ultimately, becomes perfect wood and liber in the autumn. Its structure of cells, tubes, and fibres appears to be complete from the first, though it is not till near the end of the growing season that the various parts of the organisation become visible. A few of the most recently deposited layers of alburnum and liber, together with the vital membrane itself, are the principal channels for the upward flow of the sap, out of which are attracted the elementary gases necessary for the enlargement of the walls of the cells and tubes, and for engrossing the ligneous fibres. The rapidity of the flow of sap is always in proportion to the perspiratory powers of the leaves and rising shoots; for, unless there is an escape, and consequent vacuum formed above, no supply can follow from below.

That the vital membrane, in whatever stage of its annual growth it may be, covers the whole exterior of the last year's alburnum, is perfectly evident, and it may always be detected if looked for by frequent incisions. During its growth it exhibits its entirety as a united slough or organised body, by protruding from its station round the lips of a wound to heal it. If a band be tied tightly round a stem or branch, the living membrane will endeavour to escape from under the compression, by swelling into ridges on each side. It sometimes appears oozing out at the base of cuttings, before its fibrous parts are resolved into roots. It begins swelling at the base of a lofty tree as soon as it does at the top; and, in short, shows itself in so many different ways, as leaves no doubt of its identity as a distinct member of the stem, separate, and not at all to be identified with the sap, whether in its crude or elaborated state.

The above is but a very loose representation of our ideas on this very curious subject. It is intimately connected with the business of pruning trees, or we would not have mentioned it at all. In order that what we have said may give no offence, we wish to have it understood as hypothetical only, and as such recommend it to the notice of our young readers. Our old friends, whether practical or scientific, do not like to be persuaded out of their senses, nor to have the trouble, by abandoning their early-adopted code of opinions, long and fondly cherished, to embrace another which has too much novelty and obscurity about it. (*M.*, in *Gard. Gaz.*, Aug. 20. p. 542.)

A Potting-Bench Chopper. (*fig.* 51.) — One of the greatest improvements of the present day in pot culture is the use of turfy, rooty, and comparatively rough soil, instead of the finely-sifted mould which was formerly considered a desideratum in potting and shifting greenhouse and hothouse plants. Among other interesting objects which we saw at Dropmore, about a fortnight ago, was the stout chopper, *fig.* 52. The length of the blade is about 9 in., and the diameter of the head of the hammer, attached to its back, is swelled out from the back of the blade to about $1\frac{1}{4}$ in. The blade is used for chopping up turf or rooty peat, and the hammer for breaking any small stones that may be in it; for breaking pieces of free-stone or bone to be added to the soil; and for breaking fragments of pots, or other materials, to be used in drainage. It

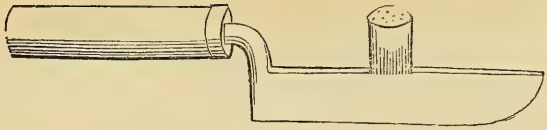

Fig. 51. *A Potting-Bench Chopper.*

may seem a very simple implement, but we can assure our readers that Mr. Frost, whom we suppose to be its inventor, finds it one of great utility.—*Cond.*

Incubation: the Thrush, the Redstart, and the Cuckoo. — Some assert that the reason why a cuckoo's egg is so small, compared with the size of the bird, is, that it may be the easier palmed on other birds; but, supposing this were not the case, still I think it may be accomplished, and I offer the following as a proof: — During this season, I put a thrush's egg into a redstart's nest, containing three or four eggs, similar in colour, yet much smaller in size, compared with the thrush's. Some time afterwards I visited the nest, and found it contained four young ones: sure enough one of them was a thrush; and if I had not given more room, by spreading out the nest (it being in a cavity of the wall allowed this), the young thrush would soon have smothered them, in a similar way as the young cuckoo does toward the rightful brood of the nest. When the thrush became full fledged, I placed it in a cage, with the view of trying the foster-parents' attachment towards it, close to the others in the nest. Both fed the young thrush, as well as the others in the nest in the cavity in the wall. What was very singular, the cock bird used to feed the young thrush with more attachment than the others. On the least approach of danger or alarm, the bird would call out, "tweet, tweet, tweet." This he often uttered, though having a large caterpillar in his beak, the food he fed the young thrush with. This is different from what he would have been fed on, if brought up by his right parents; worms would have formed his principal diet: yet, the thrush was healthy, and the silly birds were pleased with their stately chick, in a similar way as the titling is pleased with the cuckoo.

On the subject of incubation, I will not enter into the disputed points, but merely confine myself to a few observations with respect to the mysterious habits of the cuckoo. Amongst the opinions hazarded why the cuckoo does not rear her brood, are we to suppose that she is deficient in the natural qualities of incubation? Increased heat, and friction on the eggs, caused by the influence of the breast of the bird, appear to be phenomena in the economy of birds similar to that of the production of milk in the Mammalia. Fowls will sometimes sit without eggs, nay, upon the bare ground. Some will, however, doubt this; but, as Mr. Mudie justly observes: "This is no argument against the universality of the affection. Nor can we draw any more inference from those cases in which we cannot prevail upon a bird to sit, than we can from those in the Mammalia, where a female sometimes cannot suckle." From the retired habits of the cuckoo, and the time of its departure from this country being but imperfectly known, there is still room for a good deal of observation about this singular and interesting bird. — *John Wighton. Cossey Gardens, Aug.* 8. 1842.

Thinning and pruning young Plantations. — It is perfectly lamentable to see so many plantations completely ruined, for want of this necessary operation at an early stage of their growth. It was in by-past times totally neglected; and we are sorry to see it in nowise altered at the present day in very many instances. It is a prevailing error to plant very thickly of one common mixture; the consequence of which is, that the quick and useless sorts soon overtop the more valuable, and that what ought to be the permanent trees. Neglect of thinning, following mismanagement in planting, soon carries them beyond recovery; and they become drawn up like whip-sticks, useless either for shelter, for a screen, or profit. As an illustration of this ruinous neglect,

we are at the present time partly surrounded by plantations that have been planted about thirty years with one common mixture of trees, in which the birch predominates: they are not more than from 4 ft. to 10 ft. apart, and are from 40 ft. to 50 ft. high; few of them carry a trunk more than 6 in. in diameter, at 3 ft. from the ground, and many of them are of much less size. Had they been properly thinned in time, they would now have served the purpose for which they were intended, viz., shelter and ornament. (*H.*, in *Gard. Gaz.*, February 19. 1842.)

Art. II. *Foreign Notices.*

GERMANY.

Vienna, August 3. 1842. — The Railway Company (of the Nordbahn) intends to plant fruit and other useful trees along the railway, on those places where they will not interfere with the main object: for this purpose, several large pieces of ground are preparing for nurseries in different parts along the road, which will be stocked from the principal nursery at Florensdorf, near Vienna, where they have already planted 60,000 stocks for fruit-trees, part of which are to be budded this summer, and the rest grafted next spring. Seeds of different fruits and other useful trees, oaks, acers, &c., are also sown to obtain a sufficient supply for the branch nurseries; and, as the Company purposes to plant only few, but the most approved sorts, suited to the different soils and situations along the road-sides, and round the station-houses, it is expected that they will do a great deal of good that way. — *C. R.*

Art. III. *Domestic Notices.*

ENGLAND.

The Thunder Storm at Walton Hall, August 10. 1842. — During the terrible storm of thunder and lightning on Wednesday last, the poplar tree which you will see in the picture adjoined to the *Essays*, was struck and sadly rent. I had passed the day at Leeds with our celebrated Doctor Hobson. Having had an early dinner, I felt a great inclination to get home, and repeatedly requested that the carriage might be brought to the door. To this the doctor obstinately objected, but, finding me unceasing in my entreaties, he at last consented, and off we drove. You must know that every body, rich and poor, has permission to fish here, from the first of April till the first of October. Having reached home, I saw that the thunder storm was just going to burst over us; the rain having begun to fall. Seven of the fishermen had collected under the poplar tree; and on seeing them there, I ran out of the house, and warned them of their danger, and desired them to repair, without loss of time, to the saddle-room, where they would get shelter from the impending storm; forbidding them, at the same time, to stay for a moment under any of the large trees on their way thither, as the consequences might be fatal to them. Scarcely had they reached the saddle-room when the lightning struck the poplar tree, and sent fragments of it in all directions. You may well suppose that we were not long in thanking God Almighty, on bended knee, for the escape from death of those who had intended to remain under the shelter of the poplar tree, until the storm should have passed over. — *Charles Waterton. Walton Hall, August* 14.

In a subsequent letter Mr. Waterton informs us that the poplar tree itself is of some interest. "My father," he adds, "brought it, a plantling, in his pocket from a gentleman's house near Doncaster, and planted it where it now stands,

in the year in which he came of age. It has grown surprisingly, and is, perhaps, the largest Lombardy poplar in this neighbourhood. Amongst those who had taken shelter under its foliage was a fine handsome recruiting sergeant. He has been to fish again to-day; and he told me only an hour or so ago, that he had determined to wait under the tree until the storm should have passed away; adding, at the same time, how grateful he was to Almighty God for his preservation. He said, he had only just got into the saddle-room when the thunder storm burst over us.—*C. W. August* 17. 1842."

The Sycamore in Garstang Churchyard.—Having accepted Mr. Saul's kind offer (p. 404.) to send us a sketch of the sycamore in Garstang churchyard,

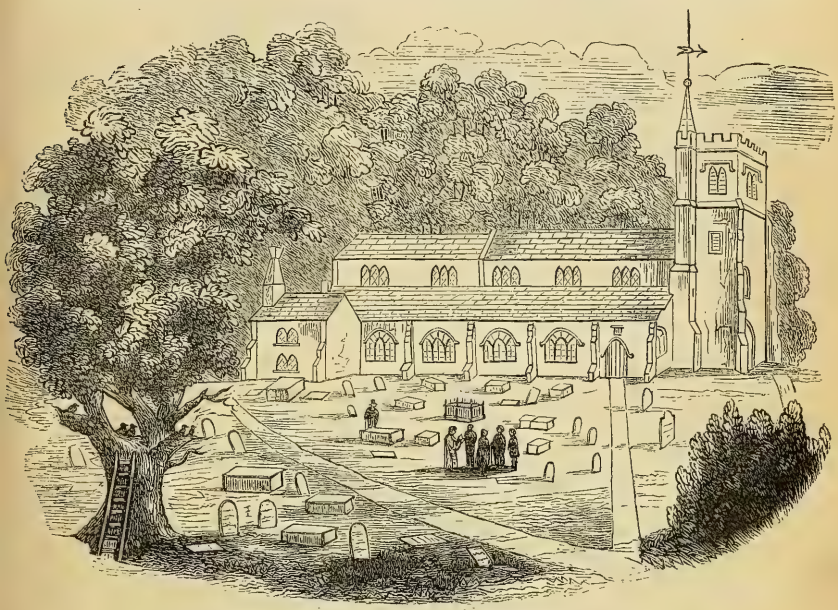

Fig. 52. *A remarkable Sycamore in Garstang Churchyard.*

we have had *fig.* 52. prepared from it. We understand there are some little errors in regard to the tombstones, but it is correct as far as it respects the tree and the jackdaws sitting on it. Respecting these jackdaws, Mr. Saul has the following observations. "A short time ago," says Mr. Saul, "I was attending the funeral of a departed friend, whose grave was near this sycamore tree. Having taken my station between the tree and the clergyman, my attention was very forcibly arrested by two jackdaws whose bodies were about half-protruded from the body of the tree. They appeared accustomed to such occasions, and seemed to me as if they too were joining in the present solemnity, as their heads and eyes were directed to the reverend gentleman while he was reading the burial service in a most impressive and solemn manner. After the conclusion of the service, according to the custom of the place, the bell commenced raising its melodious sound, to remind those present of the royal psalmist, when he cried out: 'Let me know the end and the number of my days, that I may be certified how long I have to live.' It appeared to me, when the bell commenced, that the birds began to move their heads, as if they were beating time to the bell, and joining with the people in the above portion of the psalm. As soon as the bell ceased, and the people began to depart, the birds withdrew into the tree. I went the next day to

examine the tree, and found it quite hollow, from the ground upwards, through the trunk, and into the main branches. — *M. Saul. Fort Green Cottage, Garstang, July,* 1842."

Art. IV. *Retrospective Criticism.*

Fruit Corridors. — In looking over the *Gardener's Magazine* for May, I find a paper (p. 273.) by Mr. Forsyth, very interesting on account of its novelty, but which, I fear, may tend to mislead. I agree with Mr. Forsyth entirely in the subject of his exordium, viz. that an extremely fruitful garden is a source of the highest gratification ; but about the means of obtaining such I must, in some degree, differ from him. It is a subject that I too have felt highly interested in for some years, and I never read a paper on the subject of acclimatising exotics, but I immediately think what might be done in the case of our tender fruit trees. I am afraid that what I now write will, of necessity, assume a controversial character. I must, however, disclaim all idea of controversy, as I have neither time nor inclination for a career of the kind. What is published is in the hands of a public which, sooner or later, in all matters, arrives at the truth.

Mr. Forsyth is, I perceive, all for "corridors," which, in plain English, as applied to fruit trees, I suppose mean a much wider coping than is usually given on supporters, and which, instead of being flat, rises a little in front. The principle, at first sight, appears good, and I can only wish that Mr. Forsyth had given a slight sketch of what he intends. However, in the absence of such sketch, I will put a case as near his ideas as can be well gathered. We gardeners do not travel by railway every day, but as far as I remember of the "corridor" of the railway at Derby, it is a building of some 8 or 10 feet wide, with a roof at an angle just sufficient to carry off the rain, as is usual in such cases ; in fact, something like the annexed section, *fig.* 53., which Mr. Forsyth will perhaps call a "hybrid."

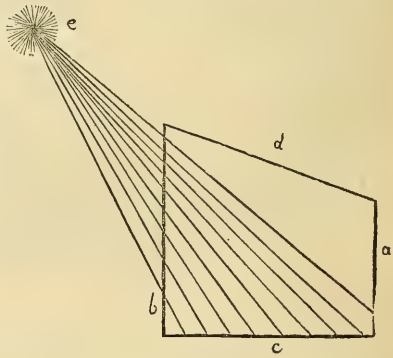

Fig. 53. *Supposed Section of Mr. Forsyth's Fruit Corridor.*

Now, *a*, is the back wall ; *b*, the front pillars ; *c*, the floor line ; *d*, the roof ; and *e*, the supposed position of the sun for 2 or 3 hours every day, for, we will say, six weeks, viz. from June 1. to about July 12.

I do not exactly know what Mr. Forsyth's arrangement of trees may be, but he speaks of a trellis. How is this to be placed, so that the sun's rays may strike every part? I can only say, the kind of corridor here described is just the sort of place to which good country-folk fly out of intense sunshine and the "mid-day glare;" and I humbly suggest that it is this very heat and glare which tender peaches, &c., like ; for, as the frogs in the fable, "what is play to them is death to us." However, this is neither more nor less than a modification of the conservative wall so often proposed, and an excellent proposition too ; only, in my opinion, Mr. Forsyth has pushed the idea much too far, or written too loosely about it.

Let me suggest the following plan, founded on the same principles, but not carried so far ; in fact, a wider coping than usual carried upwards, with the addition of a "conservative curtain" of some kind. Train the trees in the old way on the back wall, and leave all the rest to the result of shallow

borders of sound maiden loam and good gardening; more particularly in early laying in the young wood.

I beg to submit whether, in the annexed sketch (*fig.* 54.), my trees would not have all or most of the advantages of Mr. Forsyth's huge corridor, without the disadvantages.

In this sketch *a* represents the supposed position of the sun for 2 or 3 hours each day, for 5 or 6 weeks in the height of summer; *b*, the conservative curtain; *c*, back wall; *d*, coping 2 ft. 6 in.; and *e*, ground line. Let it be observed, that, although the supposed position of the sun is not quite accurate, it is quite sufficient to illustrate the matter.

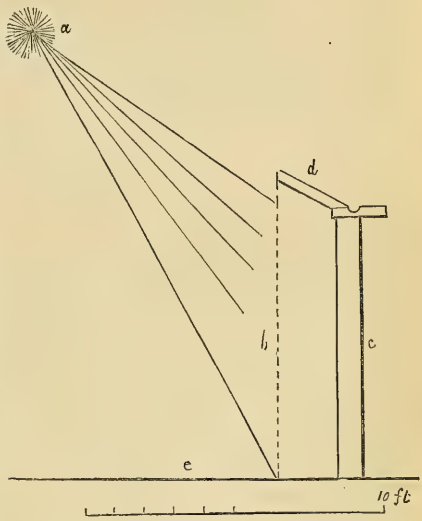

Fig. 54. *Mr. Errington's Coping for a Porch.*

At any rate, this plan of mine would be none of your cool arbours to "crack the mirthful joke in;" a pretty good argument in favour of the plan, I presume. However, perhaps this plan (*fig.* 54.) is what Mr. Forsyth intended; if so, he was unfortunate in referring to a "railway corridor."

Mr. Forsyth sympathises with the northern peach-growers, and very justly too. I can, however, assure him, that I have a wall at this time which could not be surpassed, I conceive, in the neighbourhood of London. My trees are all absolutely clean, in the finest foliage, as stout-jointed and firm in the wood as in any peach-house. I have had neither curled leaf nor mildew,—no, not a single case all the season; and, moreover (which is the consummation so much desired), a fine crop of healthy fruit, which I will show against any one on a cold wall; for I have no flues. My only grand recipe consists of: 1st, some maiden loam; 2d, planting immediately on bricks or stones; 3d, early nailing of the summer shoots, and a most liberal thinning of the same; and, 4th, a total freedom from all insect or mildew. Another tree I have, viz. a royal George, in a peach-house, from which I have obtained a Knightian medal for seven years successively. I do not intend this for boasting, although I am certainly proud of the matter; but a reference to facts is a safe course in writing for the public.

I hope the above digression may be pardoned, for reasons which will, I trust, appear on the very face of the matter; and I will now return to Mr. Forsyth's statements.

He says that "a fruit corridor, with pillars of oak or even of iron, and a roof of tile or slate, may be erected for the cost of a common south wall, or less." This is, indeed, "hard to be understood;" so are many of his sayings. I had really fancied that he required a south wall, to boot, for his "corridor" plan. However, perhaps I may be mistaken; and, if so, I hope Mr. Forsyth will set me right. Mr. Forsyth's proof of the corridor being just the thing, by a reference to certain half-hardy shrubs, is, I conceive, not a certain one. It does not of necessity follow that a nook which will preserve the laurustinus, the sweet bay, or a fuchsia, is just the place to plant a peach tree in.

A great deal has been said of late about "terrestrial heat for fruit-tree borders," more especially that for the vine; and I see Mr. Niven (p. 242.) quotes Dr. Lindley's *Theory of Horticulture* as to the average bottom heat, at certain periods of the year, being in advance of the heat of the atmosphere;

this I believe is a fact, and a most important one too. However, although the principle be correct, it is most certain that first-rate grapes, peaches, &c., are grown in the northern counties of England without artificial bottom heat; fruit, in fact, not a whit behind that of the metropolitan growers. If such be the case, then how few of the gardening public will be at this enormous expence merely to illustrate a given principle.

Surely "poor old Mr. Bull," as Mr. Waterton jocosely says, is not in the humour for such things in these income-tax days, seeing he is "well stricken in years, and bound down in so heavy a sum to keep the peace."—*Robert Errington. Oulton Park, August,* 1842.

Errata. — In p. 404. line 6., for "hole" read "bole." In p. 405. line 20., for "materials; altogether," read "materials, altogether;".

Art. V. *Queries and Answers.*

The Clubbing of the Roots of the Cabbage Tribe and Turnips. — I am much obliged to you for sending me the cauliflower (which came quite safe), as it will give me an opportunity of investigating the clubbing of the roots of cabbages, which seems not to be understood.

Messrs. Kirby and Spence, who (or one of whom) took some pains with these and allied vegetable excrescences, speaking of the turnip, observe that the small knob, or tubercle, on its roots is inhabited by a grub, similar to those of two small weevils which are found in similar knobs on the roots of *S*inàpis arvénsis; adding, "whether the disease to which turnips are subject in some parts of the kingdom, from the form of the excrescences into which the bulb shoots, called *fingers and toes*, be occasioned by insects, is not certainly known," with a reference to Mr. Spence's *Observations on the Disease in Turnips, called Fingers and Toes* (Hull, 1812, 8vo).

In a later page of their *Introduction* they observe, that from the grubs in the knob-like galls in turnips, called in some places the *anbury*, they have succeeded in rearing a small weevil.

Some years ago, I had an opportunity of examining a bed of young cabbage-plants, almost every one of which had its stem, just below the surface of the ground, swollen into several globular galls, each of which contained a weevil-grub; but the plant you have sent me has its roots dilated into large, hard, oblong swellings and knobs; on opening many of which (the surface of which was entire and sound) there was no appearance of any insect within; but, in those which had the outside scarred, I found the grubs of some dipterous insect, belonging to the family *M*úscidæ, which I shall endeavour to breed, and send you the name of. I do not, however, consider these grubs to have any thing whatever to do with the production of the *fingers and toes*, but only to have been deposited there by the parent insect, as a fitting nidus already prepared for them. I have no doubt that the grubs are those of Anthomÿia brássicæ *Bouché*, described in p. 159. of your sister's translation of Kollar, although his account of their habits is very meagre. — *J. O. Westwood. Grove Cottage, Grove Road, Hammersmith.*

The Wild Orange. — As we returned towards the boat, we stopped to examine an irregular scrambling hedge of the wild orange; another of the exquisite shrubs of this paradise of evergreens. The form and foliage of this plant are beautiful, and the leaf, being bruised, extremely fragrant; but, as its perfume indicates, it is a rank poison, containing a great portion of prussic acid. It grows from cuttings rapidly and freely, and might be formed into the most perfect hedge, being well adapted, by its close bushy growth, for that purpose. (*Mrs. Butler*, in *Bentley's Miscellany*, vol. xii. p. 120.) [Will any of our American correspondents inform us what plant is here meant? — *Cond.*]

THE

GARDENER'S MAGAZINE,

OCTOBER, 1842.

ORIGINAL COMMUNICATIONS.

ART. I. *Notices of some Gardens and Country Seats in Somersetshire, Devonshire, and Part of Cornwall.* By the CONDUCTOR.

AUG. 29. — *London to Nettlecombe Court*, the Seat of Sir John Trevelyan, Bart. The greater part of the country, as seen from the rail-road, is rich and varied; and from Paddington to Maidenhead it is in many places delightful.

At Hanwell, where the rail-road is on a high embankment, we look down upon a parsonage surrounded by grass fields, and with gardens and shrubberies, all the walks and other details of which were so distinct, with their lights and shadows, that we could not help comparing them to a map. There is a degree of satisfaction in tracing the resemblance of nature to art, as well as there is in tracing that of art to nature. The country roads seen here and in other places crossing under the embankments of the rail-road seem, in a great measure, to have lost their use and importance; and they remind us that the progress of all improvement involves the deterioration or ruin of something of the same kind that had gone before. Thus, the lower class of vegetables prepare the way for the higher; and soils are formed by the disruption and mixture of strata, and their disintegration by the weather.

At the Slough station, a large inn in the Italian style has been recently built, and surrounded by some acres of pleasure-ground badly laid out. The house, however, is admirably finished and fitted up within; and there is a regulation respecting the servants which it is to be wished were adopted every where, and which, there is no doubt, will eventually become general: this is, that nothing is to be paid to the servants by travellers; the whole expense being included in the bill.

Near Reading, Caversham House, celebrated by the immortal author of *Obs. on Mod. Gard.*, has a magnificent appearance; having been greatly enlarged by the present proprietor, Mr. Crashaw. The scenery beyond Reading includes occasional glimpses of the Thames, and is remarkably umbrageous and

rich, exhibiting some fine trees, and, among others, an Oriental plane, the only tree of this species which we have noticed between London and Plymouth; though that more tender and much less beautiful tree, the Occidental plane, is frequent wherever we have been.

On both sides of the Swindon station, the country is flat and apparently uninteresting; but the station itself is the handsomest we have yet seen. At this station, which is considered half-way between London and Taunton, there are four large refreshment rooms, two on each side of the road, of noble proportions, and finished in the most exquisite style; with the walls paneled, Sylvester's fireplaces, and beautifully painted ceilings. Such rooms cannot fail greatly to improve the taste of every one who enters them; and, in this respect alone, the proprietors of the rail-road are entitled to the best thanks of the country. All the station-houses are more or less elegant and original in design. Some are remarkable for far-projecting veranda roofs, unsupported either by columns or brackets; nor is there any essential reason why they should have such supports, since horizontal beams built into the walls, or merely the flooring joists extending through the whole structure, are sufficient to support the roof. They also afford more room for passengers below, and they cost less. The rail-road buildings on this, and indeed on every line, afford fine examples of beauty arising from no other consideration than that of fitness for the end in view.

We arrived at *Bridgewater* at 2 o'clock, and found a Minehead coach waiting for passengers, by which we proceeded to Williton, where we arrived at 5 o'clock. The road is hilly, but we passed through some curious old villages, and observed several villas, one or two of which still retain clipped yew hedges, and other vestiges of the geometric style. The road, nevertheless, is conducted without either skill or taste, though it might be led on one uniform slope down the declivities and across the combes (valleys), so as to render it easy either for ascent or descent. We arrived at Nettlecombe Court at 6 o'clock.

Aug. 29. to Sept. 5. — Nettlecombe Court. The road to this place from Williton is up the bottom of a winding combe, or valley, consisting of water meadows, woods, white cottages and their gardens, and some quarries, a fine brook, and hedge-row trees. Here is a water-mill, supplied with water by means of a course the sides and bottom of which are of stone laid in the Aberthaw lime, which has the property of setting under water, and being in that and other respects equal to Roman cement. The rock which produces this lime extends across from Wales, and proves of immense value both to builders and farmers. We passed the remains of a fine old alder; the shattered remains of a large old walnut tree, on the bark

of which Cotylèdon umbilìcus was growing luxuriantly, while the living branches were loaded with fruit; a very large crab-tree; a cottage, the walls of which were covered with the broad and narrow-leaved myrtle, both 12 ft. high, and overspread with bloom; large hydrangeas, which become blue naturally in most places that we have seen them in both Somersetshire and Devonshire; and near Nettlecombe church some immense elms. We had not an opportunity of looking at the grounds of Nettlecombe Court till the following morning, when we were astonished and delighted with the view from the windows of the house, looking up the steep sides of the rounded hills that rose on every side, and which were mostly crowned with old oak woods. The immense difference between this kind of scenery, and any thing that is to be met with within a 100 miles of London, produced the effect alluded to; and we found it to be a sort of key-note to the impressions made by the scenery of Somersetshire and Devonshire generally. Rounded hills covered with grass to the top, with winding valleys having sloping sides; the valleys more or less wide, and the sides of the hills differing in degrees of steepness; occasionally with water in the bottom in the form of a small stream or brook, and rarely of a river or an inlet of the sea, characterise the greater part of the scenery of Somersetshire, and at least of the South of Devonshire. There is no hill, or range of hills, south of Dartmoor decidedly larger than the others, so as to constitute a feature. There is not even a sharply pointed hill, or one with concave sides; and certainly nothing that can be compared to hills similarly covered with grass in the South of Scotland; no hills like those of Teviotdale; and no valleys like those of the Tay and the Tweed. Almost all the outlines of the hills in the Devonshire district are convex, but the greater part of those in the Scottish and North of England scenery are concave. The cause of this difference in the outlines is, we apprehend, to be found in the kind of rocks; the upper ones in Scotland being chiefly basaltic, and protruded through the stratified rocks, which is not the case in the greater part of Devonshire. In England, however, the rich wooded valleys have no parallel in Scotland; and Somersetshire and Devonshire only require to have some features of the agriculture of Scotland and Northern England joined to their excellent grass-land husbandry, to exemplify the highest degree of cultivation of which such a country is susceptible.

Before we proceed farther, we must notice one or two characteristics of Somersetshire and Devonshire. The first is, that the soil is almost every where red, deep, and fertile; the second, that, the surface being generally under grass, there is a predominance of green in the landscape; and the third, which, we suppose, is the consequence of the other two, is, that the cottages, villas, and

dwellings, of every description, are white-washed. The desire for this white appearance we suppose to be a physical result of the prevalence of green and red; white, though it cannot be called a complementary colour to these, as green is to red, being yet a relief to the eye, on similar principles.

The high banks on which the hedges are planted form the next characteristic of these counties, rendering it difficult to see the adjoining fields or country from the road, and being really a very great nuisance to a stranger. We have also to complain of the narrowness and depth of the lanes, or parish roads, and the general want of guide-posts. Another characteristic is the form of the churches, which have very high square towers, each with a small round tower attached, containing a staircase; the square towers sometimes, though rarely, terminating in spires, as at the little dirty Scotch-looking village called Marlborough, and the ancient town of Modbury, both between Salcombe and Plymouth. These towers, among so many round and horizontal lines, form grand and striking contrasts to the general outline of the country; and indeed are every where the most striking artificial features in the landscape.

Nettlecombe Court is a seat of great extent; and, though we took an extensive drive every day while we remained there, we did not see all the farms. The drives are exceedingly varied and beautiful, and exhibit fine combinations of pasture and woodland, comfortable cottages, and most substantial farm-houses and farmeries. The skill of the farmer is chiefly displayed in the management of cattle and sheep, and of water meadows. The farmers know nothing of the culture of turnips on raised drills, or indeed of drill culture generally; and, with as fine a subsoil as can possibly be desired, they only plough four inches deep. They understand, however, the use of lime, which they mix with the soil of the headlands and hedge wastes previously to spreading it over the general surface; and this mixture prevents the lime from separating and sinking into the soil, which it has a constant tendency to do, from the difference in its specific gravity. The same effect will be produced by scattering the lime, in a state of fine powder, on a naked or turnip fallow, the soil being also in a state of powder, as is done in Northumberland and Scotland, in the beginning of summer. Here the lime is laid on, and ploughed in, during autumn; and hence the very judicious practice of previously mixing it with dry soil. The water meadows on the Nettlecombe estate amount to upwards of 500 acres, which have been chiefly formed under the direction of the present baronet, by his very intelligent steward, Mr. Babbage. To Mr. Babbage we are indebted for the model of a very ingenious window fastener of his invention, which we shall hereafter figure and describe; as well as for the

dimensions of a number of large trees, and some interesting information on planting and agriculture generally. It is here found that, when the larch is planted along with the Scotch fir in mixed masses, the timber of the former becomes invariably rotten at the heart, even when the trees are only 20 or 30 years old; while on the same soil, planted in masses by itself, the larch produces perfectly sound timber. This is confirmatory of the experience of Mr. Gorrie in Scotland, and it seems also in favour of the excrementitious theory.

The oak woods, or rather groves, on this estate, contain a greater number of large well-grown trees than we ever saw together before. Many of them are 100 ft. high, with clean trunks of nearly uniform thickness for half or two thirds of their height, the diameter of these trees varying from 3 ft. to 6 ft., at 4 ft. from the ground. They are all, without a single exception, Quércus sessiliflòra; there scarcely being a single plant of Quércus pedunculàta in the park, or for a mile round it, either young or old. A great many single trees, so arranged as at a distance to combine into groups and masses, have been planted under the immediate inspection of Sir John Trevelyan, who has an excellent taste in landscape; as the disposition of the trees alluded to, and the drives cut through woods on the sides of steep hills, and the terrace roads, as they may be called, through open fields on hill sides, abundantly prove.

There is an admirable kitchen-garden here, with the walls covered with the very best kinds of peaches, nectarines, and pears, all in fine order, while the fig ripens as a standard. We observed a very excellent kind of cabbage, which we were informed, by the gardener, Mr. Elworthy, was raised between the Paington and Cornish cabbages, and which is called the Nettlecombe cabbage. We brought away some seeds, thinking it might be a desirable cabbage for a cottager, and we shall leave them with Mr. Charlwood and Mr. Carter, Holborn, for distribution in small quantities to whoever may apply for them. We have also given the same parties a portion of the true Paington cabbage seed procured at Paington, and a portion of the true Cornish procured at Plymouth, for the same purpose. The Cornish cabbages which we have seen in the gardens in Devonshire are very different from those which we have seen called by this name in other parts of England, and very superior.

The pleasure-grounds, and the flower-garden at the house, are in excellent order. In the pleasure-ground there is an old stone quarry, the bottom of which has been levelled, and the side planted with half-hardy plants, including several plants of Cápparis spinòsa; which will, doubtless, at some future time, supply the family with capers, as the lemon trees on the garden walls in this part of the country do with lemons. The gardener'

house is most commodious and comfortable in every respect; and it is placed so as to overlook the garden, and to form a handsome object in the landscape. In the pleasure-ground and flower-garden we found a number of the newest species of flowers, and many good shrubs. Gárry*a* ellíptica is thriving beautifully, as are the mahonias and choice berberries. Here are some masses of rock, well combined round basins of water, or distributed on the lawn, along with plants of *A*cánthus móllis, fèrus, &c. In consequence of the hilly character of the country, water can be commanded in every situation: and hence there are cisterns, picturesque basins, and ponds, in the kitchen-garden and ornamental scenery; and small water-wheels in different places for throwing water up to ponds on the tops of the hills, to form drinking-places for the cattle, or to irrigate the hill sides. In short, the management of water here seems to be fully understood.

We shall recur to Nettlecombe in a future Number, when we shall have engravings prepared; and we shall conclude our present notice with the following recollections, and the dimensions of trees furnished to us by Mr. Babbage.

The park is divided by fences of strained wire, which are inconspicuous at a distance, and found cheaper than any other fence whatever; they also enable the proprietor to graze the park as conveniently as if it were in fields divided by hedges.

The great novelty and charm of Nettlecombe are, that, the house being situated in a bottom, the scenery on every side is looked up to, instead of being looked over; the effect of which, united with the immense masses of wood, is romantic in a very high degree. Some of the valleys are so deep, that the sun does not shine into them, for between two and three months every winter.

In consequence of the bold undulations and deep valleys, the shadows produced by the varying position of the sun are continually changing; increasing in one place and diminishing in another, so as to form a perpetual variety, greatly heightened by the groups formed by the deer.

The church and churchyard at Nettlecombe are close to the house. The former is kept in excellent repair; as are the family monuments, some of which existed as far back as the time of the crusades. The churchyard is a model of neatness. There is a paved space, about 18 in. broad, and nearly on a level, all round the walls of the church; and beyond it there is a small gutter which carries off all the rain water to one point; thus forming a proper architectural base to the building. The ground is surrounded and intersected by gravel walks, and the graves are so arranged that there are grass paths between them, by walking on which every grave may be examined without stepping over any. By this means a higher character of sanctity is

given to this place of final repose; and it would be well if it could be imitated in churchyards everywhere. The late Sir John Trevelyan ordered, by his will, that he should be buried beneath a large yew tree in the churchyard, and not in the church; in which feeling we participate, considering the idea of burying in vaults as unfitted for the present enlightened age.

Having a great respect for the antiquity of families, a long descent of ancestry being one of the few things which no human exertions, no wealth, and not even chance can procure, we were much gratified by a sight of the Trevelyan family papers, from the time of Edward I.; almost all of which were in excellent preservation. Among the oldest of these were many permissions from the church to eat meat during Lent; and one pardon from Henry VIII. to a Trevelyan for killing a man in chance-medley. Tradition, however, traces back the family much higher than the written records; as it is said that the head of a swimming horse, in the family arms, relates to a Trevelyan who was on one of the Scilly Islands when it sank in 850, and that he saved himself by swimming on shore on horseback..

Fattening Swine with Fern, or Brake (*Ptèris aquilìna*). Among the many curious and useful things which Mr. Babbage related to us was the following, which we give in his own words.

"Walking over the estate one day in the spring, I saw a man and his family busily employed gathering the young shoots of fern. On enquiry I found it was to feed their pig. Having expressed a doubt as to its nutritious quality, the man said it was equal to potatoes, and that he would undertake to feed a pig with it alone, and at the end of a month produce the pig in as good condition as another pig that had been fed with potatoes. The way to prepare the fern is to boil (or rather simmer) it for two hours in an iron pot: when cold, it forms a strong jelly."

Large Trees at Nettlecombe. The following dimensions were kindly taken for us by Mr. Babbage.

"The park-wood, and the grove of forty acres, contain 1,060 oak trees, varying in length to the fork from 30 ft. to 70 ft., besides which there are many fine elms, Spanish chestnuts, and beech trees of great length and girt. Many trees contain from 80 to 150 cubic feet of timber, and a few trees more than 200 cubic feet above the fork.

"*A Cedar of Lebanon* growing at Nettlecombe Court, and about forty years from the seed, was planted in its present situation thirty-five or thirty-six years ago. It now (Sept. 4. 1842), at 3 ft. from the ground, measures 9 ft. 8 in. in circumference; and at 10 ft. from the ground it is 9 ft. 1 in. in circumference. The extreme height of the tree is 40 ft. The branches extend round from the trunk 30 ft. The trunk (exclusive of branches) contains 110 cubic feet of timber.

"Oak Trees — *all Quércus sessiliflòra.*

Length to the fork.	Girt at 4 ft. high.		Middle girt.		Girt at the fork.		Cubic feet above fork.	
ft.	ft.	in.	ft.	in.	ft.	in.		
34	16	2	13	9	13	5	220	
32	15	2	13	0	13	0	260	
46	15	0	11	6	9	6		
56	14	0	11	6	9	6		
53	14	4	11	0	9	0		
51	13	9	11	0	9	0		
37	13	3	10	7	10	4	126	
41	13	8	10	0	8	9		
44	13	0	10	0	9	0		
46	12	9	11	0	9	6		
51	12	8	10	6	10	0		
53	12	0	10	2	8	0		
70	12	0	8	6	6	0		
67	11	0	10	1	9	7		
47	11	10	9	8	9	0		
58	11	9	9	2	8	9		
54	10	4	8	2	6	6		
51	11	4	9	6	8	10		

"Elm Trees — *all Ulmus campéstris.*

39	16	6	13	6	12	0	360	about 80 years' growth."
32	14	9	12	0	12	0	200 -	
56	14	6	11	9	9	0		

Old Cleeve Abbey is a ruin in a romantic valley, now turned into a farm-house and outbuildings. There are the remains of some handsome doors and windows, and a roof with the rafters forming segments of semicircles meeting at the summit, and without any cross ties whatever. Among numerous aged thorns and fruit trees, there are a sycamore and a walnut, apparently of great age, of which Mr. Babbage has furnished us with the following dimensions.

"Sycamore (*A*cer Pseùdo-*P*látanus), 17 ft. in circumference, at 2 ft. from the ground; the length of trunk, 7 ft., from which spring a series of branches from 4 ft. 6 in. to 7 ft. in circumference; one branch extends in nearly a horizontal direction 51 ft. in length. This tree contains 440 cubic feet.

"Walnut (*J*ùglans règia) 14 ft. in circumference, at 4 ft. from the ground; length of trunk, 9 ft., from which spring three branches, measuring respectively 9 ft. 4 in., 9 ft., and 8 ft. in circumference. The branches extend all round about 45 ft. from the trunk, forming a circle of 270 ft.

"Another walnut is 11 ft. in circumference at 4 ft. high; and a third is 9 ft. 3 in. in circumference at 4 ft. high."

Dunster Castle; — Luttrell, Esq. This is a fine old castle, situated high up the side of a conical hill on the sea coast; with a park, consisting of a valley opening to the sea, with the sides finely clothed with wood. The meadows are mown or pastured, and appear as smooth as a lawn; while those parts of the hill sides not covered with wood exhibit ferns, hollies, and thorns, unmixed with foreign trees, and in such a state as we may suppose they were in when the castle was built, in the time of Henry VIII. or Elizabeth. There is no want of scenery of this kind in the parks of England, but it is not often that it belongs to a really old castle, with all its grandeur and simplicity. Many modern castles have, in our opinion, so much architectural display exteriorly, that we never for a moment suppose them to be old. The ancient entrance to Dunster Castle is through the straight street of Dunster town, the gateway to the Castle forming its termination. The actual entrance, at present, is by a winding road, which gradually ascends the hill to the Castle court. The Castle itself has, in the interior, undergone several alterations, some in good and others in bad taste. There are an excellent carved balustrade to the principal staircase representing a hunt, and a very beautiful ceiling; but the windows, which have been ornamented within subsequently, are in Batty Langley Gothic. The Castle is surrounded by terraces; and against the walls are some fine exotics, among which are a large lemon tree protected by glass during winter, a large pomegranate, large myrtles, passion flowers, wistarias, coronillas, and an immense hydrangea with both blue and pink flowers as a finale. Higher up than the Castle court, on the summit of the hill, is an oval bowling green, approached by a winding path, which commands a panoramic view of the surrounding country, including the bold promontory of Minehead, the sea, and the mountains of South Wales. The whole place was in excellent order, and appropriate keeping.

Sept. 5. — *Nettlecombe to Exeter, through Tiverton.* The road as far as Bampton was extremely hilly, consisting of narrow lanes, with their fences so high that the eye was either carried over the adjoining fields to such hilly ground as was near at hand, or, where hills were wanting, there was nothing seen but the steep high banks of the farms which bordered the deep and ditch-like road. At Bampton, the cottages have their chimney-tops finished with slates, sometimes two forming a triangle, and sometimes one large slate supported by four props, and kept from being blown away by a stone, as in the lake scenery. The walls are either of stone or of cob, the latter being formed much in the same way as the *pisé* walls in France. The roofs on the detached cottages are generally of thatch. The cob walls are frequently used for gardens, the trees being

trained on trellises placed against them; but there is the disadvantage attending them, that, when the trees are washed with a syringe or engine, the leaves or fruit are apt to get dirtied by the soil loosened and brought down from the wall by the water. These walls, as well as the houses of cob, are frequently white-washed, and sometimes rough-cast; which resists for a time the action of the weather, but not sufficiently in garden walls to justify their use where fine fruit is an object. The various ways in which the round hills are crossed by the hedges which divide the fields afford useful hints to the landscape-gardener, in cases where such hills are in cultivation, and are, at the same time, to be treated with a view to their effect in landscape. It is least desirable to have the lines of the fences cutting the hills horizontally; and most so to have the lines in the same direction as the slope, and tending more or less to the summit or highest part of the hill. Much depends on the distribution of the trees in the hedge-rows; two or three hedges, with hedge-row trees, meeting on or near the summit of a hill, add wonderfully to its effect; while a single hedge, with trees, crossing the hill horizontally, half-way between its base and summit, or at a certain distance below the summit, will destroy the character of the hill altogether. Where the soil on the summit of such hills can be moved, a conical or pointed termination may frequently be given at a moderate expense, by hollowing out a little soil from the sides, and heaping it up on the summit. Of course, hills so improved must be kept under grass, for the plough would soon reduce them to a tame, monotonous, convex outline.

From Tiverton to Exeter the road follows the course of the Exe, which passes through a finely wooded valley; and, were it not for the high road-side fences, it would be exquisitely beautiful. It is impossible, however, to enjoy this or any other scenery properly from the public roads, on account of the height of the fences.

The church at Tiverton contains some curious carving, particularly in a chapel erected long after the church; on the exterior of which was represented an extensive sea-scene with ships, proving, as all such scenes do, that the artist did not know the proper province of sculpture, which is to represent single objects, or foreground groups, and never subjects requiring the effect of distance. In the churchyard, we observed an American, a Cornish, and a Dutch elm, with both the new and old Lucombe oaks, and the Turkey oak.

Sept. 6. — *Cowley Bank;* Mrs. Wells. The grounds consist of a portion of table land, and a steep and varied bank bordered by the rivers Exe and Culm, which here form a junction. The bank has been covered with wood, which in some places is partially removed to make room for lawn, and in others thinned to admit of evergreen under-growths; and there is a con-

siderable extent of walks laid along the bank, so as to display it and the distant scenery to advantage. The views across the river Exe from the house are pleasing, and disclose meadows bounded by banks more gradually sloping than those on the Cowley side, varied by woods, cottages, and some villas. From the walks in the lower part of the grounds two stone bridges are seen, which, amid so much vegetation, have an excellent effect.

This place has been judiciously laid out and planted by Mr. Pince, who has exhibited a new feature in the conservatory, viz. that of covering the central bed of soil, in which the camellias, oranges, &c., are planted, with flag-stones supported on cross-walls or props, so as to leave a stratum of air between the flag-stones and the soil. The trees, the stems of which pass through holes in the stones, thrive as well as if the surface of the soil had been exposed to the light and air in the usual manner. This conservatory has the front sashes down to the floor, and sliding past one another; and the roof is formed of stout sash-bars, without conspicuous rafters, but with one or two large sashes for letting down to admit air. It is separated from the dining-room by a lobby, also glazed in the roof and in front, so that none of the air of the conservatory can ever enter the house. The gardener here, Mr. Griffin, has distinguished himself by gaining prizes at exhibitions, both in Devonshire and in the metropolis. He grows heaths admirably, mixing with the rough sandy peat abundance of fragments of stone throughout the whole mass, half the surface consisting of these stones protruding through the soil. This is carrying the practice of introducing fragments of stone in pot culture a step further than Mr. M'Nab has done.

There is a flower-garden with the beds on gravel edged with box; the forms without acute angles, so as to admit of covering them with plants. There is a small pinetum, in which there are some specimens of the rarer kinds; and a good collection of showy peat-earth shrubs. The edges of the walks are kept low, so that the flowing lines of the lawn are never interrupted; and the whole place was in excellent order.

Sept. 8.—*Mamhead;* Sir Robert Newman, Bart. This is an extensive place, with the house situated on the projecting swell of an elevated ridge crowned with wood. The views from the house, over a rich valley, are extensive and magnificent, commanding Exeter, the river, and the hilly country beyond. The approach is of considerable length, and appears judiciously conducted; but, as we were in a close carriage, we were not able to form a decided judgement on this point. This we can say, that, immediately within the entrance, we passed through a grove of Scotch firs of twenty or thirty years' growth, with the stems naked, or showing only dead branches to a great height, of no

great value to any estate, either in an ornamental or useful point of view. We would cut down almost the whole of these trees, and allow the self-sown hollies, every where springing up, to form, with a few scattered trees of such kinds as may be already grown up, an evergreen wood. The house is most judiciously placed. In style, it is exteriorly in a sort of modernised Tudor-Gothic, while the stable offices form a separate group in an early castellated manner, with battlements and a portcullis appearing over the main gateway. The idea of this difference of style between the offices and the mansion, the former being intended to represent the ancient castle metamorphosed into stables, and the actual dwelling-house being supposed to be a comparatively modern building, is good on paper as a theory, but is here carried rather too far; a portcullis, in good repair, being shown over the modern stable gates. The great difference in style is aggravated by the colour of the stone; which in the offices is nearly of a brick red, coarsely hewn, and in the mansion is of a light Bath-like stone, quite smooth. Independently altogether of antiquarian and architectural associations, the red colour of the offices, in artists' language, kills that of the mansion. Had both been of the same colour, the objections we have suggested would not have been nearly so strong. We could almost wish that the house had been of red stone, for we think it would have gone far to prevent an idea which arose in our minds at first sight, that the house was too ornamental and villa-like for the grandeur of the situation. Fortunately, there are no large trees close to it, otherwise it would appear too low. A house, unless it is in the cottage style or villa style, should always be higher than the average height of the trees in the country in which it is situated. This, we think, is a self-evident principle; since, as the house is the chief object in the landscape, it should be more conspicuous than the trees, which are only accessories. It is true that a house may be rendered more conspicuous than the trees, simply by placing it where there are no trees before it, and where those at the back and sides are at some distance from it; in short, by placing it in such a situation and circumstances as those of the house at Mamhead. Still we are of opinion that the house at Mamhead, to be in harmony with the grandeur of the place, ought to have been higher, and in a simpler style; for elevation and simplicity are the most effective elements of the sublime. As an example of a modern house in a naturally grand situation, and intended to be expressive of grandeur and dignity, reduced to the character of a villa by the height of the surrounding trees, we refer to Lowther Castle. This building has nothing of the castle character but round towers and battlements; and these and the masses should have been one third part higher, so as to be seen at a distance

over the tops of the trees. As an example of one in which grandeur is produced by the height and simplicity of the general mass, and which also contains some of the finest apartments in England, we quote Wooton, by Inigo Jones, near Ashbourne, noticed in our Volume for 1841.

The windows of a house intended to be expressive of grandeur ought not to be numerous or too near together; they ought to be large, with wide intervals between, to suggest the idea of spacious apartments within; and there ought to be broad spaces in the lower parts of towers and at angles, without any windows or with only very small ones, to suggest the idea of great strength and abundance of room. This kind of treatment is also exemplified at Wooton.

With respect to the interior of the house at Mamhead it is admirable, and we can only speak of the arrangement and the execution of the work in terms of the highest praise. There is, however, one point here which we cannot pass over without notice, because we think that it is calculated to propagate a false taste. In the panels of the ceiling, and in other parts of the finishing of several of the rooms, there are sculptured representations of plants, correct imitations of nature, but without any architectural or artistical connexion with the framework of the panels; in fact, they appear as if they had been gathered and thrown down at random. These plants are beautifully executed, and they are botanically so accurate, that it is easy to tell their names, and in one or two instances they are introduced in the spandrils of arches, and in the windows, so as to fill their spaces up artistically. Wherever this is not the case, we have no hesitation in saying that their introduction is decidedly in bad taste. Every whole should consist of parts, every one of which should be so connected with those adjoining it, and with the rest, as not to admit of being separated without destroying the effect of the whole; but the flowers we speak of have no connexion whatever with any of the ornaments or parts around them. Supposing a person to have seen these ceilings before the flowers were introduced, he could never have felt the necessity of their introduction to complete the design; and, supposing them now to be removed, no one would feel that the design had been injured. The flowers are, indeed, beautiful in themselves, and would have retained that beauty any where; but this is quite a different question from that of their forming or not forming component parts of a composition. As an example of flowers and fruits artistically introduced, we may refer to the chimney-pieces and windows of the dining-room and drawingroom at Mamhead. These, more especially those in the chimney-pieces, are perfect in their kind, because their forms are artistically wrought in with the architecture; and though they are coloured

so as to resemble nature, and even to be mistaken for it, which is in a low style of art, yet it is clear the artist knew what he was doing, and that he intended to represent the state of sculpture at the particular period to which he had adapted the building, a period when even representations of the human countenance in marble were coloured to resemble nature.

The conservatory at Mamhead is much too small for the situation; but, considering the house as a villa, it is, perhaps, not altogether out of proportion. Part of the roof is opaque, which we were surprised at; because that part is completely concealed by the parapet, and the light would have been of essential importance to the plants.

There are upper and lower terraces; but the latter is not, in our opinion, sufficiently separated from the park by architectural parapets and other forms to justify the introduction of flowers on it. The fortification-like character is also, we think, too conspicuous in some parts, and the lines of slope and surface of glacis are, in others, disproportionately large for the height of the house. There is a flower-garden in a sunk panel, very judiciously designed and laid out; but it is planted with shrubs and other articles growing to the height of 3 or 4 feet, which prevent the shapes of the beds from being seen in a birds-eye view, so as to form a whole. Instead of this, the beds should have been planted with articles which do not rise above the height of 6 or 8 inches; or with roses having their shoots pegged down on green moss, so as not much to exceed that height. As an appendage to such a house, this garden ought to have been in much higher keeping: but perfect high keeping, in Devonshire, we have only seen at Luscombe and at Endsleigh. The terrace walks at Mamhead are not yet united with the pleasure-ground, which, indeed, remains to be formed; and a finer situation for forming a pleasure-ground walk very rarely occurs. We took the dimensions of two or three immense Lucombe oaks and cork trees, which we need not here repeat, because they are much the same as those given of the same trees in our *Arboretum*, as measured in 1837. The dimensions now taken were, for want of time, not made with sufficient accuracy to be useful in showing the increase of the trees since that period. The kitchen-garden is at a distance from the house, very unfavourably situated in a hollow; but, notwithstanding this, we have seldom seen walls more beautifully covered with fruit trees, especially with peaches and nectarines; the borders are not cropped.

(*To be continued.*)

Art. II. *Dinbur Castle, its Gardens and its Gardeners.* By Peter Mackenzie.

(*Continued from* p. 447.)

Shortly after the conversation the gardener of Dinbur had with Sandy MacAlpine, the foreman of the garden, a night was fixed on when he would meet the young men in the bothy, and, according to appointment, endeavour to impart some useful instruction. When the night arrived, the men did not sit long over their evening meal, but got themselves washed and made tidy, the bothy floor swept, the ashes taken out, and the forms and stools arranged as neatly as possible, and waited the arrival of their master. When he came he was received with a hearty welcome, and after some general conversation he proceeded to the business of the evening.

He began by giving a short outline of the time when he was an apprentice and journeyman gardener.

"When I first went to work in the garden, my stock of knowledge was very scanty. I could read and write, and had some knowledge of arithmetic: but I soon found out that I had much to learn; and, to dispel the ignorance by which I was surrounded, I found it necessary to use the means Providence had put within my reach for extending my information. There are many who can sit down contented, wrapped in garments of ignorance, and think themselves worthy of imitation by others, never once imagining that their influence upon society is like that of the stagnant pool, spreading disease and death: while the ardent enquirer after knowledge may be compared to the flowing stream, whose waters fertilise the country, and on whose banks the hand of industry is busy; in its progress to the ocean, it diffuses benefits on the right hand and on the left, and, like a light maiden, sings merrily as it flows. There are boundaries in the pursuit of knowledge which finite minds will never surmount; but who can mark out these barriers? for what may seem insurmountable to some is easily scaled by others. He who brought the universe into existence, who created the world, and filled it with the various tribes of organised beings which exist in it, and gave them laws for their well-being, that Almighty Being who planted the mind of man within him, is alone able to know the extent of the growth of that mind which is called upon to study the works of its Creator in such a variety of aspects. If we look upon this earth as a temple reared up for the worship of our Maker, and gardeners as ministers in the *sanctum sanctorum*, then how unbecoming must it be for those who hold such a high situation to remain ignorant of the mysteries which belong to their office! There is little time for sloth or indolence in the

life of a gardener; and, from the first day of his entering that profession, he should endeavour to imitate the daring of the eagle:

> "'Proudly careering his course of joy,
> Firm in his own mountain vigour relying,
> Breasting the dark storm, the red bolt defying,
> His wing on the wind, and his eye on the sun,
> He swerves not a hair, but bears onward right on.
> Boys, may the eagle's flight ever be thine,
> Onward and upward, and true to the line!'

"Although gardeners may not have the opportunities for acquiring knowledge which others have who live in towns or their immediate neighbourhood, and may not have money to purchase books, or be able to attend lectures in colleges or mechanics' institutions, yet these wants cannot be held as valid reasons why they should remain in ignorance. By paying a few shillings in the year, they may secure as many books from a circulating library as they will be able to read; and, by means of reading and study, gardeners may, in a great measure, keep pace with those who have greater advantages for acquiring information: for it is a well-known fact, that those who attend lectures in public, and do not follow them up with private study, never make great advances in learning. Well do I remember the time when I used to go in the winter season to the library, and receive volume after volume of the *Encyclopædia Britannica*, covered up in my blue apron to preserve it from the rain and snow. At another time, when I worked in one of the London nurseries, I was well warned by my employer to beware of the company with which I associated: for, he said, 'association soon begets assimilation; and the time of life at which you have arrived is in general the time at which the character is formed, either for good or evil.' I was bound by a sense of duty to thank him for his kindness in warning me against danger, although at the time when I received his counsel I did not perceive the full force of his statements; but I have often seen it verified in after life.

"As I was a stranger in the place, I resolved to live as quietly as possible: I was fortunate enough to meet with a kind landlord and landlady. One morning, when I was at the baker's for a loaf, I passed a bookseller's shop where books were given out to read. On my return I went into it, and told the owner of the shop what I wanted. He was very obliging, and told me that I might have any book that was within his shop. He showed me his catalogue; I fixed on one, and received it. He asked my name and place of abode; I also offered him money as a deposit, which is done in some places where persons are not known. 'No,' said he, 'I will take no money from you. You are from Scotland; I was once in that country, and was civilly treated; and

never in my life was I taken in by a Scotchman.' I told him that every one could not say as much; but I hoped that I should not be the first that would cause him to alter the opinion he had formed of the natives of the North. And away I went a proud man, with a quartern loaf under the one arm, and a quarto volume under the other; getting a slice of both for breakfast, and believing the stories that are told about the frauds of London to be without foundation.

"At another time, when working in a nobleman's garden, I had to travel several miles across a wild common before I came to the market town. There was only one circulating library in the place, and there appeared to be little demand for reading; for I was allowed to take as many books with me as I could carry, and one burthen after another had the dust brushed off them, which had not been disturbed before for many a day. When I worked in the Botanic Garden of Edinburgh, I frequently attended Carfrae's sale-room at night, and often purchased some useful book; and, with one book after another, they soon became the heaviest part of my luggage. I was sadly disappointed some years ago, when on a visit to Edinburgh; I went to my old book-shop, expecting to get something new; but, instead of tables full of books ready for sale, I observed large barrels, marked 'Glenlivet,' 'Islay,' &c. I turned away with a sad heart, when I thought on the change that had taken place.

"My young men, you may perhaps be thinking that if you were to follow such a course as that recommended to you, too much of your time would be occupied with it; but, after having often taken a retrospective view of my past life, my advice to you would still be, read on. When I think of the fate of many of my companions who started with me in life, who, with greater abilities and brighter prospects, had every appearance of becoming useful members of society, but, by following frivolous pursuits and vitiated company, soon became an easy prey to evil designing men; when I remember how often books have been the means of keeping me from the tap-room, the ball-room, and other haunts of dissipation, I cannot but love them; and when I think on the pleasure I have had in their company, and the instructive knowledge they have imparted to my mind, I must always look upon them as real friends. Besides, the man who deserves the name of a gardener requires to read much, in order to qualify him to discharge aright the duties of his situation. There is much knowledge required, from the planting of a cabbage, to the pruning, and planting, and manuring of a lordly domain. With such a field before him, he will find ample scope for his mathematical knowledge, and also for what he has learned about the laws of equilibrium, of motion, and its communication.

He will also find it useful at times to be able to explain the laws by which the elementary particles act on each other, and also the combinations or decompositions resulting from the affinity of their ultimate elements, the nature of rocks, and the formation of soils. The best botanical systems, vegetable physiology, and many other branches of natural history, will be found extremely useful to the intelligent gardener. Young men may also derive much pleasure and advantage by studying the art of drawing; its foundation is laid in geometry and perspective, and the study of both is necessary towards the attainment of the art. Many may imagine that such a variety of subjects may be unnecessary for the gardener to know; but it could be easily shown how important they all are, and others besides those already mentioned, in the way of his profession. There appears to be a mutual dependence of one branch of knowledge upon another; and the various branches of science are blended with each other in such an intimate manner that many discoveries in one department of knowledge would probably never have been made, unless they had applied to ascertained facts and properties resulting from others. The astronomer, in order to find out the true position of some of the heavenly bodies, has many corrections to make, such as the correction of refraction, of the parallax, of nutation, and aberration; and, to be able to make the correction of refraction, he must go to the sciences of optics and pneumatics, and often the knowledge of one fact leads to the discovery of another. The true length of a degree of the meridian established Sir Isaac Newton's theory of universal gravitation.

"The working out of the arrangements that may be entered into this night will, I have no doubt, be the means of increasing your acquaintance with much that will prove advantageous to you all in future days. The giving away of knowledge is perhaps different from the giving away of any thing else: he who parts with it to others may do them much good, and become none the poorer himself; on the contrary, he understands his subject better, and is prepared to make new voyages in unknown regions. The plan I would advise you to follow is a very simple one, but I believe will prove a useful one. Let one take a subject of which he has already some knowledge and write a short essay; make it as plain as possible, in order that those who are ignorant of it may be enabled to understand; and, when it can be done, make experiments, and show diagrams or models, that the thing may be clearly understood as you go along. After the essay is read, let a general conversation take place on what has been delivered, and questions may be put and answers given when it can be done. Many are afraid to make enquiries after things, for fear of their ignorance being known; never let such a false delicacy influence your pursuit after such as are useful,

and when you impart information do it honestly. There are many who pride themselves on giving wrong names to things, such as plants; this is a very silly amusement, and ought to be guarded against: a little knowledge of systematic botany will defend you from such imposition and discover the knavery. I will not detain you longer at present, but will leave you to make such arrangements among yourselves as may be thought necessary; I will assist you in your undertaking, if I am able to do it; and my advice and the use of my books will be at your service."

Before the gardener left the bothy, the young men expressed themselves highly pleased with what they had heard and thanked him for the offers he had made, but were afraid their essay-writing would be a failure. "Make the attempt," said he. "A child is said to walk when he can make two or three steps; and, although your first should not fill a page, try and do something, and there is no fear that the next will be longer."

After their master was gone, Colin Forbes said that he thought that if masters were to take as much interest in the welfare of their men as theirs did, a race of better-informed gardeners would spring up in a few years. "And I believe," said Walter Glenesk, "the master will lose naething by it: there are few minds but feel grateful for a kindness done them, and will be ready, when an opportunity occurs, to do what they can to repay it."—"Ay, ay," said Bauldy Black; "but when will sic men as Donald Blamart, gardener o' Keelynine Castle, gae awa? Mony a puir chield has he harled to death, to mak up the time that he spent in the Chainge-house. If he had been a man like our present master, I wad hae been a better scholar; but, instead o' takin' a book in my hand in the winter nights, we were forced to mak tallies and tawtie creels by the lowe of a cruisie."—"Well, well, Bauldy, say no more about Donald," said Sandy Mac Alpine; "we will try and inform you about things that he knows nothing about. I once attended a course of lectures on chemistry; and, with the assistance of the notes I took, which I have still in my possession, and Griffin's *Chemical Recreations*, and *Practical Chemistry*, I will show you some things that will perhaps surprise you; and, by the aid of a few simple experiments, you will be able to understand some of the important operations of nature."

West Plean, near Stirling, Sept. 1842.

Art. III. *General Principles applicable to the Management of Fruit Trees.* By An Amateur.

Standard fruit trees occasion less trouble in managing, and are more certain in bearing, than either wall trees or espaliers; though there are some trees, as the peach, which are too tender

for being grown as standards; and others, as the vine, which are unsuitable. In standard trees, the top will generally be adjusted to the root naturally; and hence, in such trees, very little pruning will become requisite beyond that of thinning out crossing or crowded branches: but, in wall and espalier trees, as the top is disproportionately small to the roots, pruning, or disbudding, &c., as a substitute, becomes necessary during the whole period of their existence. The nearest approach which a wall tree can be made to have to a standard is, when, in the case of north and south walls, one half of the branches are trained on the east side of the wall, and the other half on the west side; or when one tree is made to cover both sides of a double espalier. Pruning may be rendered almost unnecessary by disbudding, disleafing, and stopping; but this will not always be the best course to pursue. When the root of a wall tree is to be strengthened, more shoots should be left than are required for being laid in at the winter pruning; and when the root is to be weakened, all or a part of the shoots produced may be left, but they must be disleafed or stopped as fast as they advance in growth, or the stem may be ringed, or the young shoots twisted or broken down, or the roots pruned.

Keeping roots near the surface, and encouraging the production of surface roots, will have a tendency to moderate the production of wood; and deep planting and stirring the surface to a foot or more in depth will throw the roots down to a moister stratum, and encourage the production of wood, but of an inferior quality for the future production of fruit. Dry sandy soil, not rich, will produce moderate growth and precocity, both in the fruit and the ripening of the wood, and rich deep soil the contrary; hence dry soil, comparatively poor, ought to be preferred for cold late situations, in which it is always desirable to ripen early both the fruit and the wood. By depriving a tree or a plant of its first crop of buds, a second crop will be produced the same season, but some weeks later; and, on this principle, late crops of leaves may be produced on all plants, and of fruits on all such trees and plants as have the power of forming blossom-buds, and expanding them in the course of one season; as, for example, the raspberry, strawberry, grape, and all annual and biennial fruit-bearing plants whatever. As all plants require a certain period of rest, by bringing on this period sooner in autumn, by disleafing, and depriving the roots of moisture by thatching the ground over them, they will be predisposed to vegetate sooner in spring. Hence the advantage of pruning all trees, the young wood of which is not liable to be injured by frost, immediately after the fall of the leaf. All wood that is not thoroughly ripened should be protected during winter by branches, fern, hay netting, or some other means;

but, as this is only applicable to wall trees, the soil for all others should be so adjusted to the climate as to insure their wood ripening in the open garden or orchard. As the most exhausting part of every fruit is the seed, and as the number of seeds in every fruit is limited by nature, it follows that a few fruit grown to a large size will be less injurious to a plant than the same weight of fruit produced in fruits of small size. As in plants in a state of seed-bearing the chief energies of the plant are directed to the nourishment of the seed, so in those fruit-bearing plants in which the fruit is gathered green, such as cucumbers, gourds, capsicums, peas, beans, kidneybeans, &c., none of the fruit should be allowed to mature any seed so long as any of it is gathered in an unripe state. Hence the immense importance of thinning out the blossom-buds of trees before they expand, and thinning out the fruit before the embryo of the seed begins to assume that stage which in berries and pomes is called setting, and in nuts and stone-fruit stoning. When a fruit is once set or stoned, if the embryo of the seed be destroyed by the deposition in it of the eggs of an insect, or by the puncture of a needle, the fruit, if it does not fall off, will ripen earlier, but will be in most cases of inferior flavour. The same result will take place to a limited extent even with leaves, when they are punctured.

Any check given to the head of a tree, such as disleafing, the attacks of insects, disease, overbearing, &c., has a tendency to cause the plant to throw up suckers, if it is natural to the root or stock to do so. As the leaves produced at the base of a young shoot are small, and generally soon drop off, so the buds in the axils of such leaves are never blossom-buds till they have become invigorated by at least another year's growth; and hence, when young wood is shortened, if blossom is the immediate object, it ought not to be cut farther back than to the first large bud. This is particularly applicable in the case of vines, roses, &c. In shortening such wood on spur-bearing trees, such as the apple and pear, only one or two of the imperfect buds are left at the base of the shoot, and these the following year generally become blossom-buds, if the tree is neither too weak nor too luxuriant. In general, winter-pruning a young tree retards the period of its fruit-bearing, but greatly increases the vigour of the tree; hence delicate trees, such as the peach, require more pruning than very hardy trees, such as the apple and plum.

"Summer pruning," a friend observes, "effects various objects: it exposes the fruit, where it exists, and also the embryo fruit-buds, and leaves connected with them, to the beneficial influence of light, air, and dews. This is effected by removing those portions of shoots which, as they advance, would more and more shade the lower parts, and prevent them in a great measure

from deriving advantage from the above important agencies as regards vegetation; these may be termed mechanical effects. Physiologically considered, the progress of the sap is limited by summer-pruning, and is directed towards the leaves and buds on the lower parts of shoots, which are in consequence invigorated, more especially as their free exposure to light, &c., enables them better to elaborate this increased supply. But although the foliage so left to act is increased in size and efficiency, yet the agency of this portion in producing roots is, notwithstanding, less powerful than the whole mass would be, if the shoots were allowed to grow wild throughout the summer; for in proportion to the mass of healthy foliage, so is the increase of roots. Hence excessive vigour is moderated by summer-pruning, and this in a greater or less degree according to the time and manner of performing the operation. The longer the operation is deferred, and the less the portion cut off from the shoots, the greater will be the strength which the roots will derive; and the earlier and shorter the shoots are cut, the less will be the quantity of foliage, and proportionally so the quantity of roots. Therefore, if a tree is too vigorous, summer-pruning should commence by disbudding such shoots, as they appear, as are not at all wanted to be retained for wood or spurs; and, as soon as the shoots intended to produce fruit spurs or buds at their base have become furnished with five buds, the extremity may be pinched off. As many as five buds are mentioned, because fewer do not complete one turn of the spiral, which may be traced by following the arrangement of the buds on a shoot of such fruit trees as are usually trained on walls. In the course of a fortnight, the uppermost buds on the portion left will have commenced to push; and they must be allowed to go on for a longer or shorter time without stopping, according to the greater or less danger of the buds at the base being also developed into shoots, instead of remaining in the character of fruit buds till next spring. If the roots, and of course the tree generally, require to be invigorated, the shoots will not be so numerous, and may be allowed to extend till after midsummer; and then only shortened for a little at first, in order that as much foliage as is consistent with the principles above explained may be left to act. It is a very prevalent but no less erroneous notion, that, in the case of an over-vigorous tree, as much wood should be retained, and as many shoots allowed to grow, as possible, in order that its vigour may be moderated by the expenditure. Those who hold this opinion may rest assured that the more a young tree grows, the more it is capable of growing; for growth is not a mere evolution of parts already formed, evolved by a determinate amount of expansive power. If ten buds give rise to a hundred others, these last have the power

of originating, in the same ratio, one thousand, and so on, as long as force of sap towards new formations is undiminished." —*N.*

All shoots under half an inch in diameter, cut from the side of a stem before midsummer, will generally heal over the same season. Terminal wounds made by shortening will not heal over till a shoot has been produced, the base of which will cover the wound.

The fruit-bearing shoots of all trees, in a natural state, are chiefly such as are lateral, while the wood of the tree is chiefly increased by the vertical shoots; hence some modification of lateral training will, in almost every case, be found preferable to training vertically. Lateral roots are also those which contribute most to fruit-bearing wood; and tap or deep-growing roots to upright and barren wood. All restraint imposed on trees, whether by training, root-pruning, or ringing the branches, if not followed up by art, will speedily end in disfiguring the tree and rendering it unfruitful, till it has assumed its natural form and habit of growth; and, if the tree should be of a species so tender as not to ripen fruit in its natural form as a standard, it will, by assuming that form, have become useless as a fruit tree. In the case of all trees in a state of culture, and more especially such as grow in soil the surface of which is heated more than that of the general surface of the locality, as is the case of a border exposed to the reverberation of the sun's rays in front of a south wall, artificial supplies of water are necessary at particular seasons; and water, therefore, must be considered as much an element of culture as manure. All the diseases of fruit trees cannot be effectually prevented or cured by judicious culture, but most of them may; and all insects which live on the surface of trees may be destroyed or subdued by abundant washings with clear water by the syringe or engine. All fruit-bearing plants (and indeed all others) grown in pots ought to be potted in soil which has not been sifted, and which, if not sufficiently coarse to keep it so open as to receive water freely, should be mixed with fragments of wood, bones, and stone, for that purpose, for supplying manure, and for retaining moisture.

Art. IV. *On the Cultivation of the White Guava* (*Psídium pyríferum* L.). By Edward Otto.

(From the *Garten Zeitung.*)

The well known tree *P*sídium pyríferum is but rarely met with in our gardens, although it may be cultivated without much difficulty, if it is allowed sufficient space.

The White Guava (*P.* pyríferum *L.*) is a West Indian tree which attains the height of 10 or 12 feet. The fruit is about the size of a hen's egg, with a yellowish and whitish outer covering, containing a reddish mealy pulp, in which are found the seeds. They are small, and are eaten along with the pulp, which is sweet, and of an aromatic and agreeable taste. The natives of the West India Islands eat the guava raw, or preserved with sugar; or prepare from it the well known guava jelly, which is exported in large quantities from Havanna.

The guava grows easily in a mixture of loam and peat earth, but requires plenty of room, particularly if you wish to have fruit. The temperature of a greenhouse is sufficient for it, but it should not always have the same degree of heat; because, like most tropical plants, as soon as it ceases to grow it requires a lower temperature, and a diminution of water. This period, with us, should be in winter; not on account of sparing fuel at this time of the year, but because the summer months are better calculated for the developement of tropical vegetation, as there is then a pretty equal proportion of light and heat, so necessary for the prosperity of the plants.

The guava, when growing, requires a great deal of water, and it should be gradually increased as soon as the shoots begin to expand themselves. A plentiful supply of manure, particularly when the plants are young, is of the greatest use, as it brings them quicker to a proper degree of strength.

I found several species of *P*sídium generally growing together, both on the Island of Cuba, and also in Venezuela. I found them in most cases, when not planted by the hand of man, growing in a rich, nourishing, and moist soil, in the immediate neighbourhood of a river or piece of water. Several species there are distinguished from each other principally by the fruit: such as the Yellow Guava (*P.* pyríferum *L.*, *Guajàva* pyrifórmis *Gærtn.*, *Guajàvus* domésticus *Rumph.*), and the Red Guava (*P.* pomíferum *L.*, *Guajàvus* agréstis *Rumph.*). Both species have the same properties. The fruit of the former is yellow, and pear-shaped; that of the latter reddish, and of a round form.

The leaves are sometimes laid on wounds, and on eruptions of the skin. The wood is much sought after by the cabinet-maker, and is also used as an article of fuel. The Guajava de Cochino, or Macho, probably *P.* montànum *Swz.*, a native of the Antilles, differs from *P.* aromáticum *Aublet*, a native of Guiana, the fruit of which is not eaten, as it is generally soft and tasteless. In the Bay of Matanzas, in the Island of Cuba, I saw the latter in great numbers not far from the sea, also in the neighbourhood of the Caraccas and other places, growing either in a wild state, or planted by the hand of man.

Berlin, Dec. 1841.

ART. V. *Notes on the different Kinds of Banana which have fruited in the Royal Botanic Garden, Edinburgh, arranged in the Order in which they are valued as fruit-bearing Plants.* By JAMES M'NAB, Superintendant of the Caledonian Horticultural Society's Garden, Inverleith.

1. *MU'SA sapiéntum* var. *st. helenénsis* (the St. Helena Banana) grows to the height of 14 ft. The average weight of each bunch of fruit varies from 60 lb. to 80 lb., being double the weight of any of the other varieties that have yet fruited. This variety was introduced into the Edinburgh Garden from St. Helena in 1832; but, though cultivated in St. Helena, it cannot be indigenous there. It is not only the most prolific variety that has fruited here, but it is also high-flavoured; and, where head-room can be afforded for bananas, it of all others is the most worthy of cultivation. The fruit of this variety is brought to a much larger size, by frequent tubbing and rich soil, than that of any of the other cultivated sorts can be made to attain. Strong-grown plants have produced all their leaves 14 ft. long and 3 ft. broad.

2. *Mùsa s.* var. *dácca* (the Dacca Banana) is the next in point of value. Its average height of stem is 7 ft., producing clusters from 10 lb. to 20 lb. weight. The fruit is smaller and drier than that of the St. Helena Banana, but perhaps higher flavoured.

3. *Mùsa s.* var. *Cavendísh*ii (the Duke of Devonshire's Banana), syn. M. s. chinénsis, is valuable on account of its fruiting at a small size. Few of the fruit, however, become so plump as that of the other varieties; besides, it has a great tendency to smother one half of each cluster in the folds of the leaves, unless very great heat be given just at the time it is developing its flower spike. This extra heat often tends to the injury of other plants growing along with it; and therefore a small house should be allotted for the purpose of growing this variety.

Other musas have fruited in the Botanic Garden, such as Mùs*a* paradisìaca *L.* and the common Mùs*a* sapiéntum *L.*; but the clusters of fruit of both species are small compared with those of the St. Helena Banana. The flavour is also inferior to it, as well as to the M. s. dácca and M. s. Cavendísh*ii*.

Two other sorts are now in fruit, viz. the French Banana from Jamaica, and the Strawberry Apple-flavoured Banana from the Mauritius; but nothing can be said of the merits of these varieties at present.

Since the above was written, Mr. M'Nab informs us that the Strawberry Apple-flavoured Banana ripened its fruit about the 20th of July; and "that, in point of flavour, it is considered one of the best that has yet fruited. When quite ripe, it possesses a most agreeable acid or sharpness, which will cause it to be a fa-

vourite with banana cultivators. The comparative smallness of the clusters, compared with those of the fruiting varieties, however, is a drawback."

Several other fruiting varieties recently introduced from the West Indies are expected to fruit early next year.

Mùs*a* s. díscolor, M. s. rosàcea, M. s. coccínea, and M. s. supérba, have also flowered; but they produced no fruit worthy of notice.

When bananas are attended to carefully, they may be made to produce their fruit within a twelvemonth from the time the suckers are taken off the parent plants.

The following are the only places in Scotland where the banana has been cultivated for its fruit:—Dalkeith Park; Williamfield, the seat of Mrs. Fairlie; the Horticultural Gardens here; and the Royal Botanic Garden. At Dalkeith and Williamfield the only kind fruited was M. s. Cavendísh*ii*.

Caledonian Hort. Soc. Garden,
Inverleith, July 7. 1842.

Art. VI. *Notes on the different Kinds of Banana cultivated at Leigh Park, the Seat of Sir G. T. Staunton, Bart.* By Richard Carter, Under Gardener there.

Although we have eight varieties of Mùs*a* sapiéntum *L.* here, yet we have only fruited three of them, the Banana (M. sapiéntum), M. s. Cavendísh*ii*, and M. s. dácca: the last two varieties we have fruited in abundance.

At present we have the Plantain (M. paradisìaca *L.*) with a stem measuring nearly 4 ft. in circumference at the base, with leaves from 12 ft. to 14 ft. long. We have also another large-growing variety, which produces a very large cluster of excellent fruit, but we have no name for it.

The three other varieties are not fruiting sorts, M. s. coccínea, M. s. díscolor, and M. s. rosàcea, and they are kept as flowering plants.

M. s. Cavendísh*ii* can be fruited in a pine-stove about 8 or 10 feet high at the back, but the Dacca variety, if well grown, would require a house 20 ft. in height.

M. s. dácca is a robust and very handsome-growing variety of the banana; and, when allowed plenty of room in a congenial climate, it will grow 20 ft. high, with a stem measuring 3 ft. in circumference at the base, leaves 10 ft. long and nearly 3 ft. in breadth, and producing a cluster of fruit above 50 lb. weight. The fruit, when in perfection, is of excellent quality, very much larger, and more pointed, than the fruit of M. s. Cavendísh*ii*.

Like the other varieties of banana, it is easily propagated by suckers, which should be removed when about 2 ft. long, potted, and plunged into bottom heat until they are established; they may then be kept in small compass, until wanted to plant out for fruiting.

Tubs, or a pit with brick partitions, about 3½ ft. square, will be suitable for fruiting plants. Use plenty of drainage, and fill the tubs with the following compost: about equal portions of light turfy loam, and well-rotted dung from the hotbeds, and add a small quantity of sand. This, or any similar light, rich, porous soil, will suit bananas well. Let the mixture be roughly chopped, and pressed gently into the tub; plant rather high, and allow for the soil settling a little. Occasional watering with liquid manure will add to the vigour of the plants.

Syringe the house every afternoon in fine weather, except when the fruit is ripening. While the plants are growing rapidly keep the roots rather moist, but as soon as the fruit has acquired its full size withhold water entirely; and when any of the fruits begin to change colour cut the cluster, and hang it up in a dry airy room to ripen gradually.

The summer temperature of our stove is 65° min. and 85° or more with sun heat; winter temperature, 65° min. 75° max. The bananas that ripen in winter are but little inferior to the summer fruit: but those plants that show fruit in December or January have generally very short flower stems; and, although the fruits are equally numerous, the cluster is generally less handsomely developed than those that are produced in spring or summer.

Our plants of M. Cavendíshii vary in produce from bunches of fruit weighing 30 lb. to bunches weighing 45 lb.; those of the Dacca variety from 40 lb. to 55 lb. Twenty plants of M. s. Cavendíshii may be fruited in a pit 30 ft. by 15 ft.; an equal weight of pine-apples might be grown in the same space; but much additional room would be required to forward successive pine plants, whereas young plants of Mùsa might be kept in little compass without injury. Healthy young plants put into fruiting-tubs in April or May will show fruit in the autumn, and ripen their fruits in the following May or June.

It will take from four and a half to seven months from the time the banana is in flower until it is fit for the table, according to the season of the year, temperature, &c. The plants make but little progress during the dark winter months.

The banana does not produce seeds, but produces excellent fruit at all seasons, although they often flower very imperfectly.

A banana-house for fruiting M. s. Cavendíshii, if 40 ft. long by 20 ft. wide, with a span roof resting on brick walls about 8 ft. high, would give room for a path along the sides and ends of the

house, with space in the centre for pits or tubs to accommodate 20 fruiting plants, and plenty of room at the sides of the paths for young plants. A small bark bed might be made at one end, to establish the suckers.

The whole of the roof might be fixed, and the upright sashes at each end made to slide or drop as ventilators. The glazing should be done with sheet glass, in long panes, in Mr. Paxton's manner. Such a house would be nearly air-tight, and I have experienced that a stove constructed in this manner is heated at a comparatively trifling cost. Erecting a house of this kind would cost but little, and it would be capable of yielding a supply of excellent fruit throughout the year. Heating by hot-water pipes is preferable to flues; although these, if properly constructed, would answer very well.

Leigh Park Gardens, July 19. 1842.

ART. VII. *Result of an Experiment with Grass Seeds, intended to show the proper Depth of Covering they should receive when sown.* By Messrs. DRUMMOND, of the Agricultural Museum, Stirling.

THE seeds were sown on the 13th of May, 1842, in our nursery grounds, on an open border of light soil, the covering regulated by a frame (*fig.* 55.) 4 ft. wide, the back (*a*, *c*) standing 3 in. in

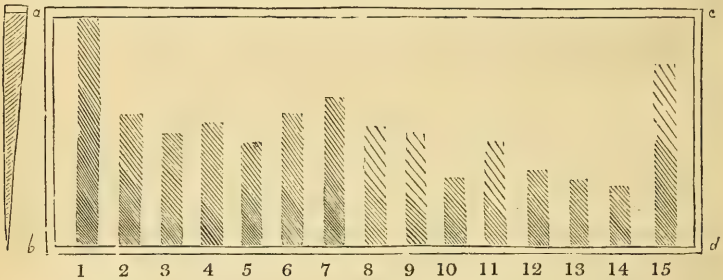

Fig. 55. *Diagram showing the different Degrees of Covering required for different Kinds of Grass Seeds.*

1. *L*ò*lium* perénne *L.*, Perennial rye grass.
2. *P*hlèum praténse màjus *L.*, Greater meadow catstail, or Timothy.
3. *Festùca* praténsis *L.*, Meadow fescue.
4. *T*rifòlium praténse *L.*, Red clover.
5. *T*rifòl. rèpens *L.*, White clover.
6. Medicàgo lupùlina *L.*, Yellow clover.
7. *P*lantàgo lanceolàta *L.*, Ribgrass.
8. *A*lopecùrus praténsis *L.*, Meadow foxtail.
9. *Festùca* duriúscula *L.*, Hard fescue.
10. *P*òa praténsis *L.*, Smooth-stalked meadow grass.
11. *D*áctylis glomeràta *L.*, Rough cocksfoot.
12. Cynosùrus cristàtus *L.*, Crested dogstail.
13. *P*òa nemoràlis *L.*, Wood meadow grass.
14. *A*gróstis stolonífera *L.* var., Fiorin grass.
15. *L*ò*lium* perénne *L.* var. itálicum, Italian rye grass.

depth, and the front (*b*, *d*) even with the surface, as shown in the figure. The shading by lines shows where the seeds have brairded; and the proportionate thickness of the plants, in the different depths, is shown by the darkness or lightness of the shade produced by the width or nearness of the lines.

The *L*ò*l*ium perénne *L.*, or common rye grass, alone, has risen the whole breadth of the frame; but, after it has passed the middle, the thickness of the plant decreases more than one half. The *P*ò*æ* and *A*gróstes, which have very small seeds, will not bear more than a quarter of an inch of cover; and from a quarter to half an inch appears the proper depth for the other sorts. Hence, instead of using the common harrow for covering grass seeds, the surface should merely be ruffled by a bush, or some implement in imitation of one, and well rolled.

Stirling, July 16. 1842.

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

THE First Annual Report of the Metropolitan Improvement Society. Pamph. 8vo, pp. 7. London, 1842.

We have frequently in this Magazine, and in the *Architectural Magazine*, suggested the necessity of a metropolitan council, committee, or board, to suggest and superintend public improvements, which have hitherto, with the exception of some parts of the city property and the crown lands, been subjected to the caprice of individuals, or at least been devised with a view to partial rather than general interests. We are therefore glad to see the establishment of a Metropolitan Improvement Society, the success of which has been even greater than we anticipated.

According to the report before us a deputation from the committee of the Society have had an interview with the prime minister, who "stated that his own opinions coincided with the views of the deputation; that he certainly considered it desirable that in the place of a committee of the House of Commons an efficient board should be appointed to institute proper enquiries, and take a broad and comprehensive view of the whole subject. He further said that, regarding the object as a most important one, he did not think the consideration of a mere trifling expense should stand in the way, and he should probably not hesitate to propose such a grant as would be sufficient to render the enquiry effectual.

"Some objections were naturally raised to any interference with plans of improvement that had already received the legislative sanction; considerable progress having been made in negotiating for and purchasing property on the different lines. The committee, however, feel extremely anxious on this point. Plans which would have been far more satisfactory to the public have been sacrificed to a spirit of mistaken economy, while those which are now being carried into execution are most faulty and inadequate. Viewing the paramount importance of the subject, and that the opportunity, once lost, can never be recalled, the committee are still using strenuous exertions to call the

attention of government to a revision of these plans; and do not despair of causing them to be modified, and materially improved.

"Valuable suggestions on various subjects connected with metropolitan improvements have also been received, and entered in a book kept for that purpose.

"The important object—that of inducing government to prepare a comprehensive plan of improvement, embracing the general interests of the metropolis, and founded upon an accurate survey—the committee trust has been secured; but to this alone the committee would not confine their exertions, but would extend them to every point tending to the health, comfort, and well-being of this vast city.

"They desire especially to effect an improvement of the over-crowded and ill-drained neighbourhoods of the poor; to provide a better description of dwellings for the lower classes, and to adopt every other available means of checking the fearful mortality now raging in the poorer districts.

"They are anxious to impress the public mind with the fearful consequences arising from the burial of the dead in crowded places, and to encourage, as much as possible, cemeteries formed at a distance from the metropolis.

"The naming and numbering of streets should also engage the early attention of the committee. Every one is not perhaps aware of the great public inconvenience resulting from the total abandonment of this branch of the duties of municipal administration to individual caprice; in illustration of this, however, it may be mentioned that in some streets there are several houses with the same number; and that in the commercial part of the metropolis alone, there are no fewer than twenty-eight King Streets, twenty Queen Streets, twenty-six Charles Streets, twenty-five Church Streets, twenty George Streets, and twenty-three John Streets, with numerous other examples of a corresponding character.

"To render their exertions effective, however, and to institute proper enquiries on all these points, the influence and funds of the Society must be increased. The committee trust they may depend on the individual exertions of the members of the Society to obtain a further accession to their numbers; and they feel persuaded that the objects they have in view require only to be well known to obtain ample support from the public."

The subscription is only 10*s.* a year, and 3*l.* 3*s.* constitutes a member for life. H. Austin, Esq., is the honorary secretary, and the office is No. 20. Bedford Street, Covent Garden.

A complete Course of Practical Geometry and Plan-Drawing; treated on a Principle of peculiar Perspicuity: adapted either for Classes or for Self-instruction. By C. W. Pasley, C.B., Colonel Royal Engineers, F.R.S., &c. &c. Second edition, much enlarged. 8vo, pp. 608, with numerous woodcuts. London, 1838.

If the price of this work (24*s.*) did not put it out of the reach of journeymen gardeners, it is one which we can very strongly recommend to them. It ought to find a place in garden libraries where the books are purchased by the proprietor, and form a part of the garden furniture. A number of the problems will be made use of in our *Encyclopædia of Landscape-Gardening and Garden Architecture*, if we should ever be able to complete that work.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Action of Salts on living Plants.—From various experiments which M. Vogel, sen., has made on the action of salts on living plants, he has arrived at the following conclusions:—

1st, That plants with their roots, when immersed into a solution of sulphate of copper, totally absorb the salt, convert it into proto-sulphate, and die quickly.

2d, That acetate of copper produces the same effects, the salt absorbed becoming proto-acetate of copper.

3d, That plants absorb sulphate of magnesia, nitrate of potash, and iodide of potassium, and die more or less quickly.

4th, That the sulphates of zinc and manganese are absorbed by plants, without suffering decomposition, and the plants die.

5th, That plants absorb nitrate of cobalt and nickel, without being able to absorb the whole of them from solution; but they die: and the same effect is produced by emetic tartar.

6th, That the oxalate and tartrate of oxide of chromium and potash are slowly absorbed by plants, and the bichromate of potash much more quickly. The *Datùra* Stramònium and Galèga officinàlis absorb the salt of chromium with the greatest rapidity; they become of a yellow colour, and die.

7th, That plants absorb nitrate of silver; but they decompose it, and the oxide of silver is reduced to the metallic state.

8th, That plants absorb also, and totally, the proto-nitrate of mercury from solution, but the salt is decomposed.

9th, That corrosive sublimate is absorbed by plants; some of them decompose it into calomel, and others absorb it without decomposition.

10th, That plants slowly absorb acetate of lead; and it is decomposed by some plants, and not by others.

11th, That plants which contain much carbonate of lime, such as the *C*hàra vulgàris and the *S*tratiòtes *a*loìdes, do not absorb a salt of copper from solution: the same also occurs with the Cèreus variábilis. (*Phil. Mag.*, July, 1842.)

Ripening Potatoes.—Potatoes, at this season, are often found to be watery and deficient in flavour, although boiled with the greatest care. It will be found that, by placing them for a week before using near a fire or stove, they will have gained their proper consistence and flavour. (*Cambridge Chron. and Journ.*, March 26. 1842.)

Beast poisoned by eating Yew.—A correspondent says:—Mr. Lygo and Mr. Dexter of Thurcaston had two beasts killed a few days ago by eating of the yew tree, and several more were made dangerously ill. It would be well if all having yew growing upon their estates would fence it out, so that no stock of any kind could get to eat it. (*Camb. Chron. and Journ.*, April 2. 1842.)

Art. II. *Foreign Notices.*

GERMANY.

The edible Snail of Germany is the vineyard snail, Hélix pomàtia *L.* It is about 1 in. in diameter, of a roundish form, and consists of five whorls, with several circular brown bands. This snail is found in great numbers almost every where, particularly in meadows, and by the sides of hedges, where they make their appearance after rain, but do not do much injury. In the South of Germany, and in all the southern countries, they are collected and put in large trenches or holes in the ground, and fed with salad or cabbage till the winter sets in, or till they shut themselves up with their operculum. They are brought in this state to market, and whole shiploads are conveyed down the Danube to Vienna from Swabia. They are considered very delicate eating, whether boiled or fried. They are killed by putting them in warm water, then pricked out of the shell, and the intestines cut off and thrown away; the remainder, either stewed or fried, is most generally replaced in the shell after being washed out, and served up on any kind of vegetable, usually sauer kraut. The operculum consists of a chalky salt slime, which is emitted in a moist

state from the margin of the mantle, and afterwards becomes dry. If the cold is very severe, they retreat deeper in the shell, and return very frequently to the operculum, adding one cover after another till the whole is sufficient to keep out the cold. These additional covers are much thinner than the outer one which was first made. They pass the winter under the earth, or in the dust and rubbish of hollow trees. Their eggs are about the size of green peas, and are deposited in a hole in the ground, and amount generally to two or three dozen. In the South of Europe, viz., in Italy, France, and England, and even in Asia, the rough vineyard snail (H. áspera) is so abundant, that it is not only eaten, but soup is made from it for diseases of the chest. It is rather more than an inch in diameter, is rough, and has brown and gray spotted bands with a white opening. (*Allgemeine Naturgeschichte für alle Stände*, by Professor Oken, vol. ii. p. 421.)

Art. III. *Retrospective Criticism.*

The Suburban Horticulturist. — [The following notes, by Mr. Lymburn, will be perused with interest and advantage by all our readers. To render them clearly understood, we have prefixed the passages in the *Suburban Horticulturist* to which they apply.]

"9. The next point of analogy between plants and animals which it may be useful to notice is that between the lungs and the leaves. An animal can no more live without its lungs than without its stomach. The stomach, as we have seen, is necessary for turning the food into chyle, and the lungs for turning that chyle into blood. Now, a plant can no more live and grow without leaves, than an animal can without lungs. The use of the lungs is to expose the chyle to the action of the air, which they decompose, so that its oxygen may unite with the chyle, and thus change it into blood. The leaves of plants, which act to them as lungs, not only decompose air, but light, in the process of elaborating the sap; and hence plants can no more live without light than without air or food, as light is necessary to turn their food into sap, or, in other words, to bring it into the proper state for affording them nourishment. Hence, in the culture of plants, the great importance of solar light. An important difference, however, between the circulation of the sap in vegetables and that of the blood in animals is, that the former have no heart."

In comparing plants with animals, the leaves can only be compared to lungs; and, similarly to lungs, it is true, they aerate the sap, and imbibe oxygen, as the lungs do to the blood: but, when we carry the comparison further, we find that not only do the leaves imbibe oxygen, but they also, by imbibing the chemical power of the light, decompose carbonic acid, absorbing the carbon, and setting the oxygen free. This is a power which has never been ascribed to lungs; and, as the chemical power absorbed probably acts in other ways on the sap presented (see 124.), though it is difficult to discriminate between organic secretion of particular organs and the chemical power of light, it has been by many eminent physiologists called digestion. Comparative physiology is valuable as assisting us to understand more readily what we are ignorant of, by comparing it with what we are already acquainted with. It is necessary to know the functions which the different organs perform before we can estimate their value, or know the necessity of supplying them with proper food; and the more we can simplify the subject, by classifying one organ in one organised being with one destined to a similar purpose in another, we the more readily arrive at a general knowledge of the whole. There are many difficulties, however, in comparative physiology; and the proper class of organs to which leaves may belong seems one of the principal stumbling-blocks.

"15. It would appear, from the case of the purple laburnum, that a true mule or hybrid cannot always be propagated with certainty, even by portions of the plant, or by what is called extension; since it never can be certain whether the portion taken off for propagation will produce the mule or one of the parents. As it is uncertain what are, and what are not, very distinct species, many of the plants originated by cross-breeding, and considered mules, may in reality not be so; and may, consequently, prove permanent and improved varieties. Some mules, also, such as that between the sweetwilliam and the common pink, are much less liable to degenerate than others. As some of the most beautiful and useful plants in cultivation are cross-bred varieties or mules, particularly among geraniums, heaths, roses, gloxinias, &c., the subject well deserves the attention of the amateur, who will find it a source of useful amusement and recreation."

Is not the purple laburnum from a bud that sprang at the edges of the insertion between bud and stock? It was said to be this, and not from seed. If so, it is not a seedling hybrid or mule.

[The true origin of the purple laburnum, in our opinion, is given by M. Camuset, in our Volume for 1841, p. 398., viz. that it is a hybrid between a laburnum and *Cý*tisus purpùreus.]

"103. *Growth.* . . . . . In general, the roots of plants are not furnished with buds, and hence roots cannot be used in propagation in the same manner as branches; nevertheless, there are numerous exceptions; and some extensive orders of plants, such as the *R*osàceæ, Campanulàceæ, Crucíferæ, and some of the Amentàceæ, have roots abounding in adventitious buds; and if these roots are cut into portions, and planted in the soil with the part of the root which was next the stem uppermost, and their points exposed to the air, or very slightly covered, they will produce plants. This, however, is never the case with the roots of annuals or biennials; and hence, in Crucíferæ, while the common sea-kale produces buds in abundance from the cuttings of the roots, the same thing never takes place in the common cabbage. The nature of plants in this respect is very different; for while the fasciculated tubercles of the dahlia, if deprived of the plate which produces the buds, have no power of originating fresh buds, yet the tubers of the common pæony, so treated, produce them freely."

It may be questioned whether the roots of *R*osàceæ, &c., abound in adventitious buds. It is more likely these buds are called into existence by an effort of the vitality of the plant. In such as the *R*hús, *P*apàver, &c., which abound in a thick viscid sap, the very smallest pieces, in which it is scarcely possible buds could be formed, are found to produce them, if they have only fibres to collect nourishment. The buds are generally formed at the edges of the cut, where the leaf is extravasated, showing they are formed from the extravasated sap, and did not previously exist in the state of buds. The edge of the cut is sometimes so crowded with buds, that they cannot be supposed to have had preexistence in such large quantities. The buds noticed at 121. may be more properly called axillary than adventitious.

"128. The art of causing plants to produce flowers sooner than they would do naturally is one of great importance to the cultivator. The principle on which it is founded seems to be that of causing a greater accumulation of nutritive matter in the particular part of the plant intended to produce flowers than is natural to that part; or, in the case of annual plants, to concentrate the nutritive matter of the entire plant, by growing it in a drier soil than that which is natural to it. Hence, by ringing any particular branch of a tree, blossom-buds will be formed on the part of the branch above the ring, while shoots more watery than usual will be formed below it. Hence, also, by grafting a shoot from a seedling tree on the extremities of the branches of a full-grown tree of the same species, blossoms will be produced some years sooner than would have been the case had the branch remained on its parent plant. In this way new kinds of fruit, raised from seed, may be proved much sooner than if the seedling plants were left a sufficient number

of years to produce blossoms. Sometimes blossoms are produced, which, from defect, or want of vigour, prove abortive; and when this is the case, by removing from the plant all the blossom-buds before they expand, for one or more years in succession, more vigorous blossoms will be produced, and the production of fruit insured. This is the reason why on fruit trees a defective crop is generally succeeded by an abundant one, and the contrary; and why double-blossomed trees or herbs, which yield no fruit, produce abundance of blossoms every year."

It has been customary to call the cause of fruiting an accumulation of nutritive matter. Were this the case, we would add to the fruitfulness of a tree by augmenting the quantity of its food or nutritive matter. The reverse of this, however, more often takes place, as in ringing and taking away roots, impoverishing the soil, &c., all which diminish the quantity of nutritive matter, and yet generally add to fruitfulness. It is not that impoverishing is itself the cause: were we able to increase the light and heat as we can increase food, there would be less cause for impoverishing. The supply of food, however, is most at our command; the others, especially the light (the most needful), we have but little power over, and must, therefore, curtail the food to suit our limited means. A certain highly elaborated state of the food is necessary before fruit-buds can be formed: experience teaches us this, as we see that fruit-buds are always most plentifully formed in seasons when the accumulation of the chemical power of the light from an unclouded sky has added most to the power of the leaves. Chemistry has not yet been able to unravel the changes required to bring the sap into a proper condition for producing fruit-buds; but that it is the quality, more than the quantity, experience abundantly points out.

"157. *Magnesia*, for all practical purposes, may be considered as lime; it is not very common in soils, and, though it is said to be inimical to vegetation under some circumstances, yet this appears very doubtful."

Magnesia, in its caustic state, is much longer in returning to the mild state, by regaining its carbonic acid from the air, than lime, especially if lime is present, as it generally is with magnesia. In this caustic state, it may be dangerous in excess; but, being more sparingly soluble than caustic lime, excess is not so apt to occur.

"158. The *iron* of soils is mostly found in a state of rust, or oxide. There is scarcely any soil without it; but it is never very abundant in soils naturally fertile. In a dry state the oxide of iron is insoluble in water, and not injurious to vegetation; but, when in consequence of saline substances in the soil, or applied to it, a salt of iron is produced, the iron becomes soluble in water, is taken up by the roots of plants, and is very injurious to them. Iron in this state is termed hydrate, and its evil effects are to be counteracted by caustic lime, with which it forms an insoluble compound."

The sulphate of iron, being the most soluble of any of the salts of iron, is most hurtful. Turning up the soil, and exposure to the air, change the sulphate into an insoluble peroxide; and quicklime decomposes the sulphate, so will also mild lime or chalk, but not so powerfully, the sulphuric acid of the iron replacing the carbonic of the lime.

"188. Hair, wool, feathers, leather, horn, rags, &c., decompose much more slowly than excrementitious or vegetable manures; but they are exceedingly rich in gelatine and albumen, and are therefore very desirable where the object is duration of effect, as well as luxuriance. Dead animals of every kind, including fish, make excellent manure; and when there is any danger anticipated from the effluvia which arises during decomposition, it is readily prevented by covering or mixing the putrid mass with quicklime. In this way, nightsoil and the refuse of the slaughter-houses in Paris, Lyons, and other Continental towns, are not only disinfected, but dried under the name of *poudrette*, and compressed in cakes, so as to form an article of commerce. Sugar-bakers' scum, which is obtained from sugar refineries, consists of the blood of cattle and lime; it can be sent, in a dried and compressed state,

to any distance, and forms a manure next in richness to bones. In gardens it may be used as a top dressing to culinary vegetables, and as an ingredient in the composition of vine borders. Animalised carbon consists of nightsoil of great age; it is sent to different parts of Europe from Copenhagen, where it has accumulated during ages in immense pits and heaps, which some years ago were purchased from the city by an Englishman. It is an exceedingly rich manure."

There is a good deal of loss in mixing quicklime with substances putrefying rapidly. The lime seizes on the carbonic acid of the substances, forming an insoluble carbonate of lime; and the extraction of the carbonic acid hastens decomposition. Ammonia, being expelled in greater quantity, is always the result of the application of quicklime, as may be detected by the smell. It may be useful, in a commercial way, to sustain a great loss for the purpose of making the article negotiable; but, where convenience will admit, rapidly putrefying substances are most economically prepared by mixing with earth or compost, and keeping cool by turning. Where they have to be carried far, sulphuric acid (vitriol), where cheap, will disinfect most economically; or, if cheaper, sulphate of lime (gypsum); or sulphate of iron (copperas), if very cheap. Quicklime is most useful with substances that decay slowly; its avidity for carbonic acid causes it to be extracted from the slowly decomposing substances it is mixed with, as couch grass, roots, weeds, &c., and hastens their decomposition. (See 195.)

"189. *Bones*, though a manure of animal origin, depend for their effects a good deal on their mineral constituents. Next to nightsoil, bones are perhaps the most valuable of all manures. Chemically, they consist of gelatine, albumen, animal oils, and fat, in all about 38 per cent; and of earthy matters, such as phosphate of lime, carbonate of lime, fluate of lime, sulphate of lime, carbonate of soda, and a small quantity of common salt. In consequence of the animal matters which they contain, crushed bones, when laid in heaps, very soon begin to ferment, and when buried in the soil previously to being fermented in heaps, the putrescent fermentation goes on with great rapidity. In gardens they should seldom be used without being broken small, and fermented in heaps for several months. Bones are valuable as a specific manure, because they contain phosphate of lime, which is an ingredient common to a great many cultivated plants, both of the field and of the garden. Bone manure, if used on the same soil for a number of years, is found to lose its effect; the reason of which is inferred from one cause of their excellence, viz. that the animal matter which they contain acts as a ferment or stimulus to the organic matter already in the soil, by which means this organic matter becomes sooner exhausted than otherwise would be the case. The remedy for this evil obviously is, to discontinue the use of the bones, and to supply putrescent manure, such as stable-dung."

When there are not sufficient of the phosphates in the soil for bones, their application will have a more powerful effect at first, than after long continuance has caused the soil to abound in these.

"193. *Inorganic or mineral manures* are, chiefly, lime in a state of chalk or carbonate, gypsum or sulphate, marl in which carbonate of lime is mixed with clay, saltpetre, kelp or mineral alkali, and common salt. The organic manures, as we have seen, act by supplying plants with the elements of which they are constituted, viz., carbon, oxygen, hydrogen, and azote or nitrogen; but the mineral manures contain none of these elements, and hence, according to most agricultural chemists, they must act beneficially on some other principle. This principle may be stated to be the rendering more soluble of the organic matters already in the soil in most instances, and in some cases rendering soluble matters insoluble, so as to diminish excessive fertility, and prepare a reserve of the fertilising principle for future use. Quicklime, for example, effects the first of these objects, and slaked lime the second. According to some writers, inorganic manures also act specifically; alkaline matters being found in all, and some sorts in many plants."

Inorganic substances, though not found in great quantity in vegetables (from 1 to 10 per cent only), are yet essential. Though great part of their action is as solvents, to introduce other substances, yet the plant will not thrive without them. It is found, for instance, in peaty soils, that there is a great deficiency of silicates and phosphates; and that wheat and oats thrive much better on these soils, when bones, containing phosphates, and when wood-ashes, decomposed straw, &c., containing silica, are added. The structure of the plant cannot be built up without all the requisites; and, though not needed in such quantities as the organic substances, and more generally found mixed in the soil, they (the inorganic) are yet essential, as the straw will not stand without its proportion of flint or silica; and the lime, phosphorus, soda, and potash found in all parts of the plant are indispensable. (See 208.) Soda is a constituent to a small extent in beans, clover, &c., and even in wheat.

"214. All mineral manures ought to be employed in a dry and powdery state, and, if possible, when the soil is equally dry and powdery; and all moist manures when the soil is somewhat drier than the manure. Other circumstances being the same, spring is better than autumn for applying manures, because the winter might wash them away, &c.; but, universally, the proper time is immediately before sowing or planting the crop. Calm weather is better than windy weather, and bulky manure ought no sooner to be laid on than buried in the soil. Exhausting land of the manure which it contains by over-croppings is like depriving a commercial man of his capital."

A great many mineral manures may be most cheaply sown with the hand, dry, in the state of powder; but are more safely distributed well diluted in water; and, being more divided, will do more good, but may be more expensive.

"215. In consequence of the great value of manures in increasing the amount of the produce of land, many ingenious persons have contrived mixtures, which, in small bulk, they allege will produce extraordinary effects; and this idea seems to have been long since indulged by some writers. Lord Kaimes, nearly a century ago, thought the time might come when the quantity of manure requisite for an acre might be carried in a man's coat-pocket; a recent author speaks of 'a quart of spirit sufficient to manure an acre;' and even Liebig says that 'a time will come when fields will be manured with a solution of glass (silicate of potash), with the ashes of burned straw, and with salts of phosphoric acid prepared in chemical manufactories, exactly as at present medicines are given for fever and goître.' (*Organic Chemistry*, p. 188.) To those who believe in the homœopathic hypothesis of medicine such speculations will not appear unreasonable; and there may be some truth in them, on the supposition that these small doses of spirit, or of silicate of potash, act as stimulants to the organic matter already in the soil; but to ordinary apprehensions it seems difficult to conceive how bulk and weight of produce can be raised without the application of a certain degree of bulk of manure. All deference, however, ought to be paid to the opinions of philosophers who, like Liebig, have profoundly studied the subject."

Wherever manures can be applied in the bulk, they will always be more beneficial than extracts, which are useful only as a saving of expense. Farm-yard manure, as it decomposes in the soil, improves its mechanical texture, a matter of great importance. To such as peat soils, silicate of potash and phosphates are valuable; but where earth can be added cheaply, it may give these also (especially if it has been well manured before, as both of these are found in manure), and the spongy peat solidified, and permanently improved in its texture. Farm-yard manure supplies most of the inorganic substances needed, improves the texture, especially of clayey soils, and is most permanently beneficial; but where this cannot be got sufficiently cheap, or where peculiar deficiencies or excesses occur in the soil, recourse may be had, with a great degree of profit, to inorganic manures in small compass.

"243. To measure the quantity of elastic vapour in the atmosphere, *Hygrometers* have been invented, and the degree of moisture is indicated in these instruments by what is called the dew-point. The best hygrometer is that of Daniell; but, as some nicety is required in its use, a substitute has been found in two common thermometers," &c.

A thin tumbler, as described in *Gard. Mag.* for July, 1842, p. 367., is the hygrometer most easily managed and understood.

"268. A sensible *effect on the human feelings* produced by the atmosphere of hothouses heated according to Mr. Penn's principle is, that a high temperature, say of 80° or 90°, can be breathed in as agreeably, and for as long a period, as one of 60° or 70° not in motion. This result is partly attributed to the motion given to the air; since, in the hottest days of summer, the heat, which would be oppressive in still air, is rendered not only bearable but even agreeable, if the air is put in motion by a breeze. In like manner the absence of heat is much more severely felt when the air is in motion than when it is at rest. Captain Parry and his companions, when in the Polar regions, could endure a degree of cold when the air was still, that, when it was put into motion, they found to be quite intolerable. It is certain, however, that a part of the agreeable effect produced by the motion of the air in Mr. Penn's hothouses is owing to the moisture which it contains; for the human feelings in a hothouse heated to 80°, in which no attempt has been made to saturate the air with moisture, are much less agreeable than in one at the same temperature in which the paths are kept moist with water. Every one must be aware of this who has felt the heat of a stove heated by brick flues, as compared with one heated by hot water; for though no water may escape from the pipes to moisten the air, yet no moisture is absorbed by them from the air of the house. In a house heated by flues, on the contrary, the clay of the bricks in the flue covers, and the lime by which the sides of the flues are plastered, having, as we have seen (155 and 156.), a great chemical attraction for water, abstract it from the air of the house, and give it that peculiar dryness which is so unpleasant to the skin, and so oppressive to the lungs."

The motion of air or wind is caused by colder air replacing warmer; this may cause the cooling effect of breezes in summer. Why the effects of still cold air are not so great as those of air in motion is, because, when in motion, the cold air is constantly replacing that partially heated by the human body. Why motion of heated air should, when uniformly heated, give relief is not so plain. Why moisture gives relief is connected with electricity. In dry air the electricity of the body accumulates, because dry air is a bad conductor. Moist air, being a good conductor, draws off the excess of electricity, which, when present, was causing a pricking uneasy sensation; and, when removed, the body gets more elastic and exhilarated. Motion is undoubtedly of benefit to leaves and stems of plants.

"281. When light falls on a transparent medium, a portion of the rays is *transmitted* through it, and a portion is reflected from its surface. The latter portion follows the same laws as the light which is reflected from opaque surfaces; and the portion which passes through it is refracted, that is, it leaves the transparent medium at a different angle from that at which it fell upon it; and by this change the light is also weakened, so as at a very short distance from the surface of the transmitting medium, as of glass, for example, to be dispersed and transfused in the atmosphere, in which state in hothouses it has no longer the same power on the vital energies of plants. We are not aware that the cause of the inefficiency of light, after it has passed through glass and reached a certain distance, has been fully explained; but the fact is well known to gardeners, who, in hothouses, invariably place the plants they wish to thrive best at the shortest distance from the glass. As the quantity of light which passes through glass at the roof of hothouses is, all other circumstances being the same, greatest when the plane of the roof is at right angles to the plane of the sun's rays; hence, the slope of the roof is, or ought

to be, adjusted to the direction of the sun's rays at that season of the year when its light is most wanted. As, in houses for early forcing, the greatest deficiency of solar light is in the winter season, when the sun is low, so the roofs of such houses are made steep, in order that the sun's rays may be received at a larger angle. Summer forcing-houses, on the other hand, have less steep roofs, so as to receive most benefit from the sun in April, May, and June, when forced fruits are ripening. A greenhouse, in which no fruit is ripened, but in which abundance of light is required all the year, has commonly perpendicular glass to receive a maximum of light during winter; and a sloping roof of glass at an angle of 45°, which is found favourable for the admission of light at every season, as well as for throwing off rain, &c."

Plants suffer most at a distance from light, when the light is only from the top, or one-sided. This has been called the attraction of light, but is no explanation. In the one-sided light, it may be the greater solidifying of the side next the light which draws. In the top light of frames, the want of direct light at the sides may cause partly the greater elongation of the top; but plants elongate below glass, even though surrounded by light. The want of motion is a great cause of this: plants uniformly elongate more in a sheltered than an exposed field. If there is any such thing as attraction between light and plants, as roots follow their food (which is partly hygroscopical in the latter case), it will be, like the attraction of gravitation, more easily perceived in its effects than capable of explanation. Refraction will disperse the light; it is difficult to understand how it should weaken what does pass through. The chemical power of light, however, is so much connected with electricity, that it may be weakened in a way we cannot account for. The chemical power of light is greatest in the least luminous part of the rays; and yet, as the quantity of light is equal, that of the equator must have most power. There is a connexion between heat, light, and electricity, not yet explained; the optical qualities of light have been much more attended to than the chemical. The red rays have more momentum than the blue; thus causing the red of the rising and setting sun, and the azure blue of the sky. Perhaps more of the blue, or chemical portion of the sun's rays, may thus be lost in refraction.

"463. *Canvass coverings* for glazed structures or detached plants require, for the most part, to be in framed panels, as well to keep them tight as to throw off the rain, and to prevent them from being blown and beat about by the wind. To render the canvass more durable, it may be oiled, tanned, or soaked in Kyan's or in Burnett's anti-dry-rot composition. When applied to cover the glass sashes of frames or pits, it should be in panels in wooden frames of the size of the sashes; and this is also a convenient and safe mode of forming temporary structures for protecting standard plants or trees: but by suitable arrangements, to be hereafter described, canvass or netting for protecting walls may be hooked on and fastened without wooden frames. This is done in a very efficient manner in the garden of the Horticultural Society of London, to protect a peach-wall. The stone coping of this wall projects over it about an inch and a half, with a groove or throating underneath. Coping-boards 9 in. broad, fitted to join at their ends by means of plates of iron, are supported on iron brackets built into the wall. The upper edge of the board is slightly beveled, so as to fit as closely as possible to the under side of the coping of the wall, in order effectually to obstruct the radiation of heat and the ascent of warm air. From this coping, woollen netting of various kinds, common netting such as fishermen use, bunting, and thin canvass, have been let down, and tried experimentally, in the course of the last fifteen years; and we are informed by Mr. Thompson, that, after repeated trials, the thin canvass was found the preferable article for utility, appearance, and duration. This description of fabric costs about 4*d.* per yard, procured from Dundee, &c."

I should think any protection from frost would be much more effectual, if drawn up or removed during a mild day; the plant would be hardier also,

and healthier, and the extremes between heat and cold not so great. In Scotland, woollen nets are most used; from the coldness of the climate, they are most beneficial; and those who keep them constantly standing find they do harm; the foliage is not so healthy, and insects collect. There is seldom so much heat there as to require shading for the blossom. Dry cold east winds do most harm.

"474. *Colouring the surface of walls black*, with a view to the absorption of heat, has been tried by a number of persons, and by some it has been considered beneficial; but, as the radiation during night and in cloudy weather is necessarily in proportion to the absorption during sunshine, the one operation neutralises the other. If, indeed, we could insure a powerful absorption from a bright sun during the day, and retain the radiation by a canvass or other screen during the night, a considerable increase of temperature might probably be the result; but the number of cloudy days in our climate, in proportion to those of bright sunshine, is not favourable to such an experiment."

White walls will heat the air around the leaves most through the day from reflection, as these are seldom close to the wall; and the extreme of cold will not be so great at night, which is most dangerous. Black-coloured walls, though they absorb heat during the day, will not retain it to give off at night, as it will be conducted through the wall, in great part, during the day, and any little retained be speedily radiated off in the early part of the night.

"500. Whatever mode of heating or kind of pipes may be adopted, the pipes should always have a gradual ascent from the place where they enter the house, or are intended first to give out heat, towards the farther extremity; otherwise, the circulation will be less rapid, and consequently the heat less equally distributed."

Practically this is not found to be the case. The reason is, that the force of the gravity of the cold water in the returning pipes is increased by the height gained, the escape of air at the highest point, &c. (See *Hood's Treatise*, p. 18.)

"501. To explain the manner in which the motion of heated air in hot-houses produces a sensation of coolness, without being altered in its temperature, we make the following quotation from Lardner's *Cyclopædia:* 'The air which surrounds us is generally at a lower temperature than that of the body. If the air be calm and still, the particles which are in immediate contact with the skin acquire the temperature of the skin itself, and, having a sort of molecular attraction, they adhere to the skin in the same manner as particles of air are found to adhere to the surface of glass in philosophical experiments. Thus sticking to the skin, they form a sort of warm covering for it, and speedily acquire its temperature.' Agitation of the air, however, 'continually expels the particles thus in contact with the skin, and brings new particles into that situation. Each particle of air, as it strikes the skin, takes heat from it by contact, and, being driven off, carries that heat with it, thus producing a constant sensation of refreshing coolness.'"

The temperature of the blood is 94° to 98°, and the heated air is not likely to be much below the temperature of the skin; to that extent, however, it will undoubtedly increase the effect; and, in motion, will give motion to the leaves and stems of plants, and will not stagnate and corrupt.

"504. *Rogers's conical boiler and hot-water apparatus.*" Why should a 2-inch pipe ascend, and 4-inch pipe descend? the friction will be in much greater proportion in the 2-inch pipe, and the molecular ascent from heat have more to contend with.

"564. *Various experiments have been made to accelerate germination*, with different degrees of success. These all proceed on the principle that germination cannot take place until the carbon of the seed is changed into carbonic acid; and this can only be done by extraordinary supplies of oxygen," &c.

Substances yielding oxygen should be of most use in germination to oily seeds, which have a deficiency of oxygen in themselves.

"570. *Sowing seeds in powdered charcoal* has been tried in the Botanic Garden at Munich with extraordinary success. Seeds of cucumbers and melons sown in it germinated one day sooner than others sown in soil, and plunged in the same hotbed; becoming strong plants, while the others remained comparatively stationary. Ferns sown on the surface of fine sifted charcoal germinate quickly and vigorously; and it seems not improbable, that this material may be found as useful in exciting seeds difficult to germinate, as it is in rooting cuttings difficult to strike.

"571. *Sowing seeds in snow.* This practice originated at Munich five or six years ago, and an account of it was given by M. Lucas in the *Garten Zeitung* for 1841, and translated in the *Gardener's Magazine* for the same year."

According to Liebig, ammonia hastens and strengthens germination; and, according to the same authority, charcoal and snow absorb ammonia from the atmosphere; this may be great part of the benefit.

"575. *Selecting the shoot.* The wood of the present or of the past year is almost invariably chosen for cuttings. In the case of plants which are not difficult to strike, a portion of the young shoot is cut off at any convenient distance from the branch from which it proceeded, and of such a length as may be considered most convenient for forming a plant. Thus in the case of willows, gooseberries, currants, &c., from 9 in. to 18 in. are considered a suitable length; and the points of the shoots of these and other kinds of easily-rooting plants are cut off, as not being sufficiently ripened to have strong buds, or as containing too many small buds. In plants somewhat difficult to strike, lateral shoots are chosen, and these are often drawn or 'slipped' out of the wood, so as to carry with them the axillary formation of the bud and the vessels of the leaf," &c.

The plexus of vessels at the heel of the shoot, or insertion of the branch in the stem, causes a peculiar activity of life there; and both buds and roots are much more easily formed and in greater quantity there than in any other place of the shoot. The insertion of the branch resembles, in this respect, the collar of the stem. (577.) If the heel of the gooseberry or currant cutting is taken out completely by breaking off, not cutting, it is better than taking off a piece of the old wood.

"578. *The time of taking off cuttings* depends much on the nature of the plant to be propagated," &c.

Cuttings of growing succulent wood have vitality most active, and strike root most quickly; but, from the unripened state of the wood, are most apt to die, and require to be kept more close and moist. There is danger in both extremes, and both must be guarded against in such as are difficult to strike.

"580. *The number of leaves which are left upon the cutting.*" When the season is hot and warm, and little time to attend to keeping moist, succulent cuttings, such as pinks, are most certain to strike, by paring close below the uppermost joint, and cutting off above close to the joint, leaving none of the leaves uncut, except those beginning to develope. Such a cutting is a mere joint in a vital active, not ripened, state, and will stand a great deal of heat; if covered with a hand-glass in sunny weather, or in a hotbed frame in cold weather, they seldom or never fail. Excitement of heat, not preservation, is all that is wanted.

"581. The lower ends of stout cuttings of plants somewhat difficult to strike, such as the orange, are sometimes cut directly across, so as to rest on the bottom of the pot, and sometimes they are, in addition, split up for an inch or two, and the wound kept open with a wedge. This has been found by long experience greatly to facilitate the rooting of such cuttings, probably by increasing the surface by which absorption of moisture takes place, and at the same time insuring only a moderate supply of moisture; and perhaps, creating a greater demand for the action of the leaves to cicatrise the wound with granulous matter."

When cuttings are tardy to strike, and have callosities formed, heat has a

powerful effect in causing them to root. Those that have stood months, without appearance of rooting, will strike in a few days in a strong heat.

"601. *Cuttings of the underground stems and roots.* A great many plants, both ligneous and herbaceous, may be propagated by cuttings of the underground stems, as in the liquorice; and of the roots, as in the common thorn, and most of the *R*osàceæ."

The best mark for such as strike most readily by pieces of the root is an abundance of thick viscid juice, as in the genera *R*hûs, *P*apàver, *Ailántus*, Gymnócladus, &c., which strike more freely than *C*ydònia, roses, &c., which have less.

"645. *The uses of grafting.* 3. To increase the vigour or the hardiness of delicate species or varieties, by grafting them on robust stocks, such as the Mexican oaks on the common oak, the China roses on the common dog-rose, the double yellow rose on the China or musk rose, the Frontignan grape on the Syrian, &c.

"5. To increase the fruitfulness and precocity of trees. The effects produced upon the growth and produce of a tree by grafting, Knight observes, 'are similar to those which occur when the descent of the sap is impeded by a ligature, or by the destruction of a circle of bark. The disposition in young trees to produce and nourish blossom-buds and fruit is increased by this apparent obstruction of the descending sap; and the fruit of such young trees ripens, I think, somewhat earlier than upon other young trees of the same age which grow upon stocks of their own species; but the growth and vigour of the tree, and its power to nourish a succession of heavy crops, are diminished, apparently by the stagnation, in the branches and stock, of a portion of that sap which in a tree growing upon its own stem, or upon a stock of its own species, would descend to nourish and promote the extension of the roots.'"

These modifications are, by stunting or lessening vigour of growth, to have the wood better ripened, and the juices more highly organised or elaborated.

"650. *Grafting by detached scions.*" It is of great consequence that the graft and stock should be pressed closely together, in order that the first emission of cambium from the stock should come in contact immediately with the inner bark and albumen of the graft. When grafts are taken off, and tied on in a growing state, the wood of the graft clings and dries; having no roots to feed it, it shrinks from the stock, leaving an empty space, and before it is filled up, unless the stock is very vigorous, the graft dies. This might be obviated by grafting before the sap rises, but grafts will not succeed till the flow of sap has begun to rise briskly; late grafting always succeeds best; and, hence, the grafts when taken off before growth commences, and kept moist till the stock begins to grow, always succeed best, as they experience no checks. Much of the success of grafting, however, depends on the state of the weather; if the heat prevails so as to keep the sap flowing, every healthy graft, well fitted, will succeed; if not, they may perish before the sap rises.

"669. *Bud-grafting.*" A species of grafting I think you have not noticed may be denominated bud-grafting, and is the best for most evergreens, as daphnes, &c. When the stock has begun to grow vigorously cut the head off, and, making an incision in the bark a few inches down, open it on both sides, the same as for budding; prepare the graft without a tongue, and insert the lower part as you would do a bud, leaving the herbaceous growing top green above. Soft succulent evergreens in which the bark opens freely will do better in this way than any other.

"674. *Budding.* In the year 1824 we placed several buds on the branches of a fig-tree, and, from some accidental cause, though the shield adhered in every case, yet most of the visible buds were destroyed, and only one of the latent buds was developed. Twelve years afterwards, when the fig-tree received a severe check, in the winter of 1837–8, the developement of a second latent bud from one of the shields took place."

Were the buds developed latent or generated? This will be difficult to decide.

Those of M. Neuman (611.) were evidently generated on the edges of a cut; as in sea-kale, and plants such as sumachs propagated by pieces of the root, the extravasated juice is formed into buds at the lips of the cut. On the stems of geraniums, the extravasated juice is entirely converted into bundles of buds. It appears, therefore, buds may be generated in the piece of bark or shield left, though the axillary bud dies. It appears farther, that, as in the case of the purple laburnum, it is possible, even, that a union of the two cambiums of stock and bud may take place at the edges, and again sport, by separating at times, and again uniting. Shoots from the purple laburnum, in leaf, flower, and habit exactly the same as the *Cýtisus purpùreus*, are sometimes got protruding from the stem of the purple laburnum, while others again are the same as the original yellow-flowered laburnum.

"696. *The after-care of grafts by budding.*" Much of the success of budding depends on the stock and bud growing vigorously, to supply the juices or cambium causing the union to take place; and allowing the bark to separate easily from the wood, so as to prevent laceration and bruising of the vessels in separating them. If the bark does not fly up freely from the stock, when the handle of the knife is inserted, it is not likely the bud will succeed; and the same if the shield of the bud does not part freely from its wood; if either of them has commenced ripening, or if the sap has not begun to run or flow, the labour will be in vain. In order to insure the cut being smooth, and no laceration of the bark of the shield taking place, the best of all methods (especially for such barks as the cherry and plum, which will not bear handling, and are very apt to spoil) is to mark the size of the shield intended, all round the bud, with the point of the knife, cutting into the wood, and then introducing the thumb at the side of the bud and raising it off with a gentle squeeze. If the shoot is growing vigorously, it will spring out, without any difficulty, so clean and smooth on the edges as greatly to facilitate the success of the operation. By the common method, if the bark is much handled, the shield of the bud is apt to be spoiled at the edges before insertion.

"703. *Whether deciduous trees and shrubs ought to be transplanted in autumn or spring.*" In transplanting deciduous trees before the leaves are fallen, it is found in practice that the shoots are not ripened, and die back often to a considerable distance, in the same manner as if the leaves had been destroyed by early frost. The young fibres, also, will protrude spongioles more quickly in the spring from the fibre that has been well ripened, than from that lifted before ripened. It can only be when the distance of removal is very short, and the plants very small, and lifted with the earth adhering to the roots, that the transplanting of deciduous plants in autumn, before ripe, can be attended with any advantage. In the nurseries, we have great experience in lifting and shoughing immense quantities of deciduous plants, and experience must say on this head, that any process of growth which may be going on in the interior of the plant during winter has very little if any outward appearance. Unless the winter is more than ordinarily mild, the spongioles are never seen to protrude, nor the buds to swell, till the spring begins to advance. Such as gooseberries, cherries, thorns, birch, larch, &c., may begin in February or March; beech, oaks, apples, &c., are later, and seldom begin to show much before April or May. Even the mezereon, which often flowers in February, is seldom found to protrude new roots before that period. Of course the period will vary as to localities; some soils and situations are more than a month earlier than others, within very short distances. Autumn planting is preferable where the soil is dry, as it washes the soil closer to the root; where the soil is clayey, and the weather soft at planting time, it gets into a state of puddle and rots the roots in winter; and, unless the weather is dry at planting time in autumn, such soils had better be deferred till spring. Quarters of young trees planted in autumn will stand all winter without appearance of failure; and yet, when the spring drought sets in, will fail nearly as much as spring-planted ones, showing that very little has been done by the plant towards establishing itself in the ground during winter.

"724. *Planting with the dibber* we have already (392.) mentioned as suitable for seedlings and very small plants. The soil ought to have been previously dug, or stirred by some other means, so that the fibres of the young plant may strike readily into it. In performing the operation, a hole is made with the dibber with one hand, then the root of the plant is inserted to the proper depth, and held there by the leaves or stem, with the other hand, while, by a second movement, the dibber is inserted by the side of the hole in such a manner as to press in one of its sides to the root of the plant, taking care that the pressure on the roots shall be greatest at its lowest extremity, and that it should be such as to hold the plant so fast that, when slightly pulled by one of its leaves, it does not come up."

In order to make sure that the lowest extremity, or root, of the plant should be most pressed, as you very judiciously request, (technically, it is called in the nurseries fastened,) it is necessary that the point of the dibber should be so introduced into the ground, as that it will be nearer the plant at the root than at the surface, the line of its direction inclining at a slight angle towards the plant. When the line of direction of the dibber points from the plant, they are fastened only at the surface, and the roots are not at all fixed in the soil. This is a very material matter to attend to, where much dibbing is practised. It is easier for the operators to push the dibber from the plant, and they require to be watched. The plants dibbed in the wrong way may be easily detected by giving them a slight pull, when they will be found to draw up easily, while those properly fastened at the roots retain their hold. If dry weather succeed the operation, almost all of those fastened at the surface only will die. Trees planted with the dibber are best for planting out again, as the roots are found spread out equally on both sides, while those trench-planted with the spade are found to have the roots all on one side, from the manner they are laid in, and the ground being beat back with the spade in the act of cutting the trench; they are generally also bent in the root, when the trench is sloped to make the plants lie, which facilitates the work but hurts the plant.

"735. *Watering, mulching, and staking newly planted plants.*" In watering box edgings, &c., newly planted in dry weather, it is of great moment when the earth is trod firmly to the roots, and before levelling on the remainder of the earth, to saturate the soil completely, all round the roots, with water, with an unsparing hand, and then finish by spreading the dry soil above. When water is poured on the surface of the soil in dry weather, the deluge of water runs the surface of the soil into a paste, which again hardens by the sun into a cake, obstructing thus the free entrance of the atmosphere into the soil, without which no plant will thrive. When straw or moss, or any of the other articles you mention, is spread on the surface it obviates this fault. Where this cannot be done, it is better to open holes in the soil, or pare up a portion of the surface, saturating the soil below, and then adding the dry soil when the moisture begins to subside. One such watering will be better than ten surface waterings, which often do more harm than good. Where none of these plans can be adopted, the direct beams of the sun should be kept from the surface, by a covering open at the ends for shade.

"740. *The disadvantages of growing plants in pots* are: the constant attendance requisite to preserve the soil in a uniform state of moisture and temperature, and to remove the plant from one pot to another when additional space for the roots becomes requisite, or when the soil contained in the pot becomes impoverished."

Such bare-rooted plants as white-broom, double-flowering whins, some pines and oaks, &c., which are very difficult to transplant and remove, are found to succeed better by being nursed in pots; but the roots have acquired such a tendency of matting together, and twining round one another, that it is a long time after planting before they shoot away freely again into the soil; and till this is done the growth will not be vigorous. The fibres may be parted again, but the roots have got a tendency to matting they do not recover for some time; and parting the ball destroys in some measure

the capability of being easily transplanted. It should only be resorted to with scarce and valuable plants or shrubs, not trees.

"752. *The specific principles on which pruning is founded, and its general effects,*" *&c.* One of the specific principles of pruning is also the stimulus given to vitality. When the leading branch of a small tree, which, perhaps, has not been growing well, but has got the roots fully established, is cut back to one bud, not only is the rush of sap which should have supplied the whole buds diverted into the one, and the shoot made thus more vigorous, but the vitality of the tree has acquired an impetus that it did not formerly possess. From a lazy slow-growing plant it has been converted into one of a quick, healthy, vigorous growth, a stimulus is given to the roots also to increase, and the tree is entirely renovated. The benefit is lasting, not temporary, and will continue, if circumstances are favourable, and no check of bad soil or bad weather ensues to counteract its vigour. It is thus that the forester cuts back his oak plants in the forest, after being a few years planted, and trains a single shoot from the bottom, knowing well that the vigour of this one shoot will be lasting; that the impetus given to the growth of the trees will continue; and that, in a few years, the cut over tree will be many times larger than those allowed to stand uncut. It is thus that nurserymen increase the vigour of their young plants by pruning; and that gardeners, when pruning for wood, cut farther back than when pruning for fruit.

"758. *Close pruning.* 768. *Stopping and pinching out.*" If the tops of the shoots of forest trees are pinched off in time, and proper attention paid to the plantation from its commencement, the contending large arms being converted into small side shoots, there will be little need for pruning at all, and skill will be of more consequence than labour. It is shortening-in, or fore-shortening, done in a much better and much easier way.

"761. *Spurring-in.*" The laying-in of small shoots, in place of cutting back to naked branches and spurs, should be more encouraged. More distance than usual should be left between the leading branches, and plenty of young wood nailed on after the manner of peach trees. It diminishes the quantity of breast-wood, which is an evident practical anomaly, and serves no good purpose, to be annually renewed and annually cut out. The growth should be much better spent in producing young wood and fruit, which will not require so much slashing of wood.

"767. *The cutting down of the stem or trunk of a tree to the ground,*" *&c.* The thin layer of alburnum is the consequence of stinting rather than the cause. A tree may be renovated though not cut back to the collar, and part of the old stem with its thin laburnum left. The vigour of the new growth will give a thicker coating of alburnum; though old hardened bark will not swell up so quickly as the new bark on a young shoot.

"769. *Disbarking.*" I have seen very fruitful trees covered every year with blossoms so thickly that the greater part had to be brushed off, and the trees very vigorous, where the *outer bark* had been renewed a few years before. The situations, however, were sheltered; the practice has not been much adopted yet, and it is doubtful if it would suit exposed situations; but for sheltered places it appears to be very effectual in renovating the vigour of old trees. It should be more often tried than it is.

"770. *Ringing.*" It has been generally said that ringing of trees contributes to fruitfulness by *accumulating* sap; but it is not explained how this is done. The wood being of more specific gravity above the ring is no proof of this, because it is denser from not having swelled out so much in bulk rather than from accumulation of sap. The ring prevents the ascent as well as descent of the sap; and it more probably acts by furnishing a smaller quantity of sap, which is more easily brought into a highly elaborated or organised condition than the ordinary larger quantity would have been.

"771. *Disbudding.*" Extent should be given to the wall tree to exhaust itself by growth, and so bring on maturity. If the border is not too rich, this should be better than tearing off a great mass of breast-wood. More young

shoots should be laid in, and they should be left longer at pruning-time, in the strongest-growing sorts. In weak-growing sorts apt to fruit they should be encouraged with manure, or we may have dry mealy, in place of large succulent, fruit.

"772. *Disleafing.*" It is not clear how disleafing will assist a tree to throw off superabundant sap. Disleafing should rather prevent elaboration of the sap, and keep the tree fuller of crude juices. It will, however, by lessening evaporation, stop the rapidity of ascent, and cause less food to be absorbed by the roots, not more to be thrown off by the tree. In luxuriant trees, it may be apt to occasion disease from too much crude sap. The safest plan, I should think, to overcome superabundant growth, would be to give little food, by making the border poor and dry, giving plenty of room to extend, and leaving the young wood long. If all these will not do, the next best would be to curtail the roots.

"776. *Root-pruning.*" Root-pruning, by curtailing a few of the largest roots, lessens the quantity of spongioles for a few years, and so curtails the quantity of absorbed and ascending sap. This, being more easily elaborated and brought into the highly organised condition required for fruitfulness, causes the production of blossoms and fruit. It is the tendency, however, of cutting roots to increase roots; and in a few years the greater number of small roots and the increased quantity of spongioles should, especially if heavy dressings of rotted manure are added, as recommended by some, and which should make up for the want of extension of the roots in quest of food, aggravate, in place of remedying, the luxuriance of growth. Pruning back all the roots of a fruit tree may bring the plant to something of the nature of a paradise stock, which abounds in roots, yet these being matted close round the stem, and not extending in quest of food, die off, and stint the growth from the spongioles not falling in with nutriment. If the root-pruning is renewed at short periods, it may render this state more permanent; but if great doses of manure are given, it will lessen the effect; and if the trees are neglected to be cut back periodically, they will ultimately get much more luxuriant than under the ordinary process of management. To keep the borders poor, but healthy, sweet, and well pulverised, and dry by draining and elevating the plants on hillocks where necessary, is best. A moderate degree of extension will suffice for the plants coming to a fruitful condition, and there will be less need to resort to the trouble of root-pruning.

"832. *Stirring the soil.*" Much of the benefit of stirring ground depends on its being stirred in proper weather. Dry weather, when the soil is between the wet and dry, and this weather likely to continue a day or two, is the best time; and the mechanical texture of the soil should be such as to allow it to break pretty freely into small pieces, and retain that form when dried, so as not to fall down too easily into a powdery mass.

"833. *Manuring.*" Liquid manures and top-dressings should be applied in showery weather. It is a loss to have them on the surface, but they do most good, especially the volatile kinds, to growing crops; when they are applied before the crop is put in, they should be pointed in with the spade or rake, or harrowed into the soil in the fields.

"863. *Selection of seedlings,*" *&c.* When it is wished to see the fruit of young seedlings, without waiting till the plant comes to maturity, it may be effected by inserting a bud into the extremity of one of the branches of a wall-tree of the same species, in full bearing, and clearing away most of the other blossoms around to give it a fair trial.

"868. *The production of double flowers.*" The common single daisy, when brought from the fields, and planted in a rich soil in the garden, becomes double. I have seen even the diminutive Sagìna procúmbens become double by cultivation. The improvement on single dahlias from cultivation in rich soil is of recent date. When any of these is neglected, as when the double-daisy edging is allowed to stand long and exhaust the soil, it gets single; and the want of cultivation causing double dahlias and other flowers to assume the

single state may be seen every season. An old root of a dahlia allowed to stand on the same piece of ground, without manuring, and to accumulate a number of stems, seldom produces full flowers. Mr. Munro's is an instance in point; but it is not two kinds of sap, but a more highly organised state, and a crude unelaborated state, of the same sap. When the quantity of sap is great, as in young and vigorous plants, flowers are seldom at all produced, till the process of growing, by extending the system of leaves and branches, has produced the proper balance. The plant, which formerly had more sap than its chemical and vital powers could elaborate into the highly organised state required for producing fruit, having now acquired more strength, becomes fruitful; and, exhausted by its fruit-bearing, generally continues fertile, unless deluged again with too much food, in the shape of manure. Such plants as fruit-trees in which the fruiting state, or state of maturity, is brought about with difficulty, at a lengthened period of years, are seldom found to produce double flowers. In those plants, however, in which the flowering state is produced annually, double flowers are more frequent. The different parts of the flower also differ as to the state of organisation in the food required to feed them. Calyx, corolla, stamens, and pistils, are only more highly organised states of leaves, or what would have been leaves; and each, in the order they are mentioned, continues to be more highly organised than the preceding. In the ordinary mature state of the plant, with a sufficiency of properly organised food, the germs of these parts of the flower will be produced in the normal manner; but if an over-supply of food, or of water to carry the food to the absorbent vessels of the root, should ensue, the condition of the food may be altered; from a highly organised condition it may be lowered nearer to the comparatively crude state required for leaves. In this state it is obvious that the germs which would have started in the form of pistils and stamens may be lowered, for want of proper food, to the inferior condition of petals, or even of leaves. When the branch is highly gorged with unelaborated sap, the pistil may even again assume the state of a terminal bud, and lead away a young shoot from the centre of the flower, as is often seen to be the case in roses and other flowers. The above appears to be the theory of double flowers most consonant to experience, it matters not whose it may be; and it agrees with all observation, that luxuriant supply of food is the cause of this monstrosity. It is also apparent, that, the farther we reduce the supply of food, it will be the more easy again to gorge the plant which has been starved, and produce monstrosity. If the seed has an extra vigour of itself, it may produce so large an absorbent system of roots as may enable it, in a rich state of the soil, to gorge the flower and produce monstrosity, from an ordinary state of the plant. It will be found, however, more easy in practice to gorge a stinted plant than to luxuriate the ordinary state of one; and hence the most successful cultivators of double stocks are those who grow them first in a starved condition, and then luxuriate them in a very rich soil; or stint the plant by keeping the seed for some years, provided it is only strong enough to grow. I have seen seed, kept till it was thought to be too old for growing, produce almost every plant with double flowers; while the very same seed, a few years before, had rarely a double flower among the lot. This will be found a more easy method than to produce the same effect by extra-vigorous seeds, and is that most adopted in practice.

"869. *Duration of varieties.*" In beds of ranunculus flowers, it is easy to pick out the varieties recently raised from seed, from the older varieties, by the greater vigour of the plant. The older varieties of the dahlia, whether from neglect or decay, are not so vigorous as they were at coming out. It is the case with newly raised seedling carnations, and flowers in general. The Lancashire gooseberries are never found to maintain the weights they had originally, when a few years from seed and the plant at maturity. Seedling potatoes have the leaves much more pulpy and vigorous than the old varieties. It is evident that circumstances will affect these, and that sometimes, from better soil, shelter, manure, &c., the case may be changed, and the older

varieties may sometimes be most vigorous; but in general it will be found the rule holds good, that the newest-raised seedlings possess most vigour.

"911. *Culture of the soil.*" Whatever mode of stirring the surface be adopted, every facility should be given to the admission of atmospheric air, heat, and moisture, and the bottom made as dry as possible by draining. The great quantities of manure given to border crops of vegetables furnish perhaps the most fruitful source of sponginess in the wood.

"914. *The potato when grown in a garden is seldom found so mealy and high-flavoured as when grown in a field, &c.*" The land in gardens is generally too rich for potatoes to be well ripened and dry; more tubers are produced of a large size, than the leaves and light are able to ripen and fill with starch.

"1168. *The mode of bearing, pruning, and training of the pear.*" If the system of training noticed in this section, or something like it, were more generally practised, there would be less need to complain of breast-wood. On standard trees there is no occasion to go through forms of pruning to produce spurs; and, if the side branches were more encouraged in wall-trees, we should have shorter shoots and natural spurs, and the tree would be kept full of young wood to the centre, from the abundance of young shoots to renew any that were getting naked. There should be greater distance between the leading shoots, and abundance of side shoots laid in to fill the wall; though they might not all be got mathematically arranged, the system of leaves and roots would be better balanced, the continual excitement to produce which causes the great abundance of breast-wood. If the greater part of them were nailed in, the tendency to produce fresh breast-wood next year would be checked, and the tree become fruitful on the small branches; better fruit would be produced; and the tree being full of young wood, any part of it could be renovated at pleasure.

"1153. *Diseases, insects, casualties, &c., of the apple.*" Canker in fruit trees, like the cancer in the human body, appears to be owing to a diseased state of the sap or blood, producing morbid concretions, of an inferior degree of organisation to the tissue by which they are surrounded, which they live on, and destroy, like parasites, till vitality is arrested. Plants being a congeries of separate distinct beings, which have each an independent existence of themselves, may be more easily renovated by amputation and removal of the exciting causes; but in these, also, the sap is affected, as it breaks out in ulcerous morbid sores often, when to all appearance removed. Willdenow characterises it as produced by an acrid corroding gum, caused by the acid fermentation of excess of sap from low-lying damp gardens. Others have thought it to be of a fungoid nature, propagating itself as above stated, and living on the healthy tissue, which it disorders and destroys. It is evidently aggravated, if not produced, by a bad climate, and removed by a good one; as trees that are very apt to canker in the open ground are generally free of it on good walls. It is also produced by a too rich damp state of the soil, as it is often removed by remedying this, and laying the ground dry and sweet about the roots. It is also constitutional; as some sorts are liable to be hurt, while others, in the same circumstances, appear not susceptible. Climate, and food, and constitution will, therefore, all require to be attended to in guarding against this pernicious evil. Amputation, and cutting away all the diseased portion, should be resorted to on its first appearance; a neglected wound may even bring on this morbid condition of the tissue. Vitality requires to be kept continually in action, especially during the active period of growth; if a stagnation is brought about by cold weather, it may form a favourable state for the developement and growth of the parasitical morbid cancerous state of the tissue. If food is in excess, or any particular portion of the food, it may thus become deleterious, (most minerals found in the soil are needed in smaller or larger quantities, it is only excess that renders them deleterious,) and the vitality of the tree may not be able to correct it, till, by accumulation, it forms a diseased cancerous state of the tissue: the more weak and languid the constitution, the more apt it will be to succumb,

and the more necessary will be the stimulus of heat to enable it to overcome, The exudation of gum in stone fruit is unattended, to the same extent, with the cancerous morbid state of parts exhibited by the apple and pear; but the disease appears to exist also in the sap, and to be ramified through the branches, in the same way as canker, as may be often seen on cutting in to arrive at its source. The small unripened shoots appear most liable, as being most tender. The bark and alburnum appear first to be infected in these young shoots, especially in the peach; the young wood of which, being delicate from want of ripening, appears unable to stand the severity of spring, gets discoloured in blotches, and gum begins to exude. It would appear here that the disease arises from imperfectly ripened tissue getting injured by severity of the weather, and affording a nidus for it. In other cases, however, the gum begins to exude from parts to all appearance sound and perfect, as if caused by a plethoric diseased state of the sap. It is probable that, as in the cancer in the human body, which may be brought on from a wound neglected or a diseased state of the blood or constitution, so likewise, in plants, the same disease may be brought about by different causes; as in the analogous fungoid disease of mildew on the leaves, which, it appears, may be brought on by excess of moisture or excess of drought, producing a diseased state of the stomata of the leaf, and a nidus for the fungus.—*Sept.* 21. 1842.

Art. IV. *Queries and Answers.*

Growing the Pine-Apple without Bottom Heat. (p. 432.)—In answer to your correspondent "A Subscriber, Winton," relative to growing the pine-apple without tan or other fermenting material, I beg leave to state that I lived gardener to the late Mr. Knight, when he first commenced that mode of growing pines; but that, from a temporary illness, my doctor advised a change of air, which prevented me then from carrying it out. The soil we chose was from a river-side pasture. The house was well flued, but had no pits for plunging or receiving the plants, so that the pots stood isolated. I found, as in the management of all heated houses for cultivation, that a steady governance of the fires was essential; and at the approach of a hot sunny day they were allowed to subside, and rekindled again in time to keep up a proper heat as the sun's influence subsided in the evening, &c. A due regard to ventilation, to counteract the influence of the sun on the glass, is also essential; and I prefer houses so constructed as to afford ventilation from all parts of the roof, as it prevents plants of all kinds from being what is commonly called drawn. The pits now used with hot-water pipes, a portion of which runs in gutters under the pits, afford a ready means of heating; and, if rightly applied, of bringing the fruit to perfection. If I can render your correspondent any further service, I shall be happy to hear from him.—*F. Torbron.* 3. *Charles Place, Kensington Square, Kensington.*

Physospérmum cornubiénse Dec. (*Ligústicum cornubiénse* L.) — This rare and very local plant has never been found in any other part of Britain than about Bodmin, though it is said to be not unfrequent in the South of Europe and in Greece. Dr. Withering says that cattle are so fond of the plant, that they eat it down to the ground whenever they can get at it; so that it is usually found only in places where it is so protected by thorns and briars as to be inaccessible to them. (*Baxter's British Flowering Plants*, 475.) Would this not be a desirable plant to sow along with clover and grasses in artificial pastures?—*D. B. Brighton, August* 3. 1842.

THE

GARDENER'S MAGAZINE,

NOVEMBER, 1842.

ORIGINAL COMMUNICATIONS.

Art. I. *Notices of some Gardens and Country Seats in Somersetshire, Devonshire, and Part of Cornwall.* By the Conductor.

(*Continued from* p. 494.)

Sept. 6.—Cowley House; Mrs. Wells. We find by a letter from the gardener, Mr. Griffin, that in our previous account of this place, we made some mistakes and omissions, occasioned by the memorandum-book in which we had made our notes being unfortunately lost on our return to Exeter. The principal mistake we made was calling the rivers which join in Mrs. Wells's grounds the Exe and the Culm, whereas it should have been the Exe and the Creedy. The conservatory has four sashes in the roof which open, instead of one or two, as we had stated; and the gardener has only won prizes at Exeter and Plymouth, and has never exhibited in London. We should also have noticed that Mrs. Wells, who is a zealous patroness of gardening, purchases all the rarest and most valuable house plants that can be obtained, so that the collection of hothouse and greenhouse plants at Cowley is one of the finest in the county. Of this we had additional proof, when we attended one of the Exeter Horticultural shows, on our return to that city, Sept. 23d (reported in *Gard. Chron.* October 15. 1842), and saw how much of the display there, which was splendid for the season, depended on the plants from Cowley House. We have mentioned house plants as being those in which Cowley House is particularly rich; but there are also in the shrubberies a great many of the choicest trees and shrubs, some of them fine specimens, the names and dimensions of which we took down at the time, as we did of many of the house plants. Having lost all these memorandums, we have written to the gardener, Mr. Griffin, for an enumeration of such articles as he pointed out to us, and of which he thought we took notes, and this enumeration we now give.

"The collection of orchidaceous plants is very extensive, containing many superb specimens, particularly Cattlè*ya* críspa, C. Harrison*iàna*, Oncídium altíssimum, O. píctum, Dendròbium Calceolària, D. cæruléscens, and Peristèria elàta (the dove plant); among the more rare sorts are, *Vánda* tères, V. Roxbúrgh*ii*, Saccolàbium guttàtum, Huntlè*ya* violàcea, Oncídium Cavendish*iànum*, Cattlè*ya* labiàta, C. Skínner*i*, and Burlingtòn*ia* rígida, &c. Amongst the stove plants are good specimens of *Pavétta* cáffra, *P.* angustifòlia, Stephanòtus floribúndus, Gésner*a* zebrìna and díscolor, Achimènes longiflòra, *Limònia* spectábilis, and a very fine plant of the beautiful little Cephalòtus folliculàris, or New Holland pitcher plant. There are good specimens of several choice and rare greenhouse plants, such as *S*tátice Díckson*i*, Boròn*ia* *a*nemonefòlia, B. vimínea, Pimelèa spectábilis, Acrophýllum venòsum, and a very large plant of *E*lichrỳsum prolíferum. The heaths are remarkably fine, as will be seen from the following dimensions: *E*rìca refléxa álba, 6 ft. high and 8 ft. in circumference; *E.* ampullàcea, 4 ft. high and 8 ft. in circumference; *E.* transpàrens, 5 ft. high and 9 ft. in circumference; good specimens of *E.* depréssa, *E.* Másson*i*, *E.* Irby*àna*, *E.* aristàta álba, *E.* inflàta álba, *E.* trícolor, and *E.* trícolor coronàta. In the conservatory are some very fine camellias, one plant of the double white having 2000 flower buds on it; fine plants of C. j. Chándler*i*, C. j. pectinàta, C. j. imbricàta, C. j. Fórd*ii*, C. j. Colvíll*i*, C. reticulàta, &c. The orange and lemon trees are very good plants and laden with fruit. The collections of geraniums, dahlias, carnations, &c., include nearly all the newest sorts in cultivation. The pines are remarkably strong and clean. At the exhibition in Exeter, on Sept. 23., four queens were shown from Cowley, the smallest of which weighed 3 lb. 4 oz.; they were grown in a house heated by Corbett's open trough system, which answers admirably." — *J. G.*

With respect to culture, we were gratified by the healthy vigorous appearance of the camellias and orange trees in the conservatory, with their stems coming up through the Portland stone pavement; with the manner in which the heaths and New Holland plants were grown in rough, turfy, unsifted soil mixed with broken stones and pebbles, in Mr. Barnes's manner, hereafter described, with a somewhat similar manner of growing the *O*rchídeæ; and in particular with the very neat and effective manner in which the heaths and New Holland plants, and indeed all house plants of a shrubby kind, were tied by slender threads or copper wires into handsome shapes, conical, globular, domical, umbrella-like, or in some other modification or segment of a sphere or hemisphere.

With respect to the place generally, it was certainly, as we have stated, in excellent order; but, notwithstanding this, the open garden department was by no means in such high keeping as the plant houses. There was not, for example, the same proportion of care bestowed on the beds of the flower-garden, to keep all the ground covered, and yet all the plants within proper bounds; to remove all the decayed flowers, and all the seeds and fruits that are not naturally ornamental; to tie straggling plants into shape; to prune and thin the branches of individual plants so as to insure an even distribution of blossom buds; to thin out groups, beds, and strips, so as not to allow common shrubs or other plants to injure the more rare ones; and not to allow any plant standing in dug soil, and consequently coming under the character of gardenesque, to touch another plant, at the same time keeping it just about to touch. We have said that the edges of the walks are kept low, and so they are generally; but we pointed out on the spot some deficiencies in this respect. The order and keeping of the kitchen-garden were defective in several points. We would have blanks filled up in kitchen crops, as well as in flower beds, and the edgings to the walks kept as perfect in the one department as in the other. We have mentioned these things to show that, if, in our former notice of Cowley House, we omitted to point out some of its beauties, we were also equally culpable as to its faults; these, indeed, are exceedingly few, and such is our opinion of the gardener, Mr. Griffin, that we know they need only be pointed out to him to be corrected.

Sept. 7.—*Mamhead;* Sir Robert Newman, Bart. We omitted in our former notice to mention the name of the gardener, Mr. Willis, an excellent cultivator, as the state of his fruit trees testifies, and one of the earliest correspondents of the *Gardener's Magazine.* We ought also to have noticed a number of fine standard magnolias on a terrace-bank in front of the hothouses in the kitchen-garden. The trees are upwards of 20 ft. high, and with heads from 20 ft. to 30 ft. in diameter. Like all the other old standard magnolias which we have seen in Devonshire, they would be greatly improved by having all the weak straggling branches thinned out. The same power of roots remaining, there would be great additional strength thrown into the remaining branches by this thinning; and hence a greater number of flowers, and more vigorous young shoots, would be produced. We have already mentioned the portcullis being in good repair, as contributing to destroy the illusion of an old castle applied to modern purposes; but, if we had taken time to develope the idea properly, we ought to have objected to the new and fresh appearance of the walls and towers, and, indeed, of

the whole of this imitation of an old castle; and said that it would have been more effective in realising the proposed effect, if built in imitation of a castle in ruins. We may add that it might be partially ruined now, or, which would be the best improvement, covered with ivy. We intended to visit this place a second time on our return from Plymouth, in order to correct or confirm our first impressions, as, from the unfavourable state of the weather, we did not see the place so thoroughly as we wished, but time would not permit.

In p. 494. we have stated that we had only seen "perfect high keeping in Devonshire at Luscombe and Endsleigh:" but we had not then seen Bicton, which is as highly kept as any place we ever saw in any country; and that not only in one department, but throughout the whole.

Oxton House; J. B. Swete, Esq. The grounds are laid out with great taste by the proprietor, who is an excellent artist in landscape architecture and figures. The style of art in the grounds is picturesque throughout; the scattered trees are judiciously disposed and well grouped; and we were particularly gratified by the appearance of a piece of water, in imitation of a wild neglected lake, which we could hardly have known to be a work of art, had we not, when walking round it, with difficulty discovered the head or dam.

Powderham Castle; the Earl of Devon. The fine magnolia trees and other exotics here are sadly neglected; the branches are unpruned, the stems covered with lichens and moss, and the plants choked up in many places with the commonest trees and shrubs. The house is being altered by Mr. Fowler, a guarantee to our minds that the general effect will be simple and grand. Some walled-up banks along the approach appeared to us much too common-place for the vicinity of a castle. Had there been rocks to penetrate, as at Warwick Castle, the case would have been different; but here the walling mode seems to have been adopted as a matter of choice, or for the sake of economy. We would have brought down the ground with a gentle slope, and had 3 or 4 feet of perfectly level surface on each side of the road, which, as it is at present, has a cramped appearance. To make this subject clear, however, would require more room and time than we can at present spare.

Sept. 8. — From Exeter, by Luscombe, Dawlish, Teignmouth, and Babbicombe, to Torquay. We set out in an open carriage with elevated seats, so as to see over the high fences, which every where border the roads and lanes. The day, like almost every other while we were in Devonshire, was fine; and the country and the sea rich, varied, and altogether delightful; all the corn carried; the turnip fields covered by luxuriant leaves; the rank pastures well stocked with red oxen and sheep;

and the apple trees, which accompany every house and cottage, laden with fruit. We passed through Kenton, and other villages or groups of cottages, and saw some churches with high square towers, venerable and grand; and many cottages with cob walls, and thatched roofs. Rather too many of these and of larger dwellings had the walls whitewashed; which, though good in a moral point of view, as conveying the idea of care and cleanliness, is yet bad with reference to picturesque effect; because white spots do not harmonise with the surrounding colours, but remain for ever the same glaring objects, except during twilight and night. "In any scene where harmony prevails," says Sir Uvedale Price, "the least discordancy in colour disturbs the eye; but, if we suppose a single object of a glaring white to be introduced, the whole attention, in spite of all our efforts to the contrary, will be drawn to that one point; if many such objects be scattered about, the eye will be distracted among them. Again, to consider it in another view, when the sun breaks out in gleams, there is something that delights and surprises in seeing an object, before only visible, lighted up in splendour, and then gradually sinking into shade; but a whitened object is already lighted up; it remains so when every thing else has retired into obscurity; it still forces itself into notice, still impudently stares you in the face. An object of a sober tint, unexpectedly gilded by the sun, is like a serious countenance suddenly lighted up by a smile; a whitened object like the eternal grin of a fool."

The views of the sea, and of the scenery all along the coast, are varied and beautiful; though the houses at Teignmouth and other watering places convey more the idea of the temporary residences of visitors and invalids, than of permanent abodes. One of the handsomest newly built villas which we saw was one in the Elizabethan style by Mr. Hayward of Exeter: the situation is elevated, and the terraced gardens in front very appropriate; the entrance is from behind, as it always ought to be in such cases.

Luscombe Castle; Charles Hoare, Esq. Well known for its beauty and the high order in which every thing, even to the farm offices, is kept. The grounds are said to have been originally laid out by the late Mr. John Veitch, father of the present nurseryman of that name. The castle is placed on the side of an ascending valley, and the two sides of this narrow valley are beautifully varied by trees, which thicken into woods as they approach the summits of the two ridges, so that the house may be said to stand on the side of a valley surrounded by hanging woods. There are a number of large magnolias and other choice trees and shrubs, including the two largest plants in Eng-

land of *P*ícea cephalónica, of which the history has been given by Sir Charles Napier in our *Arboretum Britannicum*, and in a former volume of this Magazine. The finest place to be met with has some fault; and that of Luscombe is, that there is not room enough about the house. It does not stand on a sufficiently large platform; nor did there appear to us an obvious and all-powerful reason why it should be set down precisely where it is, rather than any where else. When this all-sufficient reason is not furnished by nature, art should supply the deficiency; and, therefore, Luscombe Castle ought to have been supported by terraces. Such was our general impression on the spot; but all first impressions ought to be corrected by a second inspection, and by reflection, so as to support them by reasoning. Among the trees of which we took notes were: in the kitchen-garden, an olive 12 ft. high and 8 ft. wide, after being twelve years planted; another, 13 ft. high and 10 ft. wide; both these plants have ripened fruit; Callistèmon *s*alígnus, 12 ft. high and 6 ft. wide; lemons, citrons, and limes, 12 ft. high. In the pleasure-ground, Magnòl*ia* grandiflòra, 36 ft. high; M. fuscàta, 12 ft. high; and Eriobótrya, 12 ft. high. Two trees of Edwárds*ia* were from 20 ft. to 30 ft. high, but are now cut down; there are also many plants of Magnòl*ia* grandiflòra, 30 ft. high; *P*ícea cephalónica, two plants, each 12 ft. high; *C*èdrus *Deodàra*, 12 ft. high; *P*ìnus insígnis, 8 ft. high; *P.* austràlis *syn.* palústris, 15 ft. high; many hydrangeas 6 ft. high and from 10 ft. to 20 ft. in diameter, all with red and blue flowers at the same time, which we observed to be generally the case throughout Devonshire; Araucària imbricàta, large fuchsias and myrtles, camellias, coronillas, cedar of Goa, Judas trees, catalpas, chimonanthus, and many other fine things. In the kitchen-garden, a splendid row of the belladonna lily, now in full flower throughout Devonshire.

Babbicombe; the Lord Bishop of Exeter. A very handsome Italian villa is just completed in the upper part of a small valley between two hills, with terraced gardens and suitable appendages, all in the same style; the architect, Mr. Gribble of Torquay. We have seldom seen any thing so complete; there is one walk which descends through the grounds to a secluded bay on the rocky shore, and another which ascends to a hill or piece of high open table land or downs covered with short turf, where the fresh breeze may be enjoyed, and from which extensive views are obtained. Before the entrance front of the house there is a mass of rock, which might be exposed in such a manner as to form a feature appropriate to the situation; but it has been earthed up and turfed over. Some broad margins of turf are wanted along the terrace-walls and parapets, to harmonise them with the exterior scenery; but these and other

suggestions may easily be carried into effect, if they should be approved of. We found *Scílla vérna* in flower as well as in seed on the downs, owing to the great heat of the summer and the recent rains; a circumstance which, we were afterwards informed by Mr. Gullet, the gardener at Woodbine Cottage, was not unusual.

Torquay. A delightful little sea-port and bathing-place, with cottages, villas, and lodging-houses, from the sea-shore to the summits of the rocky wooded hills with which the bay is surrounded. Some of these are in good taste, and almost all of them exhibit marks of care and design, both in the house and grounds, which, being evidence of progress, is sure to lead to good taste in the end. The grounds in several instances have been laid out and planted under the direction of Mr. Gullet, already mentioned. Mrs. Herder's inn is an excellent house, with a piano in every sitting-room, but rather a scarcity of readable books. When speaking to her on this subject, we found she belonged to a German family, and we therefore recommended to her to add Herder's *Philosophy of Man* to her library, which she politely promised to do. We believe we also recommended *Chambers's Journal*, the *Penny* and *Saturday Magazines*, and the *Athenæum.*

Woodbine Cottage; Miss Johnes. A description of this place has already appeared in our Volume for 1836, p. 26., so that little is left for us to say, except that we found it still more romantic than the description led us to expect. The whole is kept in excellent order by Mr. Gullet, who is unquestionably, not only an excellent gardener, but a man of genius as a sculptor and mechanic. To be convinced of this, it is only necessary to see the numerous figures which he has cut out in wood with his knife during the winter evenings, some of which are portraits of well known characters at Torquay; and the manner in which he has brought water from a distant hill, across a valley, and over an intervening hill, by a siphon. In the quarry covered by glass, mentioned in Vol. XII. p. 27., we found esperione grapes ripe, and of very superior flavour to the Hamburg. Not only the heat, but the soil, must have some effect in improving the flavour; for, had we not seen the leaves, and the form and close berries of the bunch, we should never have recognised the variety by the taste. A great many Cape, Australian, and Mexican plants flourish in the open air here, without any protection, in winter. The agaves are very large and fine; and *P*hórmium tènax seems a favourite here and in many other places. The Pittósporum *Tobìra* stands the winter better than the common laurel. Pelargoniums have stood out five years without any protection. Cliánthus puníceus has attained a large size; *P*hìòmis fruticòsa has acquired the character of a

little tree, and Coronílla glaùca and Medicàgo arbòrea have become large bushes. In short, there is no greenhouse plant that might not be trusted out here summer and winter. The woods in some places rise from a covering of tutsan, and in others from one of ivy; which is also introduced into dry stone walls near the bottom, and soon changes these walls into evergreen hedges. The common ash, Mr. Gullet finds, will transplant better than any other tree when of large size, and it also stands the sea breeze remarkably well. Miss Johnes, the proprietress of Torquay, is sister to the late Colonel Johnes of Hafod in Cardiganshire, a splendid place, where we had the pleasure of passing a few days professionally, so long ago as 1805. Miss Johnes is upwards of ninety years of age, and in perfect health.

Sept. 8.—*Torquay to Paington, Totness, and Kingsbridge. Tor Abbey* is principally remarkable for some fine ruins, stone coffins, large elms, and an avenue of lime trees. There is a Catholic chapel, which always commands our respect, as being characteristic of an old family and an old place. The effect of the ruins is in a great measure destroyed by the sycamores, elders, and other trees with which they are overgrown. Ivy is almost the only plant that can luxuriate among ruins without injuring their dignity. Trees may be allowed to spring out of the actual walls, because in that situation they never grow large, or, if they do, that circumstance enhances the idea of the age of the ruin; but luxuriant trees growing out of the ground, which completely cover the ruins by their branches, prevent them from being seen as a whole, and consequently from making their characteristic impression. There is here a fine old Saxon doorway, and near it a sweet bay, 30 ft. high. In the kitchen-garden, Cístus ladaníferus is upwards of 10 ft. high. The gardener, Mr. Pullinger, from Prudhoe Castle, Northumberland, is an intelligent industrious man, who reads, and who deserves a more extensive charge.

Paington. Celebrated for its cabbages, which are a coarse sort, coming nearer to the Strasburg or Scotch cabbage than any other variety, and, like it, attaining a large size on well manured loam. It cannot be recommended for the garden, unless perhaps in those of cottagers who may require it as food for cows or swine. Spoke with two of the growers, and brought away some seed (see p. 485.). A very old yew in the churchyard, with a hollow trunk filled in with brickwork.

Berry Pomeroy Castle; the Duke of Somerset. This is the ruins of what has been a lofty and widely extending castle; but it is now shorn of much of its dignity, by the duke's tenantry having, till within the last twenty years, taken away almost all the master stones of the building, such as the lintels and jambs

to the doors, windows, and fireplaces. To prevent the walls of the castle from literally tumbling down, the place of these lintels was supplied some years ago by oak beams, and that of the jambs by common rubble stonework. This gives the whole ruin a mean appearance, and destroys the idea of great age; for no building with wooden lintels can last for centuries. Another circumstance which greatly detracts from its dignity is its being overwhelmed with trees. Such, however, is the height of the walls, and of the well defined portions which occur here and there, for example the gatehouse, that, were it not for the want of the master stones, it would not be difficult to render this a grand and impressive ruin; and to restore in it one or two rooms, so as to form a habitation for a person to take care of the whole. The views from the castle must, from its elevation, be very extensive; but it is so shrouded in trees, that we can only see over the precipitous terrace walls to a deep valley, the sides and bottom of which are covered with ancient wood. Immediately within the gatehouse there is an elder tree, the branches of which are covered to their very extremity with *P*olypòdium vulgàre, giving it a very singular appearance, which we suppose would be not unlike that of the dank woods of Demerara and other places, where the trees are covered with *O*rchidàceæ. In one of the kitchens there is a common maple, which has sprung up out of the floor, and is nearly 50 ft. high; and in another kitchen there is a large fireplace, with an oven on one side, and a niche for the turnspit to sit in on the other. Such a tree as this maple might remain, provided the floor were cleared out so far as to show distinctly that it was a floor; but almost all the other trees we would remove, together with as much of the soil and rubbish as would allow us to recognise what the castle had been, the height of the walls in some places, the dimensions of the rooms and their uses in others, and if possible the situation of the staircases; for the stone steps have been generally removed. From these hints may be derived a knowledge of the principle on which ruins in actual scenery are to be treated, viz. that of showing, by what exists, what has been. To show the height of walls, clear away the rubbish, in some places, to their very base; to show lateral extent, uncover or indicate such fragments of foundations as may have belonged to the building when in a perfect state; to show the sizes of the rooms, clear out their floors; and, to show the whole group of ruins at a distance, remove such of the surrounding trees as may be necessary for that purpose.

Sharpham; —— Durant, Esq. The road from Totness to Sharpham is a crooked narrow lane between high banks, in which two carriages can with difficulty pass. If widened and carried along an improved line, which might be almost on a

perfect level, it would be one of the loveliest drives in the world, from the abundance of wood and the great beauty of the valley of the Dart, the water of which expands so as to resemble a winding lake. The narrow lane alluded to is two or three miles in length; and the approach road, after leaving the lodge, extends upwards of a mile. We passed many fine old trees, and among others the most magnificent Cornish elm that we ever beheld. By a rude measurement, we found the trunk to be 15 ft. in diameter; the diameter of the space covered by the branches to be 136 ft.; and the height 80 ft. The house is very well placed on a projecting platform, which forms, as it were, the corner between the valley of the Dart and another valley, which may be called that of Sharpham. Here the "sufficient reason" for choosing the situation is obvious at a glance. There is much natural beauty at this place, and many fine woods and trees; but it is in a state of sad neglect, nothing having been done to it for several years. It appears, indeed, never to have been completed; for the walls of the kitchen-garden have not been built, and there are the rafters of a vinery, under which vines are trained, but for which, we were informed, the sashes were never made. The feeling of melancholy which such a place as this produces is so mixed up with misery, that it affords no pleasure; whereas, an old neglected place, where there is no evidence of the neglect being the result of want of means, fills the mind with a feeling of veneration and respect, as well as sadness. A young or new place in a state of neglect or disorder affords an example of melancholy and misery; while an old full-grown place, uninhabited, in which nothing seems to be doing but keeping the place in tolerable order, is an example of melancholy and grandeur. To remove the idea of hopeless melancholy from an old place, there ought to be signs of life and improvement, if it were nothing more than the planting here and there of young trees where the old ones have been cut down. An old place, with nothing but old trees, leaves the mind without hope. There is nothing to look forward to but their decay; but an old place, with both old and young trees, more especially if it has been long in possession of the same family, and that family have children, is, we think, better calculated to give a feeling of perpetual existence to the proprietor for the time being, than any other state of things that we can conceive, unless it be that of a hereditary sovereign. One of the finest things at Sharpham is a broad walk from the house, along the side of a steep valley, to the head of that valley, where it crosses over by the gardener's cottage to a similar walk on the opposite side; the walk all the while winding much in direction, but being always nearly on a level. We were informed that it is continued through the woods towards the sea, exhibiting many fine views of the Dart and its opposite banks.

Notwithstanding the wretched state in which this place was, we noticed in a flower-garden near the house very large plants of Clianthus puníceus and fuchsias; Bouvárd*ia* triphýlla, 4 ft. high, and forming a large bush; rosemary, 6 ft. and 8 ft. high, forming most beautiful bushes; large magnolias of different kinds; and a bed of broad-leaved myrtles pegged down, so as to cover the entire bed with their white flowers. Among the trees and shrubs, along the walk before mentioned, were, a straight erect arbor-vitæ, upwards of 30 ft. high, with a clear trunk 1 ft. in diameter; immense rhododendrons, azaleas, and laurustinus; and a black spruce, 50 ft. high, feathered to the ground, its lowest branches rooted in the soil, and their points forming a circle of young trees ranged round their parent.

Sharpham to Kingsbridge. We went by very bad parish roads, crossed by innumerable other roads, or rather narrow lanes, equally bad, without a single guide-post any where; and with so few houses, or people at work to enquire of, that it was with the greatest difficulty we found our way to Kingsbridge.

Sept. 9.—Kingsbridge to Combe Royal, and by the Moult, Woodville, Salcombe, and Marlborough, to Modbury. In the garden of the inn at Kingsbridge is a large lemon tree, protected by glass during winter, but without fire-heat, which supplies lemons enough for the use of the inn. The horse-keeper is the gardener, and, being fond of that business, has the garden in excellent order. A few books are to be found in the inn, but nothing to what there ought to be; no county histories or local topography.

Combe Royal; John Luscombe, Esq. This place has been long celebrated for its orange and lemon trees, of which an account has appeared in our Volume for 1834, p. 36. We found the trees in the highest order, and covered with abundance of beautiful fruit. There are also excellent collections of all the hardy fruits, and a great many of the more rare and valuable trees and shrubs. All the *C*itrus tribe are here propagated by cuttings of the young wood, taken off in spring, and cut across at a joint where the wood is beginning to ripen. These are planted in sand, with little or no loam, in a pot prepared as follows: the pot is nearly half-filled with drainage, over which is placed a piece of flat stone fitted to the sides, so as barely to let the water through to the drainage; on this a little sand is put, and the cuttings are then planted in such a manner that the lower end of each cutting is in close contact with the surface of the smooth stone. The pot is then filled up with sand, and placed in gentle heat in a frame, or covered with a hand-glass. With the usual treatment as to water, shading, &c., they root and are fit to transplant in about six weeks. The use of bringing the lower end of the cutting in close contact with the smooth

stone, the gardener thinks, or has been told, is to exclude the air from the pith. Planted in sand well drained, without a flat stone, they do not root nearly so soon, and some of them not at all. We should be inclined to think that the chief use of the stone was to prevent the sand from being washed through the drainage, so as to leave the lower end of the cutting loose; since nothing contributes more to the striking of a cutting, or of a newly transplanted seedling plant, than pressing the soil firmly to its lower extremity. Perhaps this very pressure may operate by excluding the air, and causing those exudations to granulate and form spongioles, which would otherwise be dissipated in or absorbed by the loose soil; and, if so, the gardener (whose name we neglected to take down) is right.

The Moult; —— Jackson, Esq. The house and grounds occupy a narrow sloping strip of land at the base of a steep descent, on a rocky shore, 20 or 30 feet above high-water mark. The climate is considered to be the mildest in England, Salcombe Bay being the most southerly bay in the island. The ground is varied by terraces, and enriched by numerous plants grown elsewhere in greenhouses. On the rocks the samphire luxuriates, and in the sandy places the sea-beet. From the steep rising ground behind, a protruding rocky point on one side, the sea in front, and the continual noise of the breakers against the rocks, there is a peculiar mixture of solitariness and wildness about this place, which we have not found any where else, and with which we were much delighted. It was in good order, with abundance of oranges, lemons, and peaches on the wall trees. Among the plants we noted Aloý*sia* 8 ft., Eucalýptus 15 ft., and *A*càcia dealbàta 20 ft. high; Medicàgo arbòrea, 6 ft. high; *Verónica* decussàta, 3 ft. high; a flower stem of Agàve americàna, 27 ft. long, the remains of a plant which had flowered after being thirty years in the open ground without protection. The leaves of some agaves which had not yet flowered were 6 and 7 ft. long. Richárd*ia* æthiópica is here quite hardy, and ripens seeds.

Woodville; Mrs. Walker. Similarly situated to the Moult, except that the strip of pleasure-ground is broader, and fronts an arm of the sea, looking across to rising grounds and to Salcombe Castle, a ruined fort. There are several walls 10 ft. high covered with orange and lemon trees, which require very little protection, and this is given by reed mats or boards, without the aid of artificial heat. Here, as at the Moult, and as at an adjoining place belonging to Mrs. Prideaux, it is chiefly the older greenhouse plants that have been planted out, with the exception of the new fuchsias. The agave flowers freely every thirty years, and Medicàgo arbòrea, Coronílla glaúca, Edwárds*ia* macrophýlla and microphýlla, Pittósporum *Tobìra*, the myrtle, the olive, and similar plants, have attained a large size.

There are a great many plants of the New Zealand flax at Woodville, which would appear to have been planted with a view to use. The keeping was good, but, we should say, not founded on principle; because in some places, where accident had washed away the gravel from the edges of the walks, it was not supplied, and the edges consequently were left high and raw. The wall-trees, both here and at the Moult, were admirably managed. Neither here nor at the Moult had the gardeners ever heard of our name or of any of our works, or of any of the gardening newspapers. We took memorandums of an agave twenty-two years old, with leaves 7 ft. long; a metrosideros, 10 ft. high; myrtles, 10 ft. high; *P*hórmium tènax, 6 ft. high, which, after being twelve years planted, has flowered; olives as standards, and one in the stable-yard upwards of 20 ft. high; a splendid bush of rosemary, 7 ft. high; one of the oranges with a stem 18 in. round at a foot from the ground, and another 12 in. The walls here, at the Moult, at Mrs. Prideaux's, and Lord Kinsale's adjoining, are chiefly of stone.

Salcombe; Mrs. Prideaux. There is an agave here coming into flower with four stems. Every one of the leaves has been injured at the points, and most of them along the edges; but, whether this was done by accident or by design to throw the plant into flower, we could not ascertain, the gardener not being at home.

Sept. 10.—*Modbury to Fleet House, Kitley, Saltram, and Plymouth.* Modbury is an ancient town of considerable size, without either a good inn or a bookseller's shop. We were informed that there was a subscription library for the better class; but we did not see the slightest evidence of intelligence or intellectual enjoyment among the mass.

Fleet House; J. Bulteel, Esq. The house is of considerable antiquity and well placed, and it is undergoing great improvement under the immediate direction of the proprietor, who is his own architect, and is, perhaps, one of the cleverest amateur artists in England. He is not only a painter, but a modeller and sculptor. The doorways and fireplaces of the house had been originally of granite, with torus mouldings in a style peculiar, as it appeared to us, to those parts of Devonshire where granite was used as the master stone-work of buildings. These granite door-cases and chimney-pieces had in this house, as in Monadon House which we saw in the neighbourhood of Plymouth, been covered over with plaster, we suppose to give the house a more modern air; but Mr. Bulteel has removed all this, and is restoring these leading features to their original grandeur and simplicity. The ultimate effect will be unique. There are some large rooms admirably managed both in their finishing and furniture, and a long picture gallery, with a number of curious and valuable

statues and pictures. Little or nothing has yet been done to the grounds; but they possess remarkably fine features, which will, doubtless, be taken advantage of. We learned here from Mr. Bulteel that the best apple for cider is called the white-sour; and also that the custom mentioned in our *Arboretum* still exists, of addressing the apple trees at a particular season, but with some additions as follows, the additions being in italic:—

> "Here's to thee, old apple tree,
> Whence thou mayst bud, and whence thou mayst blow;
> And whence thou mayst bear apples enow.
> Hats full! caps full!
> Bushel—bushel—sacks full!
> And my pockets full too!
> *If thee does not bear either apple or corn,*
> *We'll down with thy top, and up with a horn.*"
>
> [Here the farmer shoots at the tree.

Mr. Bulteel informed us that this practice is still continued by some persons; and that a few years ago a farmer, who was in the habit of going through the ridiculous ceremony, was cited before the ecclesiastical court for witchcraft; and that, before he could disentangle himself from the net in which he had inadvertently been caught, it required a considerable outlay both of time and money.

Kitley; E. P. Bastard, Esq.; at present in the occupation of Lord Seaton. This is an extensive and well-wooded place, with a fine expanse of water. The house has recently been improved in the old English style by George Repton, Esq.; and the flower-garden, Lord Seaton informed us, is from a design volunteered by Chantrey, while he was on a visit to the late Mr. Bastard. The drive round the park is remarkably fine, both from its trees and from its views. Beautiful views of the salt-water lake and estuary are obtained in some places, and of the open sea in others. In one part of the drive, where it passes through old quarries, the ground, the road, and the larches have been so arranged as to remind us of Switzerland; and, in other low damp places, the continuity of spruce firs of different ages recalls to mind the forests of this tree between Memel and Konigsburg. We went to the kitchen-garden to see the Kitley shaddock; but Mr. Saunders was not at home, and we could only guess at which was the plant which yielded the fruit sent to us in 1826, the first year of the *Gardener's Magazine.* In the drive we noticed a common laurel with a straight erect stem, 50 ft. high, and the stem 18 in. in diameter.

Saltram; Earl of Morley. The park is very extensive and judiciously planted, and in the kitchen-garden are some good orange trees against the walls; and myrtles, magnolias, acacias, &c., as standards. The park was planted and the roads laid

out, we were informed, by the late Mr. David Smith, who was the late Lord Morley's gardener for thirty-five years, and was considered one of the best gardeners of his time. He died a few months ago; and we should be glad if his widow, or some of his friends, would enable us to pay a better tribute to his memory.

Sept. 11. to 13.—*Plymouth.* Through the unwearied attention and kindness of Mr. Pontey, we were enabled while here to see a great deal in a short time; but we shall only notice nurseries and gentlemen's seats.

Athenæum Cottage; Mrs. Foulstone. This place, which does not occupy much above an acre, was created by the late John Foulstone, Esq., architect, who has displayed in it very great skill and taste in landscape-gardening, no less than in his own art. The ground is a narrow strip by the road-side, extending from the bottom to the top of a hill. Across the bottom runs the stream of water which supplies Plymouth. The house is placed half-way up the hill; the kitchen-garden occupies the upper part of the strip, and the pleasure-ground the lower; the view from the drawingroom terminating in a cascade formed by the stream. The skill of the artist is chiefly displayed in managing the side scenes, so as to vary the boundary of the narrow glade of turf which leads the eye down the slope to the cascade. This is done with so much taste and judgement, that, if we can, we shall on some future occasion illustrate it by a ground plan. Unfortunately, Mrs. Foulstone was not at home.

Mr. Pontey's Nurseries. The larger nursery which is two miles from Plymouth, at Vinstone, is of considerable extent. It contains an arboretum arranged according to the Natural System, in examining which, and in correcting the names, we spent half a day. We were agreeably surprised to find so extensive a collection of trees and shrubs, and we strongly recommended Mr. Pontey to increase it by procuring additional species from the Fulham Nursery, where the plants are all correctly named, or by getting cuttings from the Horticultural Society's garden. We also recommended him, as we would every other nurseryman and private gentleman who is an F. H. S., or has a friend who is one, whenever there is the slightest doubt about the name of a tree or shrub, to send a specimen of it in a letter to Mr. Gordon, the superintendent of the tree and shrub department in the Horticultural Society's garden. The first step towards the knowledge of things is to know their names, and nothing would contribute more to spread a taste for trees and shrubs among country gentlemen, than to have correct names put to the more choice kinds which they already possess. The mere naming of any plant creates an interest in it in the spectator, which leads him to enquire about it, to notice the plant when he meets with it

elsewhere, or even when he sees something like it in other gardens. Thus, step by step, a person who would never have noticed a tree if he had not seen it named, becomes an amateur of trees and shrubs, than which no objects, scarcely even architectural ones, form more beautiful or permanent ornaments to a country residence, and to the general aspect of the land. Next to agriculture, therefore, a taste for planting and landscape-gardening is the most to be desired in a country gentleman; for, while he is improving and ornamenting his own estate, he is at the same time beautifying and enriching his country. All nurserymen who plant arboretums are aiding in infusing a taste in country gentlemen for trees and shrubs, and hence they well merit the general thanks of the public.

Every nurseryman, when he sends out trees and shrubs which are not quite common, ought to send out along with them properly prepared names to be nailed to wooden pegs or stakes. This may either be done by having the names stamped with type on plates of lead as practised by Messrs. Whitley and Osborn, and for which they charge only 12*s*. per hundred, as mentioned in our Volume for 1841, p. 584.; or by writing the names with prepared ink, as practised by Mr. Rivers of the Sawbridgeworth Nursery. These labels, Mr. Rivers informs us, will last at least 10 years; but we shall have more to say on this subject in our next Number.

At the Vinstone Nursery resides Mr. Pontey, senior, a most intelligent and intellectual gentleman, young in mind and activity, though above eighty years of age. He pointed out many things to us, and told us many anecdotes. His chief amusement is reading history. He noticed to us the intense bitter of the leaves of *V*ibúrnum *p*runifòlium, and gave us the history of several varieties of trees which will be spoken of hereafter.

In Mr. Pontey's Plymouth Nursery, there is a straight walk from the entrance, the longest of the kind we recollect to have seen; Mr. Pontey says it is upwards of a quarter of a mile. On each side there is a border with specimens of the more showy or rare trees and shrubs. Among these we noticed good specimens of a variety with very large leaves raised from seed of *P*ỳrus *S*órbus vestìta; *P. A*`ria fr. lùteo with large yellow fruit; fine specimens of the different varieties of *P. a*rbutifòlia, P. spùria, and *P. A*`ria græ`ca; Cotoneáster acuminàta, frígida, and affìnis; *Bérberis* umbellàta a new species, and Deeríng*ia* índica, with many others. Against the gable end of a house, the Isabella grape was covered with bunches of its fine black fruit nearly ripe. Among many plants in the houses, we observed a good stock of a new tropæolum, supposed to be T. azùreum; of two new sorts of yuccas, one with narrow leaves from 5 ft. to 6 ft. long, and the other with broader leaves, said to grow from

6 ft. to 8 ft. long. There are a great many other greenhouse and hothouse plants, including Daubentòn*ia* Tripet*iàna*, heaths, pelargoniums (of which Mr. Pontey has four new sorts, for which he asks from a guinea and a half to three guineas each), *C*ácti, bulbs, and *O*rchídeæ, Mr. Pontey having lately received large collections of these from South America and the Cape. In a word, we found nothing wanting that is to be expected in a complete nursery. The grounds are exceedingly well laid out, and remind us of the Edinburgh nurseries, as do those of Messrs. Lucombe and Pince, and Messrs. Veitch, of Exeter; and, like them, they are kept in excellent order. The houses are all heated by Corbet's open gutters, which Mr. Pontey, as well as Mr. Pince, and all other nurserymen and gardeners that we have seen who have tried it, agree in most strongly recommending.

In Mr. Pontey's town nursery there is a pear orchard, consisting of an extensive collection of trees grafted on quince stocks, and trained pyramidally. Mr. Pontey informs us that he found only about a dozen kinds of pears that would grow well on quinces when grafted direct on that stock, but that he accomplished his object by first grafting a sort that took freely, and then grafting the plant so produced with any other sort that would not grow on the quince. In this way, by great labour during a number of years, he has got most of the following kinds to grow vigorously and bear abundantly:—

List of Pears on Quince Stocks grown in the pyramidal Form, 4½ ft. apart, and now (1842) 7 *ft. high, in Mr. Pontey's Plymouth Nursery.*

Ambrosia
Ananas d'E'té
d'Hiver
Belle de Jersey
Belmont
Bequêne musqué
Bergamot, Autumn
York
Summer
Wormsley
Hollande
Royal
Gansell's
Boyle Farm Wilding
Buchanan's new or Spring Beurré
Bergamotte Cadette
Beurré de Ranz
Easter
Brown
d'Amalis
de Capiaumont
Diel
D'Argenson
Du Roi
D'Aremberg
Romain
Spence
Bezi d'Héri
de la Motte
Vaet
Bishop's Thumb
Bon Chrétien Musqué d'Automne
Winter
d'Espagne
Fondant
Summer
Caillot Rosat
Crassané, Winter
Knight's
Althorp
Cadillac
Colmar d'Auch
Passe
Citron des Carmes panaché
Chaumontel
New London

Comte de Lamy
Calebasse
Crown
Doyenné Gris
Blanc
Duchesse d'Angoulême
Duc de Berri
Double de Guerre
Dunmore
Délices d'Hiver
Eastnor Castle
Elton
E'pine d'E'té
Excellent d'Espagne
Figue de Naples
Flemish Beauty
Forelle
Franc-Réal d'Hiver
d'E'té
Grande Brétagne dorée
Glout Morceau
Green Pear of Yair
Gracioli
Hacon's Incomparable
Hessel
Henri Quatre
Jargonelle
Joséphine
Knivett's Seedling
Louise Bonne
of Jersey
Marie Louise
Monarch
Napoléon
Nelis d'Hiver
Ne plus Meuris
Orange d'Hiver
Rouse Lench
Royale d'Hiver
Rousselet de Rheims
Saint Germain
Sucré Vert
Swan's Egg, Old
New
Thompson's
Urbaniste
Vallée Franche
Van Mons Leon le Clerc
Whitfield
Williams's Melting.

To the above will be added, next year, the undermentioned sorts, now growing in the other quarters of the nursery on pear stocks, with a great variety of others not mentioned here:—

Bergamot, Searle's
Downton
Beaudelet
Bergamot, March
Echasserie
Ramilies
Ormskirk Bergamot
Poirre Niel
Gendeseim
Poire Anglaise
Chaptal
Bon Chrétien de Vernoi.

Rendle's Nursery. This also contains a very long straight walk with many fine specimens ranged on each side, together with rockwork, basins of water, aquatics, and a number of houses filled with greenhouse plants, Cácti, heaths, Orchidàceæ, bulbs, new tropæolums, rare pelargoniums, and various other articles; the whole in excellent order.

Plymouth Bone-Manure Manufactory; Messrs. Pontey, Rowe, and Co. The machinery, which is impelled by water, is very powerful, and the quantity of bone-dust produced in an hour is so great, that we cannot venture to put it down. The greater part of the bones are imported, and among them are human bones. Before the bones are put in the machine, they are each separately examined by women; for, the price being high, the foreigners find it worth their while to adulterate them, by inserting nails and other pieces of old iron in the hollows and crevices, and when bones having these scraps of iron in them get into the mill, the injury they do to the cylinders is very

great indeed. There is a heap of old iron weighing several tons, the whole of which has been extracted from the bones by the women. When in Bavaria in 1828, we saw immense quantities of human bones in the charnel houses, the sculls having the names which they bore when alive written on their fronts, and being arranged on shelves, and the other bones lying in heaps on the floor. We do not suppose these sculls have been removed; but it is most probable that the other bones are now manuring the turnip fields of England.

Tor House; Captain Foot. The house commands an extensive prospect, is judiciously entered from the back, and is finely adapted for terrace gardens in front.

Monadon House; The Rev. John Paulby. An extensive and grand place, with the wood admirably disposed, and with the power of forming a fine lake in the middle distance. The house is entered in front; but, by terraces and other arrangements, a portico might be added at one side, so as not to show a stranger every beauty before he leaves his carriage, as at present. The doorways and chimney-pieces are mostly of granite, like those of Fleet House. The walls are in some places 8 ft. thick, and up one chimney there is a concealed chamber 6 ft. square, in which a great many old papers and parchments were discovered some years ago, but not till they were so far charred as to be illegible. We noted here a fine old tulip tree with a trunk 15 ft. in circumference, and a silver fir of astonishing height, with a trunk about 6 ft. in diameter.

Pennycross Chapel burying-ground affords a remarkably fine view, as does the village green at *St. Bude*, about three miles from Plymouth; but, above all, *Bickham Hill*, the property of Lord Graves. To all these places we were kindly driven by Mr. Pontey.

Sept. 13.—*Mount Edgecumbe;* the Earl of Mount Edgecumbe. We first walked through the separate gardens and all the scenes through which we could not drive; and next, in consequence of permission kindly obtained for us by Mr. Pontey, we drove through every part of the park, so that we had the great satisfaction of seeing Mount Edgecumbe deliberately and thoroughly. High as were our expectations from the published descriptions and the long celebrity of the place, we were not disappointed. We never before looked down on the sea, on shipping, and on a large town, all at our feet, from such a stupendous height. The effect on the mind is sublime in the highest degree, but yet blended with the beautiful. There was something to us quite unearthly in the feeling it created. The separate gardens, as may readily be supposed, are overgrown, and the magnolias and other fine trees greatly injured, by the elms and other common trees and shrubs. One garden, in imitation of an ancient Roman burying-ground, which contains a great many

altars and urns, is so covered with evergreens, that it is not even mentioned in the guide-book. The only garden worth notice is what is called the Italian garden, though there is nothing Italian in it but the orange trees and a few white painted leaden statues; the former disfigured by the ugly unarchitectural tubs, and the latter, with the exception of a few on the parapets of a flight of steps, unartistically placed. We were sorry to see some alterations going on at the house, the object of which, as it appeared to us, was to change the entrance from the back, where it is at present, to the front, where it will display the finest views from the place before entering the house. Among the plants we noted down were, orange trees in tubs with stems 13 ft. high and 12 in. in diameter at the surface of the tub, the heads also being 12 ft. in diameter; various magnolias, from 30 to 36 ft. high; numerous cork trees, 50 ft. high; many immense ilexes, some 100 ft. high; remarkable red cedars, one with a trunk 5 ft. in diameter; pittosporum, 6 ft. high and 6 ft. in diameter; hydrangeas, 12 ft. high; Chinese privets, 14 ft. high; eriobotrya, 12 ft. high; catalpa, with a trunk 2 ft. in diameter; several Portugal laurels above 30 ft. high, with clean erect trunks 8 ft. high and 2 ft. in diameter, splendid trees; arbutus, 40 feet high; *A*bies Douglàs*ii*, 20 ft. high; Chimonánthus frâgrans, 12 ft. high and 16 ft. in diameter. There is said to be a large Bermudan cedar here, but that we do not recollect to have seen.

Sept. 14. — *Plymouth to Saltash, Trematon Castle, Pentillie Castle, and Callington.* We found the Globe Inn at Plymouth an excellent house, centrally situated for the nurseries and the post-office, with a piano in the sitting-room, and some books, but not enough. Every inn ought to have the history and description of the town in which it is situated, if there is one; and, next, county descriptions and histories, with a copy of Shakespeare. If every traveller were to say as much at inns about books as we generally do, every inn would soon have a library. All who think this desirable should do as we do. It can be no great hardship for the smallest inn or public-house to take in *Chambers's Journal*, or the *Penny Magazine.*

Trematon Castle; B. Tucker, Esq. This might be a fine place, for there are some well defined portions of the castle still remaining; but it is ruined by indiscriminate planting.

Pentillie Castle; J. T. Coryton, Esq. A splendid place by nature, and next in our opinion to Mount Edgecumbe. The house is particularly well situated, and entered in a proper manner, so as just to give an idea that a view of something grand and striking may be obtained from the drawingroom windows, but not to show it till there. There are some extensive walks well laid out under the direction of the late Mrs. Coryton, who, the gardener informed us, was a lady of great taste and skill in

landscape-gardening. The walks here are covered with debris from the lead and copper mines, and those which have been laid with this material twenty years ago never bear a weed, not even moss; but, on those which have been covered more recently, weeds grow the second year, because the miners are now more careful in separating the ore. At the lodge we observed a fine tree of *C*ratæ`gus orientàlis covered with fruit, and in the flower-garden a female Menispérmum enriched with its round black berries. At the house are some fine magnolias and large myrtles. The head kitchen-gardener has been here fifty years, and is eighty years old. We walked to a mausoleum placed on what is called Mount Ararat, in which one of the proprietors of this place is said to be interred in full dress; but for this story we must refer to the *History of Cornwall.*

Sept. 15.—*Callington to Whitford House, Endsleigh, and Tavistock.* The Golden Lion Inn at Callington is a good and cheap house, and it can supply several books; there is, besides, a bookseller's shop in the town.

Whitford House; Sir William Call, Bart. The grounds are beautifully varied and well-wooded, but the house is placed on a spot of no mark or likelihood, and the approach to it shows the whole of the kept ground before arriving at the front door. It is capable of immense improvement at a moderate expense.

Endsleigh; the Duke of Bedford. At the entrance there is the largest, most ornamental, and best kept lodge-garden we have yet seen in Devonshire, and which may be described as characteristic of all the lodges to the Duke of Bedford's residences. Proceeding along the approach, we pass another splendid cottage-garden, the low wooden fence beautifully covered with different-coloured nasturtiums varied by dahlias. This cottage is occupied by Mr. Forester, who has the general charge of the demesne.

A little beyond this cottage we obtain the first glance at the Tamar, here a clear and rapid river, passing through richly wooded banks and fertile meadows. "The cottage on the banks of the Tamar" is not now thatched, as represented in Repton's works, and as it was when he laid out the grounds, but slated; and, though it still maintains the character of a cottage, it is, without doubt, a very commodious dwelling. Mr. Repton's description of the situation and his improvements, as printed in our edition of his works, p. 586—597., is calculated to give such a clear idea of the place, that, as we have at present little time, we gladly refer to it. We admire Endsleigh exceedingly, for its natural beauties, and for the very high keeping displayed in all that we saw. Over a fountain in the stable yard is the following inscription:—"Endsleigh cottage was built, and a residence created in this sequestered valley, by John Duke of Bedford; the

spot having been previously chosen, from the natural picturesque beauties which surround it, by Georgiana Duchess of Bedford. The first stone of the building was laid by her four elder sons, Wriothesley, Edward, Charles Fox, and Francis John, Sept. 7. 1810."

Milton Abbey Free School was founded by the Duchess-Dowager of Bedford mentioned above; and the gardens, we were informed by a gardener at work in them, were laid out from the duchess's own designs. Some cottages, also, were built by Her Grace near this school, with suitable gardens round each; and so anxious was Her Grace to have these gardens properly cultivated and kept in good order, that she had openings, like windows, made at regular distances in the boundary hedges next the road, in order that she might see through them from her carriage, as she passed along the road, whether the gardens were properly kept. Every where we found the duchess highly spoken of by the people.

Tavistock. There is an excellent inn here, the only one we ever recollect to have seen without a sign of any kind, or even a name. There are some bookseller's shops in the town, an excellent subscription library, and, what we particularly admired, some new schools and teachers' houses by Mr. Blore, whose style is always simple and grand, and his chimneys high, bold, and free; that is, with their pedestals raised so high as to be freely separated from the roof and side walls. (See *Supp. Cott. Arch.*, p. 1296. art. iv.)

Sept. 16.— *Tavistock to Buckland Abbey and Moreton Hampstead.*

Buckland Abbey; Sir Trayton Drake. This is an old place situated in a bottom, chiefly remarkable for having been the residence of the circumnavigator Drake, and for containing various articles which he carried round the world with him, including his drum, writing-desk, chest of drawers, &c. There is a curious Elizabethan ceiling in the hall; and there are double windows, and a very ingenious contrivance to prevent the doors from slamming; viz. a cork put half-way into a tin tube, the latter being fixed to the style of the door in such a manner that the door strikes first on the cork, and consequently its force is broken by the compression of that elastic material. A piece of Indian rubber might be let into the style in such a manner as to have the same effect; and there is an excellent contrivance for the same purpose by Sir John Robison, described in our *Architectural Magazine*, and in the *Supplement to the Encyclopædia of Cottage Architecture.* The farm-yard is close to the house, and the barn is doubtless that which belonged to the monks. We guessed it at 200 ft. long, 30 ft. wide, and 60 ft. to the ridge of the roof. The roof is supported by curved beams or rafters,

which meet in the centre like an arch, and support purlins. Against each arch thus formed there is an exterior buttress; and thus, no cross ties being required, no interruption is given to the storing up of corn in the sheaf. In this barn are two threshing-machines; they are wretched pieces of machinery, and cannot, we should think, thresh clean. The farm-yard lies on a slope, in consequence of which, the whole of the drainings of the dunghill run to waste. A more wretched specimen of farm-yard management we never saw on so large a scale.

From Buckland Abbey to Moreton Hampstead, the road lies across Dartmoor, which we were very glad to have an opportunity of closely inspecting. The soil is every where excellent, and in but few places is in want of draining; and we consequently conjecture that it forms a covering to an immense accumulation of granite boulders. There is not an acre of surface that we saw which does not admit of as high a degree of cultivation as any part of Peeblesshire or Selkirkshire. The only drawback to Dartmoor is the expense that would be incurred in removing the stones that now protrude through the surface, or exist a few inches beneath it. As shelter is the great object that is wanted, many of these stones might be collected into ridges, and trees planted among them; or they might be formed into walls. We repeat that the soil is uniformly excellent, and would grow turnips and wheat as well as any soil in the Scotch counties mentioned. From the frequency of streams of water, the necessary farm buildings, if the farms were of large size, might be so placed as to have water-wheels for their threshing-machines; and there might be a great many acres of water meadow. The prison buildings at Dartmoor afford a specimen of the mean and the melancholy combined. Moreton Hampstead is a small place, with a very indifferent inn.

Sept. 17. — *Moreton Hampstead to Ugbrook and Exeter.* The road to Ugbrook is through a beautiful country chiefly along the sides of well-wooded valleys, with rich meadows, and apple orchards laden with fruit.

Ugbrook; Lord Clifford. The park here contains the greatest quantity of fine old wood that we have seen in Devonshire. The trees are not crowded, and many of them, therefore, have attained an immense size, and taken their natural shapes. They are also remarkably well displayed with reference to the inequalities of the surface. Sketches of many of these trees have been taken by Mr. Nesfield. We only measured one or two, a Dutch elm 20 ft. round at 4 ft. from the ground; and an oak with a trunk 27 ft. round, 60 ft. high, and with the branches covering a space 120 ft. in diameter. What gratified us much was to see a number of young single trees introduced throughout the park

in very suitable places. No tree is put down except on the precise spot chosen by Lord Clifford, who, from the remarks he made to us, and the operations going forward, we should conclude to be possessed of good taste in landscape-gardening. The house is a square mass, pierced with equidistant windows all of the same size, without any other merit; it is too meagre to be called elegant, and not lofty enough to be considered grand. A house, however, is within the power of man, but the grounds and the woods of Ugbrook can only be produced by a fortunate concurrence of natural circumstances many years in operation.

September 18. — *Exeter.* Viewing the cathedral and other objects in the town.

September 19. and 20. — *Bicton ;* Lady Rolle. This is an extensive place, celebrated for its improvements, for the collection of rare plants of every kind, for its arboretum on a large scale recently planted, and for its very high keeping. Too much can hardly be said in honour of the late Lord Rolle, through whose munificence the improvements were made, or of the present Lady Rolle, by whose taste and energetic mind His Lordship was stimulated to do so much; and by whom, since His Lordship's death, the improvements have been continued, and the place kept up with a degree of care very rarely to be met with in similar cases.

The surface of the grounds at Bicton would be described as greatly varied in any other English county than Devonshire, but even in that picturesque county they contain many striking beauties. The park is situated within 2½ miles of the sea, of which from various points it affords fine views; and in the interior the landscape is bounded by ranges of hills, some of which are covered with wood, others with cultivated fields, and some are in a wild state. The soil is chiefly sand and sandy loam. The house, which is well placed on a knoll, is extensive and commodious, containing a suite of magnificent apartments on the principal floor, and very extensive offices, but without any pretensions to architecture. The grounds have been judiciously laid out by Mr. Gilpin, and a piece of water formed by Mr. Glendinning under his direction has an excellent effect. There are two approaches, the one from Exeter, and the other from Sidmouth; the latter passes through an avenue of araucarias, planted in 1842. There are an outer and inner park, and also outer and inner lodges, but none of these lodges has much merit.

In a gardening point of view the most interesting feature about Bicton is the arboretum, which extends from the house, along the boundary of the inner park, till it reaches the flower-garden, at the distance of 112 chains, or nearly a mile and a half. The average width is about 3 chains, which will give from 33 to

34 acres, as the whole extent of the ground covered by the trees and shrubs. The planting was commenced in the spring of the year 1839, and continued in the spring of 1840. It would have been better had the extent of ground been greater: but, as it is, it was admirably arranged and planted by Mr. Glendinning, while at Bicton; who has, both there, and in various articles which he has written in the *Gardener's Magazine*, proved himself to be possessed of an excellent taste in landscape-gardening, as well as an enthusiastic love of trees and shrubs. The plants in the arboretum are judiciously disposed according to the space allotted to them, but greater room to the trees would have been an advantage, if it could have been obtained. It was a great step, however, to have formed so new a feature as an arboretum at all; and the merit of having accomplished so desirable an object is, we believe, entirely due to Lady Rolle. We examined a great many of the plants individually, and found many of them with wrong names, the inevitable consequence of the present state of nomenclature in almost all the nurseries; some species were dead, and, with regard to completeness, a number wanting. The care of this arboretum is at present committed to Messrs. Veitch and Son, who are taking measures to have all the plants correctly named, and all the blanks and deficiencies supplied. When this shall have been done, the collection, open as it is to the inspection of the horticultural world, will be of inestimable value to the surrounding country. We cannot leave it without noticing the very careful manner in which the plants have been planted on raised hills of prepared soil, and carefully staked and mulched, where staking and mulching were necessary. The boundary of the arboretum on the side next the outer park is a sunk fence, and on the inner side either a strained wire fence or iron hurdles. The arrangement is according to the Natural System, beginning near the house with the *Clematídeæ*, and ending at the entrance to the walled flower-garden with the *Junipérinæ*. A green drive leads through the whole. Nothing can be more perfect than the style in which every part of this arboretum is kept; Messrs. Veitch and Son having six men constantly employed mowing the grass, and mulching the dug circles round the plants with it, as practised in the Derby Arboretum (see our Volume for 1839, p. 539.); destroying weeds as soon as they appear; and removing dead leaves, suckers from grafted plants, insects, decayed blossoms, &c. One great beauty of the Bicton arboretum is, that every tree and shrub which it contains may be seen, and the name on its label read, by a person while sitting in a carriage, and driving through it along the green walk.

There is a drive through a pine wood to a prospect tower, (the latter the best piece of architecture at Bicton,) which deserves

notice for its extent and the quantity of evergreens, such as rhododendrons, mahonias, and *Ruscus aculeatus*, which have been planted as undergrowths. A great many rare pines, firs, cypresses, and junipers have also been introduced along this drive, so that, by adding more, it will in a short time be interesting as a pinetum. The tower is in the Gothic style, so high as to command a panoramic view of the surrounding country and the sea. It contains several rooms; in one of which, appropriately fitted up, a rich collection of china is tastefully displayed. This tower is understood to have been built by Lady Rolle, entirely unknown to Lord Rolle, and undiscovered by him, as an agreeable surprise for his birth-day, October 16. 1839, when he completed his 88th year; and, the following birth-day, Lady Rolle surprised Lord Rolle with the china room.

Connected with the arboretum, so as to form a part of the tour of the place, is a menagerie containing a rich collection of birds, monkeys, kangaroos, and various other foreign animals. Thus, with the arboretum, the drive to the tower, and the flower-garden, as means of recreation in the open air; the menagerie and the collection of china, for amusement under cover; and the library and pictures in the house, there is at Bicton every source of enjoyment that can be desired. Nothing is wanting but a collection of shells and minerals, for the sake of those who are fond of these departments of science, and this is about to be formed; a great quantity of shells, and some minerals, having been procured for the purpose, though they are not yet arranged.

The kitchen-garden was judiciously formed and planted by Mr. Glendinning. It is supplied with water by several basins lined with stone distributed throughout the garden, and fed by a stream which runs from one to another, thus keeping the water always fresh and clear. The wall trees have been all planted above the surface, and they seem to bear abundant crops. The flower-garden contains several acres, and is at a short distance from the house. It is a parallelogram, having the hothouses, &c., which are very extensive, on the north side, with a noble temple in the centre. It is suitably laid out and planted, and kept in the very highest order. The architectural and sculptural ornaments are vases, stone baskets, statues, busts, and a candelabrum fountain with a jet from the upper part, which rises to a considerable height, and has a splendid effect from every part of the garden, but more especially from an upper terrace walk, and when brought in a line with an obelisk in the park which forms the termination to a vista. There is water enough, we understand, to form a cascade over stone steps in the ancient style, which would be a magnificent substitute for the green terrace slopes which form the commencement of the vista.

The whole of the gardens at Bicton are under the direction

of Mr. James Barnes, and we must say that we do not think we ever before saw culture, order, and neatness carried to such a high degree of perfection, in so many departments, and on so large a scale, and all by the care and superintendence of one man. From the commonest kitchen crop in the open garden, and the mushrooms in the sheds, up to the pine-apples, the heaths, and the Orchidàceæ, every thing seemed to be alike healthy and vigorous. We could not help noticing the evenness of the crops of cabbages, cauliflowers, savoys, &c. in the kitchen-garden; and the extraordinary vigour and beauty of the pines, heaths, hothouse plants, chrysanthemums, &c., in the houses; and nothing could exceed the neatness of the lawn, the walks, and the flower-beds.

Queen pines are grown at Bicton to the weight of 5 lb., and their flavour, as we can bear witness, is excellent; all the plants in pots or boxes, from the smallest heath up to the largest orange tree or camellia, are grown in rough turfy stuff mixed with broken stones or pebbles, sometimes with the addition of powdered bones, and generally with a mixture of charcoal. The introduction of this last ingredient in general culture is a new and important feature, apparently of great importance, for which the horticultural world is indebted to Mr. Barnes. We have prevailed on him to furnish us with an account of his practice, both in the open garden and the hothouse department, and to supply some lists and dimensions of plants; and this he has kindly done in a series of letters, which we give in a separate article, in the order in which they have been received.

(*To be concluded in our next.*)

Art. II. *Bicton Gardens, their Culture and Management. In a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

Letter I. *Bicton Kitchen-Garden. Goose-necked short-handled Hoes. Kitchen-Garden Rules. Vegetable and Fruit List. Onion Loft. Use of Charcoal in the Culture of Plants. To make a rough Sort of Charcoal for Kitchen-Gardening. Devonshire Farming. Preparing Ground for Cabbages, Winter Salading, &c. Early and late Cauliflower. Tallies to Kitchen-Garden Crops. Improvements. State of the Men and Labourers in Bicton Gardens.*

The first interview I had with you, Sir, was at Bicton kitchen-garden, with two small Goose-necked short-handled Hoes one in each hand, having just been hoeing out my seedling lettuce; for I never have any weeding done except in the gravel walks, but hoe every thing before weeds can be seen. This is a greater assistance to the plants than any dung or manure that can be

put on. By continually hoeing and stirring the earth, nature supplies the wants of the plants better than we can do by adding any thing to assist: my rough system of potting, when we come to speak of it, will explain this. Fix me in the room I am now in, for one month, with my cloth shoes and hat on, with a comfortable place to lie down on, and plenty of the best food and drink, do you not think I should be blighted, cankered, or mildewed, or in some way stagnated? I fancy I should be better off turned out for the same time without any of the above luxuries. I have six different sizes of those hoes, from one inch to six inches; and I use two at a time, one in each hand.

You next caught a sight of my Kitchen-Garden Rules, and asked my reason for adopting them, which I think you understood. I enclose a copy of those rules [printed at the end of this letter], likewise a copy of my Vegetable and Fruit List for the week ending Sept. 25. [see the opposite page]. Your time being so short, we did not come to any explanation why I adopted this weekly list. The following are the principal reasons: — 1st, That my employer's housekeeper, butler, and cook should know what is in season, and fit for table every day in the week or year. 2d, That they should know what they have had, and what they ought to have. 3d, Because I do not like to be imposed on: for you know that gardening is a very anxious, bustling, persevering business, and that we gardeners have blights of all kinds to contend with, without having hand-blights, and idle and neglectful blights. I speak feelingly on this subject; for the facts which I am about to relate I have seen with my own eyes. I have taken or sent in a dessert to the housekeeper's room, and, having occasion to go in afterwards (I speak of a place where I lived in the house), I have seen one third or half of this dessert gone, by first one person, then another, taking article after article. But that is not the worst; for what fruit is left, in such a case, I have seen pinched or squeezed and bruised to that degree that it was not fit to send to a nobleman's or gentleman's table, or, indeed, any other. For example, grapes with the shoulders picked off; peaches and nectarines squeezed; cherries, gooseberries, &c., the best and finest all picked out and eaten up; cucumbers, &c., in the pantry, put aside because they had not time to slice them up and get them ready for table; the same cucumbers sent in next day after lying about, having become withered up and spoiled; and hence I have been blamed for sending in so tough a salad. I have seen the very best of vegetables, of all kinds, and at all seasons, come from the scullery in the hog-tub; never having been touched after leaving the garden basket, except being bundled into the hog-tub; at the same time I have been complained of because there was such a short supply of fruit, salads, and vegetables.

Vegetable, Fruit, and Flower List, for the Week ending Saturday Sept. 25. 1842.

Sept.	19	20	21	22	23	24	25
Mushrooms - dish	1				1		
French Beans -	1	1	1	1		1	1
Warwick Peas -			1				
Early Frame Peas					1		
Long Pod Beans -		1					
Windsor Beans -						1	
Cauliflowers - -	1	1	1		1		1
Artichokes - -				1			
Cape Broccoli -	1		1			1	1
Cabbage - -	1	1	1	1	1	1	1
Greens or Coleworts		1			1		
Turnips - -	1	1	1	1	1	1	1
Carrots - -	1	1	1	1	1	1	1
Potatoes - -	1	1	1	1	1	1	1
Vegetable Marrow -		1				1	
Spinach - -			1		1		
Silver Beet - -	1						
Cucumbers for Stewing - - dish		3				5	
Peas - - -				1			
Lettuce - -		1				1	
Endive - -				1			
Red Cabbage -						1	
White Celery -		1			1		
Tomatoes - -			1				
Horseradish - dish				1			1
Onions - -	1	1	1	1	1	1	1
Shallots - -		1				1	
Leeks - - -	1				1		
Garlic - - -			1				
Parsley, Curled, bun.	1	1	1	1	1	1	1
Sweet Marjoram -		1				1	
Sweet Basil - -			1			1	
Fennel - - -				1			
Tarragon - -	1				1		
Green Mint - -			1				
Chervil - -	1	1		1	1	1	1
Sorrel - - -			1			1	
Winter Savory -	1						
Chives - - -					1		
Pennyroyal - -				1			
Salad for Servants.							
Cucumbers - dish	1		1		1		1
Lettuce - -	1	1	1	1	1	1	1
Radishes - -		1		1		1	
Picklings.							
Gherkin Cucumbers				200			
Onions, silver-skinned - - peck			1				
Red Cabbage doz.					1		
Capsicums - -			200				
Chillies - -					200		
Green Tomatoes doz.		6					
Ripe Tomatoes for Sauce - doz.				7			
Cut Flowers, basket	1			1			

Sept.	19	20	21	22	23	24	25
Dahlias - doz.	4			4			
Magnolia Flowers -	2			2			
Plants for baskets in front hall - -	26			14			
Salad sent in for Table.							
Cucumbers - dish	1	1	1	1	1	1	1
Lettuce - -	1	1	1	1	1	1	1
Radishes - -	1	1	1	1	1	1	1
Celery - - -		1		1		1	
Endive - -			1		1		
Red Beet - -	1						
Mustard and Cress		1				1	
American Cress -				1			1
For Preserving.							
Orange Flowers qt.			10				
Magnolia Flow. doz.			3				
Figs - - doz.					2		
Grapes - basket			1				
Guava Fruit - doz.				8			
Damsons - qt.			8				
Apples for Jelly, bush.					2		
Kitchen Fruit.							
Apples - - peck	2			2			
Waste Peaches -			9				
Plums - - qt.					1		
Cherries - - lb.			1½				
Currants - -		1				1	
Raspberries - -		1				1	
Pears for stewing dz.			2				
Apples for roasting					2		
Table Fruit.							
Pine-apples							
Brown Sugar-loaf		1					
Queen - -				1			
Otaheite - -						1	
*Cy*cas revolùta -	9				7		
Mùs*a* Cavendíshii -		7		7		7	
Guava Fruit - -			9		9		
Black Hamburg Grapes - - lb.	1	1	1	1	1	1	1
Sweetwater, Dutch	1		1		1		1
Muscat of Alexandria		1		1		1	
Peaches, Malta -	4			5		5	
Figs - - dish	1	1	1	1	1	1	1
Cherries - -		1		1		1	
Keen's seedl. Strawberries - -	1		1	1		1	1
Red Currants -	1	1	1	1	1	1	1
White ditto - -	1	1	1	1	1	1	1
Apples - -	1	1	1	1	1	1	1
Pears - - -	1	1	1	1	1	1	1
Walnuts - -	1	1	1	1	1	1	1
Melons - - -	1	10	1		1		1
Impératrice Plums				1	1	1	
Ice - - -							

I have been told that a good lot of mushrooms was wanted for pickling, catsup, &c., and must be had. I have had them procured, and many times have risen up early before daylight to get them myself, lest the gathering them should interfere with my day's arrangements, and because I would get them before other people were about collecting them; I have been wet-footed, and otherwise wet up to my knees, in this business. I have had occasion to go to the house about 11 o'clock in the forenoon, and have seen stablemen, footmen, and women-servants having a feast of the very mushrooms I took the trouble to get while they were in bed, the good ones stewed, broiled, &c., with only a few odds and ends, stalks and parings, left in the very basket I sent or took them to the kitchen in. They have bought mushrooms afterwards for pickling, &c., because it had been said that I could not get them. Now is not that enough to cause one to establish rules of some kind? I feel a great pleasure in producing every thing plentifully, and changing as often as possible; but it is always grievous to me to see waste, more particularly when it is caused by neglect and idleness.

You noticed the Onion Loft over the fruit-room and tool-shed. Some of the finest of the onions I have were manured with charcoal dust sown in the drills at the rate of two pints to 100 ft. of drill.

You asked me how I came to think of using Charcoal. In the year 1829 or 1830, while living at Norwood, in Surrey, at the Beulah Spa, I was rummaging about the woods for loamy mould, and in different spots there had been large quantities of wood charred. I could not help noticing how wonderfully strong the various weeds grew at a little distance round about those spots, where a thin sprinkling of charred dust had got amongst them. I got a basketful and tried it amongst my cucumber soil. I found it improved them in strength and colour, so that I began to try it with other soft-growing plants; and thus I have continued trying it, when I could succeed in getting it, with hundreds, I might say thousands, of plants under pot culture. This I shall treat of as I arrive at the different houses. The use of it began in my framing-ground at Norwood, and you are the first person I have communicated it to publicly. I did give my brother privately, some time ago, a little information respecting the use of charcoal, and he has tried it with many plants, and is beginning to use it with every thing.

I find the following a good plan to make a rough sort of Charcoal for Kitchen-gardening, to be kept dry, and sown when the seed is put into the drills, at the rate of three or four pints to a drill 100 ft. in length. Collect all the rubbish together such as will not rot, trimmings of bushes or any rubbish wood,

cabbage and broccoli stalks, old pine-apple stems, and, in short, vegetable rubbish of any kind. Put it together, first placing some straw to set it on fire, and still shaking in a little straw, as you continue increasing the heap, on the side at the bottom of the heap you intend setting fire to, so that the fire can run into the middle of the heap after setting fire to it; taking care as you form your heap to beat it tightly and firmly together. When the heap is formed, cover it over with short close moist rubbish of any sort from the rubbish heap, such as short grass, weeds, and earth; so as to keep the fire from flaring through at any place round your heap for any length of time. As soon as the fire breaks through in a blaze or flare, throw on more short rubbish, so that you keep it from blazing, and keep in it as much smoke as you can. It is necessary to thrust a stake or broom-handle into the heap in different places to entice the fire regularly all over it; but as soon as the fire blazes through these holes stop them up, and make others where you think it not burning. When it is finished, collect the whole of the charred rubbish, ashes, &c., together, and put it into old cement casks, old packing-boxes, sacks, or anything you choose. Put these casks or boxes into a dry place, and use it when wanted, taking care to pick out or sift out any pieces of charred wood, which there will be if you char large wood. These can be broken up with a hammer for potting and other uses if wanted, which I shall treat of when I reach the different houses of plants.

I will here make a digression on Devonshire Farming. I cannot help mentioning the vast quantity of the very best of manure that the farmers in this neighbourhood lose every day. For example, we will suppose that this day there are some of them busy fetching lime for wheat, taking for this purpose a team, man, and boy, a whole day to get home a waggon-load of lime. Now, there have been heavy showers falling on their dung yards all the time that they were fetching the lime, and the very essence of their stock of dung has been running away into the river or out into the street, or into some place where it is never made use of; and thus they are perhaps losing four times the value of the very load of lime they have been fetching home. This puts me in mind of brewing, and then throwing the liquor away, and keeping the grains to make use of as a luxury. I am sorry to say, but truth it is, that the most slovenly way of farming I ever saw is that of Devonshire. I have noticed one thing particularly, which is, that they keep the docks growing until the seed is ripe, and then cut them off, and carry them to the hedge-side, or throw them into the middle of the road, for the horses' feet to thrash out the seed, and mix it up amongst the very mud they scrape up to take

back into their fields again; as if they were afraid of losing the sort of docks and thistles they so carefully cultivate. Do you not think there ought to be some heavy fine for this method of doing business? [See p. 193., and *Gard. Gaz.* 1841, p. 532.] I fancy, if it were not for the beautiful soil and favourable climate we are blessed with here, it would be short commons with many farmers about this neighbourhood.

I think you made a memorandum of my Method of preparing the Ground for Cabbages, by casting up sloping banks at every 12 ft. to shelter the plants, and also to afford suitable slopes on which to prick out late endive, lettuce plants, cauliflower, cabbage plants, &c.

I think you understood my Plan of sowing Cauliflower seed for spring growing, not sooner than from the 18th to the 25th of September, when I sow both early and late inside of a frame. As soon as they make one rough leaf I prick them out into thumb pots, and shift them afterwards into larger. I keep them growing on freely all winter, at the bottom of a peach-house, vinery, or cold airy situation of any kind, until February. Having had the hand-glasses put away all winter, and in spring got the ground well prepared and in good order to receive them, they are turned out, four under each glass, when they enjoy themselves, and are ready in April when vegetables are scarce.

The reason why I mention *early* and *late* cauliflower is, that I observed last year a question asked and answered in the *Gardener's Chronicle* respecting early and late cauliflower; and it was answered in this way, viz. that there was no difference between the early and late cauliflower except sowing the seed, which made me fancy they knew nothing about it. I know, and have known for years, that there are two distinct sorts both in foliage and flower; and that there is a month or five weeks in their coming into flower, though sown and planted on the same day, and having the same treatment all through: and I can give you an instance of my being very much disappointed. In the spring of 1832, when, by some mistake, I had got my late cauliflower planted under my hand-glasses, and my early planted out in the quarters, those I had planted in the quarters came in twenty-six days sooner than my hand-glass plants. This mistake happened notwithstanding what you saw yourself, viz. that I put a tally to every thing I plant and sow in my kitchen-garden, with the name and day of the month. I do this more for the sake of giving information to my men than for myself. By having tallies placed on the above plan, when the crop turns out any thing extra fine, the men feel more interested to look at the tally to know when it was sown or planted, what preparation made, what manure applied, &c.

Now, Sir, gardening will always be done in a slovenly un-

workmanlike manner, until the men take an interest in it. It is true, there have been some improvements made during these last few years; but the movement is slow, and by no means at a railroad pace, as it ought to be. The principal feeling that some men have who hold situations is to hold on, not thinking of making the least improvement; and if any improvements should be proposed to them by their employers, or any one else, it is like throwing dirty water in their faces; the answer is, that they have more to do now than they can do. Now, to establish my Rules at Bicton was something like my going into the garden on a hot day, and after kicking against the bee-hives to stand in front of them, and let the bees exercise themselves freely on myself. By routing out some of the most factious, and getting good young men, I have been able, by degrees, to bring things as they are; that is, by no means to perfection, but with ample room left for improvement on every thing under my charge, as well as for improving myself.

In respect to men, I would just observe that you may give way to them in sloth, neglect, and all that is injurious, until you get every thing into a bad state in doors and out, and can get no more done with twenty men than you could with five with proper management: and the five men would be just as well satisfied with you as the twenty would, and to all outward appearance the five men would not work harder, nor exert themselves more, than the twenty; the five taking an interest in their labour, the twenty in making away with the day in any way, so that one should not have it thrown in his teeth that he had done more to any job than the others, or that one should begin his job before the others. I am always pleased to do a favour for any young man or labourer that lies in my power. I like to see them merry and comfortable: but I hate a drunkard worse than I do a thief, for this reason, that a drunkard you cannot put the least confidence in at any time; he may be clever in some things, but the evil day comes, he gets drunk, which overturns all the cleverness he has been performing for years; the thief you watch for, detect, and punish.

When I first entered Bicton gardens I found the labourers' working-hours were from six in the morning to five in the afternoon; that is, one hour allowed every day to go home to manage their own gardens, &c., half an hour for breakfast, and one hour for dinner: but I was surprised to find, on the first morning, not a man on the grounds till about seven, some later, &c. When they did arrive, it was with the knees of their smallclothes not buttoned or tied, their shoes not laced, &c.; not a tool in its place, but thrown down where a job was finished, and all confusion and disorder in every corner; coals lying about in every place through which they had been wheeled;

flower-pots thrown together, dirty and clean, broken or not broken. The first thing they thought of was liquor to drink; and they never were satisfied except they were tossing, and guzzling, and smoking. What would you think of six or seven men mowing a nobleman's flower-garden with each a short pipe in his mouth, blowing a cloud as if doing it for a wager? I am sorry to say I have seen all the above in practice in Bicton gardens. Do you not think I was a little surprised at such things? I was not long before I told my foreman of each department, that I must have a little better order in every place. They with one voice said it was impossible, for there were not half hands enough to do the work. I pointed out the way I should proceed, which caused a great stagnation and blight with both foremen and men. I was the whole talk of the neighbourhood round: it was said that my long ugly legs would not be walking Bicton gardens long. I got one young man from London. They swore him to their rules and ways, and he turned out the worst of them all. I was obliged to brush him off in great haste. Do you not think I was justifiable in persevering with my own Rules and Regulations? The difference in the industry, cleanliness, happiness, and contentment amongst my men is truly astonishing. They are always in time of a morning, as clean as I can expect labourers, merry, whistling, singing, going to work as if they were taking an interest in doing good, and always knowing where to put their hand on any tool that is wanted, which you observed when here. It is one of the greatest pleasures to me that can possibly be imagined, to see such a change; but I still live in hopes of seeing further improvement here in every way.

RULES AND REGULATIONS OF BICTON KITCHEN-GARDEN.

*** The following Rules to be strictly attended to, and the Fines to be paid each pay-day. The amount so paid to be divided equally amongst the men at the end of the year, or put to some useful purpose, as shall be agreed on.

Rule		d.
1.	Coming to work on a Monday morning with a dirty shirt - -	3
2.	Coming to work any morning without shoes being either laced or tied	3
3.	Any person employed in these gardens found gathering fruit with unwashed hands - - - - - - -	4
4.	Walking from any border, bed, or quarter of the garden on to the walk without first scraping their shoes or boots on the scraper kept for the purpose - - - - - -	3
5.	Neglecting to clean away dirt from the scrapers placed at the above-mentioned places or any quarter of the garden - - -	3
6.	Neglecting to raise up a scraper, too low for proper use, when finishing a job near the same - - - - - -	3
7.	Treading on the box-edgings, or wheeling over them, without first placing over them the bridge kept for the purpose - -	3

8. Taking a wheelbarrow badly laden, or with a dirty wheel, on any gravel walk - - - - - - - 3
9. Neglecting to grease a wheelbarrow-wheel when requisite - - 3
10. Neglecting to do any job after having been once told of it - - 3
the second time - 6
11. Neglecting to put in its proper place any tool, ladder, watering-pot, or any thing belonging to the garden - - - - 3
12. Putting away any of the above-mentioned articles dirty, for each article - - - - - - - - 3
13. Leaving any box-edging covered with earth or rubbish when finishing a job near the same - - - - - - 3
14. Leaving any job, in any part of the garden, in an unworkmanlike manner - - - - - - - - 3
15. Going to a job near or adjoining a gravel walk, without taking a broom with other tools - - - - - - - 3
16. Placing an iron rake against a wall or fence, or laying the same on a walk teeth uppermost - - - - - 3
17. Neglecting to shut any door or gate when required, or to fasten the same - - - - - - - - - 3
18. Carelessly breaking any tool, glass, or flower-pot - - - 3
19. Leaving heaps of weeds, leaves, or any other kind of rubbish, about the garden when finishing a job - - - - - 3
20. Smoking a pipe of tobacco in working hours - - - 4
21. Swearing or making use of bad language, for every separate evil expression - - - - - - - - 3
22. Any man found intoxicated in working-hours to forfeit his day's wages, and be otherwise dealt with as thereafter shall be considered just.
23. Any dispute arising as to who had infringed any of the above Rules to be settled by arbitration.
24. Damaging or in any way defacing the above Rules - - 12

Bicton Gardens, Sept. 27. 1842.

LETTER II. *Potting-Bench. Painting Strings for tying Plants. Garden Rules for the Flower-Garden Department. The Palm-house.*

As you wished me to make a few remarks on different plants that you saw here, my treatment of them, their dimensions, &c., I shall commence in my humble way at the potting-bench, that being the first place you entered in the flower-garden department of these noble gardens, and it being the manufactory of all the hothouse business; that is to say, sowing, propagating, and potting in all its stages, from the seedling to the mature plant.

The Potting-Bench is formed of Portland stone slabs, supported by the same standing edgewise, by which means it forms bins or partitions, to keep the different sorts of mould or soil underneath, without getting intermixed with each other. You particularly noticed in what a very rough manner I potted every thing. My reason for so doing is, that I consider we ought to assist nature. If we only take one glance to the right

or left wherever we go, is it not plainly to be seen that we often act in direct opposition to that parent of all things? Look into any rill, under any tree, into the inside of a wood, or on the top of a hill, do we not notice the decay of autumn, and the progress of spring, which ought to serve for our guide? On the bench you noticed sods of heath mould, and of different kinds of loam, leaf mould, &c. On the side bench were pots filled with four different sizes of pebbles, from the size of a grain of wheat to the size of the palm of the hand; four different sizes of broken freestone; four different sizes of charcoal (considering the pot of charcoal dust one of them); four different sorts of sand; two sorts of bone, one of half-inch size, the other of dust; four different sizes of broken pots for draining, potsherds of sizes for putting over the hole of any sized pot; a basket of moss, one of soot, and another of rotten cowdung; a hammer, choppers for cutting sods of mould, &c., pincers, potting-sticks, sieves of different sizes; wire of sizes for making trellises of all kinds for training plants; flower-stakes of all sizes made by the men in wet weather, and painted green; green string of all sizes for tying and training plants, also painted by the men.

Painting Strings for tying Plants.—You particularly wished me to mention in what manner I painted the strings; the following is my method, which I have never before seen employed. I take a ball of string, stretch it inside of a shed, from one nail to the other, until the whole of the ball is unwound. I get some tolerably thick green paint, put on an old leather glove, or take a piece of leather in my hand, on which glove or piece of leather I put some of the paint with a bit of lath. I take as much of the string on my hand as is convenient to rub the paint into, and soon colour the whole ball.

Garden Rules.—You next noticed the Garden Rules in the lobby. As they are somewhat different from the rules for the kitchen-garden, I beg to enclose a copy of them according to your wish. [These Rules are given in p. 567., at the end of this letter.]

The Palm-house, which you next went into, appeared to interest you much; and, as you requested, I shall proceed to give you some particulars respecting my treatment of the plants in it, their height, dimensions, &c. It will be rather startling to some persons when I state the facts I am about to do. In the first place, I wish it to be understood that every plant inside that house is growing in loam, charcoal, stones, and sand, with occasionally a little manured water. The house is 58 ft. long, 34 ft. wide, and 33 ft. high. The first plant you noticed opposite the door at which you entered was Mùs*a* Cavendísh*ii*, with above 400 perfect fruit on it; 42 fruit on the uppermost

hand, 38 on the next, the foliage of the plant perfect and green. I asked you and Mrs. Loudon to taste the fruit, knowing that it was generally disliked, and spoken badly of. You wished me to remind you of an observation I made, which is, that the fruit of the Mùs*a* should not, on any account, be touched with a knife, either in gathering it, or in eating it: if cut with a knife the flavour is spoilt. The fruit should be left on the plant to ripen, should not be gathered before it is perfectly ripe, and then not kept long before being eaten. [The flavour of the fruit was decidedly superior to that of any bananas we had before tasted; doubtless in part owing to its being fresh gathered.]

Cỳcas revolùta, a noble plant, with a head of 700 fruit on it. Stem 3 ft. 2 in. high; the girt, 18 in. above the top of the tub, 3 ft. 4½ in.; circumference of the head of fruit 4 ft. 8 in. In March, 1841, the stem measured only 1 ft. 11 in.; but, after removing the top surface, I applied a quantity of charcoal, mixed with some loam, as a top dressing, which caused it to make the above-mentioned extraordinary growth, the most wonderful I ever had the pleasure of seeing.

Doryánthes excélsa, flower-stem 16 ft. high.

Sàbal *Blackburn*iàna, a noble plant.

*Strelítz*ia *regìnæ* with seven spikes of flowers.

P*apỳrus antiquòrum*, 14 ft. high with ten stems.

*Dillèni*a *speciòsa*, 6 ft. high.

*Mùs*a *sapiéntum*, a young plant 4 ft. high, planted out last March into a quantity of loam and charcoal, the trunk of which this day measures 14 ft. 6 in. high, with leaves reaching to the very top of the house (33 ft. high); the base of the stem measures 3 ft. 3 in. in circumference. The above may perhaps be doubted, but it is true.

*Mùs*a *Dácca*. Four suckers were planted on the same day as the above Mùs*a* sapiéntum, and in the same kind of preparation, and their progress is quite as astonishing; they being, when planted, respectively from 3 ft. to 3 ft. 6 in. high. M. Dácca is a more dwarf-growing species than M. sapiéntum, nevertheless the stems of the four plants are from 9 ft. to 11 ft. high, leaves 9 ft. in length, circumference of stems from 2 ft. 4 in. to 2 ft. 8 in.

Chamæ'rops excélsa Lodd. Cat., a noble plant.

Pandànus *odoratíssimus*, very fine.

*Furcræ'*a *longæ'va*, two fine plants of it, the circumference of their stems 22 in., and 4 ft. high.

Latània *rùbra*, fine.

Coffèa *arábica*, two plants 10 ft. 6 in. high.

Státice arbòrea, very fine.

Cỳcas circinàlis, a fine plant.

Lucùlia *gratíssima*, 7 ft. high.

Latània *borbónica*, very large.

Acrocòmia sclerocárpa.

Astrapæ'a Wallíchii, 14 ft. high, the circumference of the head 38 ft. This plant is wonderfully improved, since a dressing of charcoal dust has been applied with loam as a top dressing.

Mùsa sapiéntum and *M. paradisìaca*, planted about two years, have reached the top of the house (33 ft.) with their noble leaves, their stems being about 18 ft. high.

Araucària excélsa, 26 ft. high; the circumference of the stem, at a foot distant from the earth, 2 ft. 2 in.; the diameter of the spread of the branches 22 ft.

F*ìcus elástica*, 25 ft. high.

C*aryòta ùrens*, a fine plant.

Dracæ'na Dràco, 9 ft. high.

Zàmia hórrida and *Zàmia púngens*, fine plants.

C*ombrètum grandiflòrum*, 10 ft. high, covering a large space of wire trellis with its noble shoots and fine foliage.

Quisquàlis índica, 22 ft. high, also covering a large space of wire trellis, and in flower nearly the whole of the year.

*Banistè*ria *chrysophýlla*, *B. nítida*, Calàdium *pinnatífidum*; all very large.

Bambùsa a*rundinàcea.*

F*ìcus* Benjamìna, two plants, 10 ft. high.

C*aryòta sobolífera*, *Mùsa s. coccínea*, C*hamæ'rops hùmilis*, *Cheirostèmon* p*latanòides*, *Durán*ta *Plumiè*ri; all five noble plants.

Cèreus grandiflòrus, covering a large space, 20 ft. high.

C*áctus speciosíssima*, with C. *truncàta* worked on it from the ground to the height of 20 ft., which looks very grand when in flower.

P*sídium Cattley*ànum, Cattley's Guava, 16 ft. high, covered with fruit. There have been gathered this season from that one plant, and from a small plant against the wall, 29 doz. of fruit, and I should think there are 20 doz. more on them. They have made a wonderful progress since shifting them early last spring, when I added a considerable quantity of charcoal dust amongst the loam. No one would believe it, that two years ago the large tree was a tall thin plant, in a No. 4. pot.

C*ròton variegàtum*, 7 ft. high.

Large Shaddocks, against the back wall.

Several different species of Passiflòra, and other noble plants too numerous to dwell on at this moment.

In my next letter I will give you a rough idea of the other houses you walked through, the dimensions of them, and my treatment of the Heath and New Holland houses, which, I hope, you will find interesting. I have no doubt I shall astonish you with some facts from these two beautiful houses.

RULES AND REGULATIONS OF THE PLANT DEPARTMENT IN BICTON GARDENS.

*** The following Rules to be strictly attended to, and the Fines to be regularly paid each pay-day. The amount collected to be equally divided at the end of the year, or put to some useful purpose, as hereafter shall be agreed on.

Rule		d.
1.	Coming to work on a Monday morning with a dirty shirt	3
2.	Coming to work any morning without shoes being laced or tied	3
3.	Any person employed in these departments found gathering fruit with unwashed hands	4
4.	Going into any hothouse, greenhouse, &c., or walking on any gravel walk, with dirty shoes	3
5.	Taking a wheelbarrow with a dirty wheel on the walks, or in any other way making dirt and not immediately cleaning the same up	3
6.	Leaving any door or gate open in any department of the garden	3
7.	Leaving any door or gate unlocked, after opening the same, and not returning the key to its proper place	3
8.	Leaving any stoke-hole dirty, not keeping the ashes clean out from under the grate, not sifting the cinders once a week	3
9.	Leaving any fire at night not in proper trim or order	3
10.	Leaving any thing dangerous in or about the stoke-holes or furnaces	12
11.	Leaving a job unfinished, in an unworkmanlike manner	3
12.	Making any waste of coals, dropping them about, or not keeping them swept clean up together	3
13.	Leaving open the cover of any boiler or cistern	6
14.	Smoking a pipe of tobacco in the hours of work	4
15.	Neglecting to grease a wheelbarrow when requisite	3
16.	Leaving any tool, wheelbarrow, steps, ladder, water-pot, &c., out of its proper place, or putting it away dirty	3
17.	Leaving rubbish in any hothouse or greenhouse, or in any way making dirt and not immediately cleaning the same up	3
18.	Leaving heaps of grass, weeds, leaves, or any rubbish whatever, about pleasure-grounds, borders, walks, &c., for each heap	3
19.	Carelessly breaking any plant, pan, glass, tool, &c.	3
20.	Breaking any flower-pot with plants in it, and not immediately potting the same plants properly	6
21.	Neglecting to do a job after having been once told of it	3
	the second time	6
22.	Neglecting to attend to water fountains, &c.	3
23.	Any man found at his work intoxicated shall forfeit his day's wages, and be otherwise dealt with as thereafter shall be considered just.	
24.	Swearing or making use of bad language, for every separate evil expression	3
25.	Damaging or in any way mutilating or defacing the above Rules	12

Bicton Gardens, Sept. 26. 1842.

REVIEWS.

Art. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

A History of British Forest Trees, indigenous and introduced. By Prideaux John Selby, F.L.S., M.W.S., &c. 8vo, pp. 540. Illustrated with a wood-

cut of each species, and numerous vignettes. Parts II. to XI., forming one vol. 8vo. London, 1842.

We noticed the first part of this work in our Volume for 1841, p. 624., and the remaining parts, making in all eleven, are now before us. On the work, as a whole, we can bestow unqualified commendation, both in respect to the letter-press and the engravings. To give the reader an idea of its contents we make the following quotation from the preface :—

" Most of these treatises [on trees] are restricted in their design, and are confined to certain departments of dendrology, and operations connected with the general culture and management of forest trees, and do not enter upon the particular history, or any detailed account, of individual species. Of this description are the works of Pontey, Menteith, Nichol, Sang, Billington, and various others, in all of which the operations of planting, thinning, pruning, and nursery culture, constitute the permanent features, leaving the history of the species to which the above-mentioned operations are meant to refer but slightly touched upon, or forming a very secondary portion of their contents.

" The classic 'Sylva' of Evelyn, and the valuable 'Arboretum et Fruticetum Britannicum' of Loudon, are, however, works to which the present volume approaches nearer in the general outline of its plan ; but as the former was written upwards of a century and a half ago, and at a time when several trees, now naturalised and extensively cultivated in Britain, were but little known or recently introduced ; and as the latter embraces a much wider field of investigation, besides being voluminous in size and costly in price, and consequently in a great measure confined to the libraries of the opulent, it did not appear to the author that he was trenching upon ground, either so fully occupied or exhausted previously, as to render another work (connected as it is with a subject of such importance as the growth and management of British timber,) altogether unnecessary and uncalled for.

" In speaking of the various important operations connected with the management of timber, the author may remark that he does so with the experience of nearly forty years, during which period he has not only been a planter to some extent, but has also devoted much time and attention to the culture of his trees; his observations, therefore, may be considered the result of practical and oft-renewed investigation, conducted, so far as he was able, in accordance with the principles of vegetable physiology. It will not, therefore, much surprise his readers, that he should differ from Pontey and his followers, in regard to the pruning of forest trees, seeing that the denuding system of that writer is directly opposed to such principles, and that, so far from contributing to promote a more rapid increase or a greater deposition of the woody fibre, it tends, on the contrary, to check materially the growth and vigour of the tree to which it is applied. Even the system of *shortening in*, or curtailment of the lateral branches, a mode of pruning now very generally adopted, though far preferable to the other, and when judiciously used frequently of decided advantage, may easily be carried to excess, as the author has seen in repeated instances. In short, it is seldom that trees planted in mass, or within a short distance of each other, require aid or assistance from the pruning knife, or are even benefited by the abscission of their lateral branches—the difficulty, on the contrary, is to induce trees so situated to retain these necessary and efficient members in requisite numbers, and for a sufficient length of time to insure a healthy and vigorous growth and a rapid deposition of the woody fibre. One of the most efficient modes of producing such an effect is, the timely application of another important operation, viz. that of thinning, the advantage of which, when properly administered, the author has endeavoured to impress upon his readers in various parts of his work.

" With respect to the planting of forest trees, he would briefly remark that he is not an advocate for the trenching of the ground previously to that operation, being convinced, from personal observation and experience, that no

adequate or remunerating advantage, either by a more rapid growth of the tree or an improvement in the quality of the timber, is obtained, sufficient to compensate for the great additional expense incurred, without taking into account the difficulty in adopting it in many districts well adapted to the rearing of wood, or where plantations are made upon that extensive scale now so prevalent throughout the kingdom. In regard to the statistics of the various trees described, the author has been obliged, from the restricted extent of his volume, to confine his remarks within narrow limits; this he cannot but regret, as he is aware the omission must prove a disappointment to many of his readers; it is, however, satisfactory to be able to refer them to so able a work as the 'Arboretum et Fruticetum Britannicum,' in which the statistical information respecting its various contents are generally full and satisfactory; Lauder's edition of 'Gilpin's Forest Scenery' also contains much interesting information of this kind, respecting the various trees noticed and enumerated in the pages of that delightful work."

Scotch Farming in the Lothians. A Letter addressed to the Editor of the "Manchester Guardian." By Robert Hyde Greg. Pamph. 8vo, pp. 33. London, 1842.

Every landed proprietor who wishes to make the most of his land, and to raise the character, and increase the comforts, of the tenantry and the labourers on his estate, ought to peruse this shilling pamphlet. We are aware that much of it will not be believed by proprietors, managers, and farmers, who have not been in Northumberland or Scotland, and we also know that there are a number of English proprietors who prefer having their lands held at will by their tenants. To these this pamphlet will be of no use, for the first step to improvement is the granting of leases of reasonable length. Necessity is the mother of improvement, as well as of invention, and we are much mistaken if the political changes which are taking place do not advance agriculture at a railroad pace. The following quotation will give an idea of the contents of the pamphlet:—

"Considering the fate of the Corn Laws to be sealed, and all unequal protection to the landed interest about to be withdrawn, I was anxious, both as a landlord and a farmer, to prepare for the state of things which such a change might introduce; more particularly as a farmer, to prepare myself, by increased skill and economy in the management of my farm, for the keener competition and lower prices which the free introduction of foreign agricultural produce must establish.

"I may, perhaps, just mention that my farm is in the county of Hertford, and consists of 500 acres. It is conducted on the best system current twenty or twenty-five years ago, very superior to any thing in these parts, and my bailiff was brought up in the Lothians; but aware that we might have been stationary, whilst elsewhere, as in Scotland, a rapid progress had been going on, I determined to ascertain the actual state of farming where it had made the greatest advance, and, with this view, desired him to meet me at Edinburgh on the first of July last. Owing to the kindness of a friend, who understood farming well himself, and who had an extensive personal acquaintance with the farmers, I was enabled to visit a number of farms of various descriptions, and to communicate with the farmers themselves in freedom and confidence.

"It would be uninteresting to the general reader, were I even competent to do it, which I am not, to enter minutely into details: those capable of understanding them should visit the country; and, whether they do so on a tour of profit or amusement, they will be amply repaid.

"The general conviction which remains upon my mind is this, that, with a system equal to that of the Lothians established throughout England, landlords might receive double rents, farmers be rich and prosperous, and the country be rendered, for two generations, independent of foreign supplies,

notwithstanding an abolition of all protective duties. I am confident the agricultural produce of England, Wales, and the West of Scotland, might be doubled; and that of Lancashire and Cheshire be tripled, and this without any material addition to the agricultural population."

Cottage Residences; or, a Series of Designs for Rural Cottages and Cottage-Villas, and their Gardens and Grounds, adapted to North America. By A. I. Downing, Author of a "Treatise on Landscape-Gardening." 8vo, pp. 187, illustrated by numerous Engravings. New York and London, 1842.

The author of this work seems to have taken for his model our *Suburban (Architect, and Landscape) Gardener.* Like it, the *Cottage Residences* contains a series of designs for residences of moderate extent, with plans for laying out the gardens, lists of trees and shrubs for planting them, general directions for their culture and management, and remarks on the principles of culture and of design and taste on which the whole is founded. Throughout, the author gives evidence of his having studied architecture as an art founded on principles (p. 10.), and he has produced a number of very handsome designs, not faultless, any more than ours are, but calculated to convey ideas of what cottage residences are susceptible of. We rather wonder that the geometric style of laying out grounds is not in higher esteem in the United States, because we should suppose that, where there is so much natural woody scenery, it would be desirable frequently to introduce the geometric style as forming the greatest contrast to it. Perhaps the reason may be, that this style is better adapted for extensive places, than for such as consist of only a few acres; or, perhaps, the idea of following the taste now prevalent in Europe may be, like other fashions, all powerful. Be these things as they may, we consider Mr. Downing's book highly creditable to him, as a man of taste and an author; and it cannot fail to be of great service in adding to the comforts, and improving the taste, of the citizens of the United States. A large edition of Mr. Downing's *Treatise on Landscape-Gardening*, noticed in our Volume for 1841, p. 421., has, we are informed, been already sold; which affords a most gratifying proof of the progress of refinement in a country where refinement seems to be the chief moral want.

The Botanical Looker-out among the wild Flowers of the Fields, Woods, and Mountains of England and Wales; forming a familiar Monthly Guide for the collecting Botanist. Interspersed with pictorial Glances, botanising Incidents, and Notices of many remarkable Localities of the rarer and most interesting English and Welsh Plants. By Edwin Lees, F.L.S., &c. Post 8vo, pp. 376. London and Cheltenham, 1842.

The object of the author is to "be in some degree useful, in attracting the many to the pleasures afforded by the examination of plants in their wild localities;" and for this purpose his work is divided into months. There cannot be a doubt as to the good that such a book is calculated to effect, by calling forth and nourishing one of the most rational and perpetually interesting tastes, and there seems no better plan of effecting this than that which he has adopted. The author seems precisely the sort of person that ought to write such a book, being a man of leisure, who pursues botany as a recreation, and not as a professor or a botanical author. Of course, the interest which he can throw into it depends, not only on botanical knowledge, and particularly that of our indigenous flora, but on his knowledge of country matters generally, and of poetry and history. From a cursory glance at the volume, the author does not seem deficient in any of these requisites. Every large town, or at least every county, ought to have such a work written on it, and we would not confine ourselves to indigenous plants, but include also foreign species, either in cultivation or planted in parks and pleasure-grounds, as rare

or ornamental. Some idea of the work will be obtained from the following headings to the chapters on January, February, and March.

JANUARY. — Introduction — Flowers in their relations to the Human Race — First aspect of the Year — Evergreens — Ivy and Holly contrasted — Natural History of the Mistletoe — Its Stations on various Trees — Trees upset by the Gales — Localities of remarkable Yew Trees — Yew-in-the-Oak — Groundsel, Dead Nettle, &c. — Stocking Gorse — Aspect of Nature.

FEBRUARY. — Various Tints of Buds and Twigs in the Sunbeams — Brilliant Effects of a Frozen Shower — Dandelion, Veronica, Daisy — Mosses in perfection of Beauty — Hellebore, Periwinkle — Sudden Snow Storm — The awakening of Spring in the Country and the City — Appearance of Gelatinous Fungi — Miseries of a Thaw — Snowdrops.

MARCH. — A March Morning on Malvern Hills — Crocuses, Mezereon, Apricot, Pyrus japonica, &c. — Flowers of the Woods and Fields — Flowering of the Hazel, Yew, and Elm — Vernal Indications — Various Species of Violets — Golden Saxifrage, Tuberous Moschatel, White and Yellow Awlworts — Daffodils and Sallows — Windflower.

ART. II. *Literary Notice.*

ILLUSTRATIONS of the Botany and other Branches of the Natural History of the Himalayan Mountains, and of the Flora of Cashmere. By J. F. Royle, M.D., F.R.S., &c., Professor of Materia Medica and Therapeutics, King's College, is about to be reissued in 22 monthly Parts.

MISCELLANEOUS INTELLIGENCE.

ART. I. *General Notices.*

ON the Existence of Sulphur in Plants. — M. Vogel, sen., remarks that it has been proved by the late M. Planche and other chemists that many plants contain sulphur. Water-cresses (*Lepídium satìvum L.*) are among those which especially contain much sulphur.

As soils distant from volcanoes do not contain perceptible traces of sulphur, it appears to M. Vogel not impossible, that plants which are much disposed to assimilate sulphur may have the property of deriving it from the decomposition of the sulphuric acid of sulphates. M. Vogel, however, found that seeds placed in a soil perfectly free from sulphur and sulphates yielded plants which contained a notable quantity of sulphur. The soil employed for this experiment consisted of coarsely powdered white glass; it was first strongly heated, but not fused, in a crucible, and, being afterwards washed with boiling water, not the slightest trace of any sulphate could be detected. Seeds of water-cresses kept in a moist state were placed in this, and when the plants were several inches in height, they were removed with their roots. After having washed the plants, the white fibrous roots were cut off, and these as well as the plants were dried; and, on heating them in a retort, it was found that both of them yielded considerably more sulphur than the seeds contained. The expressed juice of the young plants cultivated in the powdered glass also contained soluble sulphates. The seeds of water-cresses sown in coarsely powdered quartz, flint-glass, and very fine silica obtained from silicated hydrofluoric acid, yielded similar results with respect to sulphur and sulphates, though the plants did not flourish so well in the last as in the two former substances.

To obtain approximative results as to the quantity of sulphur in the water-cress seeds and the plants which they yielded, the following experiments were made. The seed (100 grains ?) was heated to redness in a retort, and the gases disengaged were received into a solution of potash; acetate of lead was added to the alkaline liquor as long as precipitation occurred. The precipitate was of a brownish colour, and consisted of hydrate, carbonate, and sulphuret of lead; the two former were dissolved by dilute nitric acid, and the sulphuret of lead remained, which, after washing and drying, weighed 0·95 gr. which indicated 0·129 gr. of sulphur. According to this experiment, 100 gr. of the seed contained 0·129 gr. of sulphur.

The young plants obtained from the growth of 100 grains of the seed were similarly treated. Their weight was 2040 gr.; they yielded, by the above-described process, 15·1 gr. of sulphuret of lead, equivalent to 2·03 gr. of sulphur: consequently the dried plants contained more than fifteen times as much sulphur as the 100 gr. of seed which produced them.

According to this, 100 lb. of the dried plants would yield nearly $\frac{1}{5}$ of an ounce of sulphur, although grown where none could be obtained by the roots.

As the growth of the young plants of water-cresses took place in a soil devoid of sulphur and sulphates, and in a room which contained no sulphurous vapours, the origin of the sulphur, M. Vogel remarks, is to him a perfect enigma, and at present he confesses that he is unable to give a satisfactory explanation of it. (*Journ. de Pharm. et de Chim.*, Mar. 18. 1842, as quoted in *Phil. Mag.* for July.)

Soils. — In affording warmth to plants, the earth is of considerable utility, and the power of accumulating and retaining it varies as much in soils, as the proportions of their constituents. Sir Humphry Davy found that a rich black mould, containing one fourth of vegetable matter, had its temperature increased in an hour from 65° to 88° by exposure to the sunshine, while a chalk soil was heated only to 69° degrees under similar circumstances; but the first, when removed into the shade, cooled in half an hour 15°, whereas the latter lost only 4°. This explains why the crops on light-coloured tenacious soils are in general so much more backward in spring, but are retained longer in verdure during autumn, than those on black light soils; the latter attain a genial warmth more readily, but part with it with equal speed. The following experiment, which has often been successfully repeated upon light as well as tenacious soils, demonstrates how greatly the colour of a soil influences the accumulation of heat. Coal-ashes were sprinkled over half the surface of beds sown with peas, beans, &c., and on these the plants invariably appeared above ground two or three days earlier, obviously on account of the increased warmth; it being a well-known fact that dark bodies absorb caloric more readily, and in larger proportions, than those of lighter hue. (*Cambridge Chron. and Journ.*, May 28. 1842.)

Trenching stiff Soils. — By the old method of ridging or trenching, we do not obtain such a thorough pulverisation of the soil as may be desirable. During my twelve years' service at Cannon Hall, where I had to contend with a stubborn and clayey soil, I found the method which the annexed diagram may serve to explain answer my wishes better than any other that I could hit upon. Let *a*, *b*, *c*, *d* represent a section of the ground to be trenched 2 ft. deep. In the first place, the ground is measured out in longitudinal beds, 4 ft. wide; this done, the top spit of the bed *e* is laid on the bed *g*; and the second spit of the bed *e* is laid on *h*. The first or top spit of the bed *f* is then laid on the bed *i*, and the

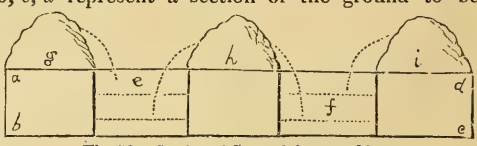

Fig. 56. *Section of Ground for trenching.*

second spit from the bed *f* is laid on *h*. So that the top-soil and sub-soil are kept on separate and alternate beds, and may be mixed, reversed, or returned as taken out, at the will of the operator. By this method, the advantages are, a much greater exposure of surface to the action of the weather; the opportunity of incorporating with the soil any desirable or obtainable manures, and at any desired depth ; a thorough blending of the soil to the depth of two or three feet ; and it also facilitates the operation of draining where necessary. It is needless to add, that, when the first thrown-out beds are sufficiently pulverised, they are levelled down, and the others thrown out in the same manner. (*T. Parkins* in *Gard. Chron.* for 1842, p. 6.)

Utility of the Rook.—Although, at certain periods of the year, rooks do considerable mischief, yet they make ample compensation in the end by destroying the grubs of the cockchafer, and other under-ground feeding insects, which, if left to themselves, would utterly destroy the crops which the rooks only partially injure. Mr. Yarrell, in his *History of British Birds*, says:—"On some very large farms in Devonshire, the proprietors determined, a few summers ago, to try the result of offering a great reward for the heads of rooks: but the issue proved destructive to the farmers, for nearly the whole of the crops failed for three successive years; and they have since been forced to import rooks and other birds to re-stock their farms with. A similar experiment was made a few years ago in a northern county, particularly in reference to rooks, but with no better success: the farmers were obliged to reinstate the rooks to save their crops." (*Camb. Chron. and Journ.*, June 11. 1842.)

Plums on calcareous Soil.—Have you ever heard that plum trees thrive best in the limestone districts? In confirmation of this, my garden never fails of an abundant crop of apricots, which, you know, are grafted on plum stocks. From seven trees I shall pick this year from 150 to 200 dozen.—*P. F. M. July* 22. 1842.

Grape-growing.—I have tried with great success the filthy feeding system for grapes ; dead dogs, rats, calves, and horses have been buried about 10 or 12 feet from seven vines, which now, the third year, are going to give me an abundant crop of grapes; not less than 250 fine bunches.—*Idem.*

Orange Syrup.—This syrup is so easily made, and can be used so constantly to advantage, that no housekeeper should be without it. Select ripe and thin-skinned fruit; squeeze the juice through a sieve ; to every pint add a pound and a half of powdered sugar; boil it slowly, and skim as long as any scum rises ; you may then take it off, let it grow cold, and bottle it off. Be sure to secure the corks well. Two table-spoonfuls of this syrup, mixed in melted butter, make an admirable sauce for plum or batter pudding ; it imparts a fine flavour to custards ; and a tea-spoonful introduced into a glass of punch adds much to its deliciousness. (*Camb. Chron. and Journ.*, April 2. 1842.)

Potato Salad.—In your cottage gardening, when you are giving directions for the cooking and use of sundry vegetables, perhaps you might add a mode of making a potato salad much used in some parts of the Continent, and which would not only be useful to the cottager, but is thought by many to be delicious eating, particularly with salmon, or fish in general, or indeed any thing else. The mixture of vinegar, oil, mustard, salt, and hard egg is the same as for common salad, and according to taste; the potatoes are sliced when cold, with beet-root also sliced. The cottager may merely use the vinegar, salt, and mustard, and add sliced onions. (*Camb. Chron. and Journ.*, April 2. 1842.)

Taming and training Horses.—In confirmation of a paragraph on this subject, inserted in p. 328., we quote the following:—"The taming of horses," says the *Newbourn Advocate* (a North Carolina newspaper), "by breathing in their nostrils, seems to be gaining friends. Mr. David Clayton, of Tyrrel county, having seen an article in our paper stating that horses had been rendered gentle by breathing into their nostrils, determined to try it on a

young mule belonging to him, who would suffer no person to handle him. Mr. Clayton fastened him in a stable, and, after considerable trouble, succeeded in breathing several times in his nostrils. Before he left the stable the mule became gentle, and would stand still and suffer himself to be rubbed, and would nose and smell around him. He followed Mr. Clayton out of the stable, around the yard, and wanted to go into the house. We advise our friends who have colts to break to try the experiment; if it does no good, it can certainly do no harm." (*Stamford Mercury*, as quoted in *Morn. Chron.* October 8. 1842.)

Art. II. *Foreign Notices.*

CHINA.

Manure among the Chinese. — In arranging the various classes of the people, the Chinese place the literati in the foremost rank, as learning is with them the stepping-stone to honour; but, immediately after the learned, the husbandman takes the precedence of all others, because, being engaged in raising the necessaries of life, he is abundantly more important than the mechanic, who merely changes the form of matter, and the merchant, who originates nothing, but only barters and exchanges commodities for the sake of gain. This honour put upon agricultural employments is evidently the result of design; and shows that the country, being overstocked with inhabitants, needs cultivating to its utmost extent, in order to provide the people with sustenance. The industry and skill of the Chinese, striving to produce as many of the necessaries of life as possible, would also argue a dense population, ever struggling against threatening want, and compelled to exert themselves for their daily bread. In tropical climates, where the ground is fertile and the population scanty, the natives find that by a few months' labour they can produce sufficient food for a whole year's consumption; and are, therefore, indisposed to exert themselves further: but in China the inhabitants are incessantly employed; and every individual is obliged to be busy in contributing his quota to the commonweal. Every one in the least acquainted with the manners of the Chinese knows that they are untiring in their exertions to maintain themselves and families. In the business of agriculture they are more particularly active; raising two crops from the ground every year, extending their cultivation, and bringing the most unpromising spots into use, in order that nothing may be lost. Their skill in effecting these objects is not, considering their few advantages, contemptible. They thoroughly understand the importance of varying the crops; they know perfectly well the seasons and soils adapted for certain productions; and they are fully sensible of the importance of manuring the ground, in order to maintain its fertility. A stranger is struck with this on first setting his foot on the shores of China. Most individuals met in the paths of the fields are provided with a basket and rake; and every evening the cottager brings home a certain quantity to add to the dung-heap, which is a most important appendage to every dwelling. Having but few sheep and cattle, they are obliged to make the most of the stercoraceous stock of man and swine. This is carefully collected, and actually sold at so much per pound; while whole strings of scavengers may be seen cheerily posting into the country every successive morning with their envied acquisitions; little heeding the olfactory nerves of the less interested passengers. Every other substance likely to answer the end is anxiously collected, and carefully disposed, so as to provide for future exigencies; such as decayed animal and vegetable matter, the sweeping of streets, the mud of canals, burnt bones, lime; and, what is not a little singular, the short stumpy hair, shaven from millions of heads every ten days, is industriously gathered, and sold for

manure throughout the empire. (*Madras Almanac for* 1841, in *Camb. Chron. and Journ.* May 14. 1842.)

NORTH AMERICA.

Strelítzia regìnæ. — There are several specimens of this beautiful plant in this city. About two years since, Mr. Dreer, florist and seedsman, had one in flower, and, as he was uninformed about its history, I gave it to him, and having inserted it in a daily city paper, a purchaser was speedily found at ten dollars. The British botanists and cultivators of plants know its locality and discoverer, but may probably not know all I am about to write concerning the latter, and therefore I send you the article alluded to. "The late distinguished friend and liberal patron of science, Sir Joseph Banks, Bart., in early life was an ardent cultivator of botany and natural history, and, although under an actual matrimonial engagement, applied for and obtained the place of naturalist to the first expedition under Captain Cook, and at the Cape of Good Hope met with the plant in question. Finding it to be a new genus, he, with great tact, determined to name it after the queen of England, a princess of the house of Mecklenburg Strelitz, and coined for it the classical name of Strelítzia, adding regìnæ. A greater compliment could not have been paid her. But you will ask, what became of Mr. Banks's betrothed? I heard several years since from M. Correa de Serra, that the suspension of Mr. B's proceedings was not relished by the lady or her friends, and excited some severe remarks; which, however, were soon quieted by the powerful charm of a draft in her favour on his banker for 10,000*l.*; not that he loved her less, but that he loved "science more." M. Correa's standing as a botanist is well known. It was he, as you know, who ascertained that the Doryánthes excélsa was a new genus, and gave it an appropriate name. He resided eleven years in England, as secretary of the Portuguese legation; and afterwards in this city, first as a private man, and subsequently as minister from the court of Brazil. — *J. M. Philadelphia, August*, 1842.

Agàve americàna. — Mr. B. Duke, the successor of B. M'Mahon, is now exhibiting at the Masonic Hall an agave in flower. It is stated by him to be one of the original plants grown by Mr. Hamilton, at the Woodlands, in Blockley township, Philadelphia county; and which, after his death, came into the possession of Mr. M'Mahon's family, and thence to the present owner. The plant first exhibited its flower-stem on the 17th of May, and from that time to the 8th of July, it increased daily from 2 in. to 9 in., when it had attained the height of 20 ft. 1¼ in. It then commenced throwing out lateral branches and forming its buds, and continued to do so the greater portion of the month; on the 29th it expanded its first flower, at which time the spread of the lateral branches, from tip to tip, was nearly 5 ft. The whole number of these is twenty-two. The probable number of flowers which will be displayed on the plant cannot be less than from 1300 to 2000. The summit clusters expanded two days since, and now the plant presents a magnificent spectacle. It is supposed to be ninety-five years old. A sixth American specimen is said to be about to flower in the greenhouse of Mr. Van Rensellaer, of Albany, New York. The editor of the *Saturday Courier*, of Philadelphia, says that a few years since he saw one in flower in the greenhouse of Mr. Peter C. Brook of Boston: this makes seven specimens in the United States. — *Idem. August* 11. 1842.

[For an account of the flowering of three plants of the Agàve americàna in America, see *Gardener's Magazine*, vol. vii. p. 454.]

Venerable Cactus. — In the beautiful greenhouse of Joshua Longstreth, Turner's Lane, about two miles from the northern limit of Philadelphia, is a specimen of *Cáctus triangulàris*, venerable in years, as it is lofty in stature. It has been in possession of the present owner thirty years; it was held by the former one forty years, and he supposed it about ten years old when it came into his possession. It is 17 ft. high. — *Idem.*

Art. III. *Domestic Notices.*

ENGLAND.

Ipomœ'a Leárii, turned out in June into an open border, and trained against the east end of the stove-house in the Oxford Botanic Garden, has thriven exceedingly, and has produced its beautiful blossoms in tolerable abundance. —*W. H. B.* [So it has at Rose Hill, under the management of Mr. Ogle, where we saw several square yards of terrace wall covered with its blooms on October 15.]—*Cond.*

Hédera Hélix.—At Godston, near Oxford, amongst many fine specimens of ivy which thrive on the ruins of the nunnery, are two which more particularly attracted my observation. One has a trunk which measures, at about 1 ft. from the ground, full 3 ft. in circumference; and then divides into two branches, each being about half the size of the main stem: the other is flattened by its close contact with the wall, from which it projects about 10 in., and is, in its widest diameter, 1 ft. 4 in. The branches extend a considerable distance over the old walls, and have not the least appearance of decay.—*W. H. B.*

Art. IV. *Retrospective Criticism.*

Virgin Soil. (p. 70.)—A paper of mine on virgin soil (p. 70.) was written in consequence of a letter which appeared in the *Gardener's Gazette*, signed R. By your Magazine for August, I find that Mr Lymburn was R. and that he differs a little from me in opinion. However, as he truly says, "the difference is more in the application of the term than in any thing else." Perhaps I ought to have been more careful how I expressed myself: for instance, when I mention that I hardly knew what an alkali was, although it is pretty well understood what constitutes an alkali, he or any one else might see I expressed myself in a joking way; when alkalies are derived from rocks, better have them ground. Mr. L. considers that a tithe of the labour I bestow on the study of bees would be better applied to the study of geology and chemistry: this may be true; but if he considers the study of bees a small one he is mistaken, for illustrious men of all ages have thought it worthy of attention. Among the ancients were Aristotle and Virgil; among the modern naturalists we have Swammerdam, Reaumur, Huber, Bonnet, Hunter, and others. But to return to the subject of virgin soil; whether that term ought to be applied to surface soil, I mean that from rich pasture land, or subsoil as Mr. L. will have it; to the latter, I will not dispute, but observe that subsoil would be of little use for the same purpose that gardeners put the former to. Mr. L. observes that a little of the latter is useful, mixed with "soil so spent and worn out that no manure we put on it will renovate its lost powers." But the grand question is, what are those lost powers? Mr. L. has given a very good account of the manner in which soils are affected by manures and by different kinds of crops; still there are some things yet to be learned on this subject. In my former paper I mentioned that Mr. L. considered that the excretions from the roots of plants may have something to do with it; but we have yet to learn if there be such a thing after all as excretions. May it not have been a fungus that led to such a notion?—*J. Wighton. Cossey Hall Gardens, August* 26, 1842

THE

GARDENER'S MAGAZINE,

DECEMBER, 1842.

ORIGINAL COMMUNICATIONS.

ART. I. *Recollections of a Gardening Tour in the North of England and Part of Scotland, made from June 22. to September 30. 1841.* By the CONDUCTOR.

(*Continued from* p. 440.)

AUG. 3. — Melrose to Dalkeith, by Dryburgh Abbey and Thirlstane Castle. The ruins of Melrose Abbey are, perhaps, the best preserved ruins of the kind in Scotland, though they admit of the improvement of showing the whole of the original floor, by removing from it the heaps of rubbish with which it is now disfigured. The accompanying burying-ground is extensive and not over-crowded with graves, and it might be surrounded and intersected with some straight gravel walks; and along these might be planted a few Irish yews, and other evergreens, chiefly of cypress-like shapes, which would afford agreeable walks for the inhabitants, and display the abbey to advantage to strangers. There are not many grave-stones that would be found in the way of the walks; but, where these did interpose, the symmetry of the walk could always be preserved by expanding it voluntarily as much on one side of the grave-stone as it was expanded from necessity on the other; surrounding the grave-stone with a circle or an oval of grass, or grouping it with a tree or shrub, where necessary or advantageous. If the levelling down of the grave mounds were an objection, soil could be procured so as to raise the walk above their level, which would give it a terraced character, rather desirable than otherwise, by affording the spectator a more commanding view on each side. It is much to be regretted, that a regular system of laying out the burying-grounds of country churches is not adopted; and also a prearranged system, such as we have described in our *Suburban Gardener*, followed in making the interments. The walks of burying-grounds might have borders, and along each of these might be planted a row of low trees, alternately evergreen and cypress-like, and deciduous and round, or spreading-headed; and these borders might be let out in perpetuity, in portions, for erecting tombs; while the interior of the compartments might be ex-

clusively devoted to graves having no tombs, or to persons who, or whose friends, preferred a tablet put up on the walls of the church, as a writer in the *Quarterly Review* for September, 1842, judiciously recommends. *Figs.* 57. and 58., borrowed from our *Suburban Gardener*, will show what is meant without further explanation. We are advocates for the American mode, of allowing every man to bury on his own property, with or without a tombstone, or other mark of remembrance, as he might choose, but simply under such restrictions and regulations as public health and decency might require. We are persuaded that it will ultimately come to this, and that public grave-yards will only be resorted to by those who have no garden or field that they can call their own. Few will deny that the public health would incur less risk of being injured by such a change, and in many cases, we believe, the feeling of respect for the memory of parents and relations, and the good consequences of that feeling, would be kept more alive than is now the case under the churchyard system. The clergy alone would be the sufferers, and it would be but justice that the existing race should have a compensation.

Dryburgh Abbey; the Earl of Buchan. Great pains were taken with this place by a former earl, who planted an extensive orchard, many cedars of Lebanon, and other ornamental trees, and erected some ornamental buildings. We regret to say that the whole place appeared to us in a state of neglect, and no part more so than the grounds about the ruins. The sheep were injuring the fruit trees and the cedars, by rubbing against their stems, and the cattle breaking down the fences. The ruins are extensive, but they are too much encumbered with trees and shrubs, and, what is worse, with dug ground and flowers. Dug ground about an old building, when carried to any extent, always gives the idea of yesterday, and checks the feeling of veneration which would otherwise predominate. The floors of the interior of these ruins are heaped up with rubbish, and overgrown with rank plants, and there is a damp vault set round with busts of stucco, such as are sold in the streets, which are shown by the guide, who evidently thinks them of far more importance, and more deserving of attention, than the ruins themselves. The poor woman who shows these busts and gives them names knows no better; but what are we to think of the proprietor of the place, who permits such things? By nature, Dryburgh Abbey has immense advantages, and these ruins are objects of intense interest, which might be turned to good account in rendering the place worthy of respect and admiration, instead of creating, as it now does, feelings of an opposite nature.

Thirlstane Castle; the Earl of Lauder. After passing a

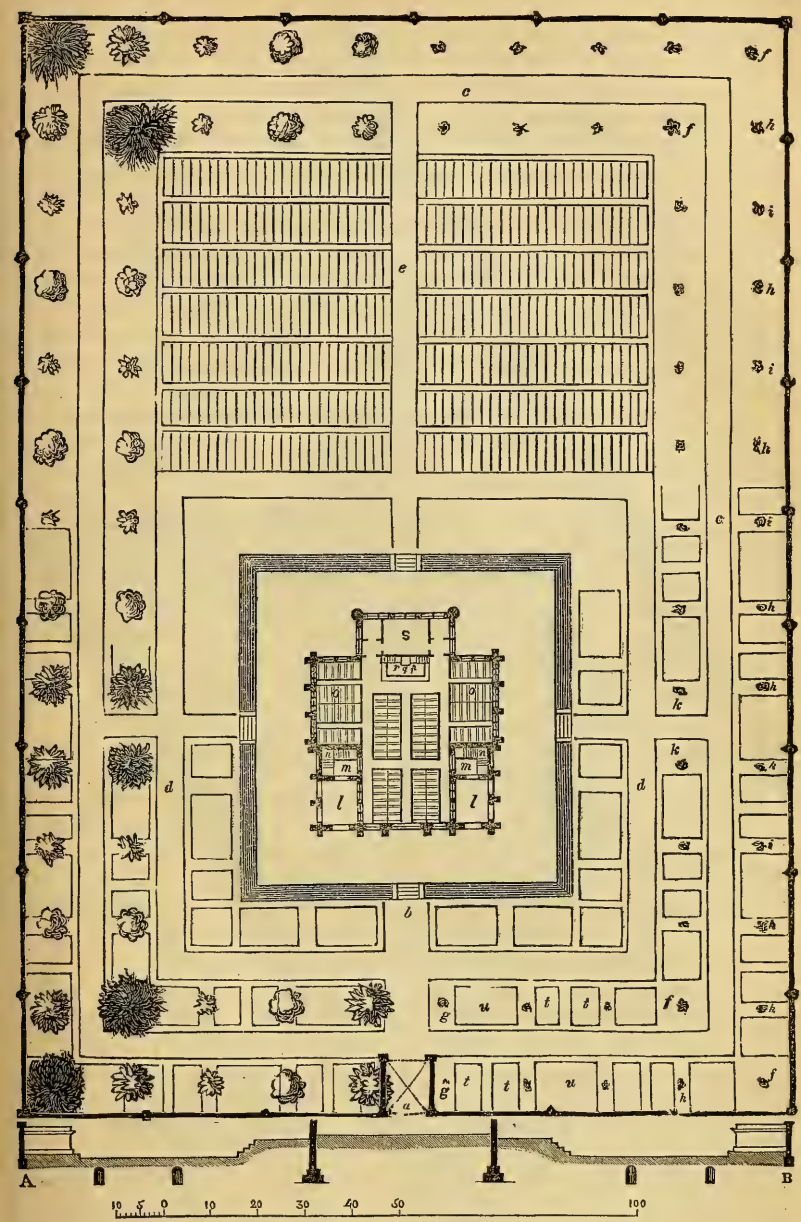

Fig. 57. *Ground Plan for a Country Churchyard.*

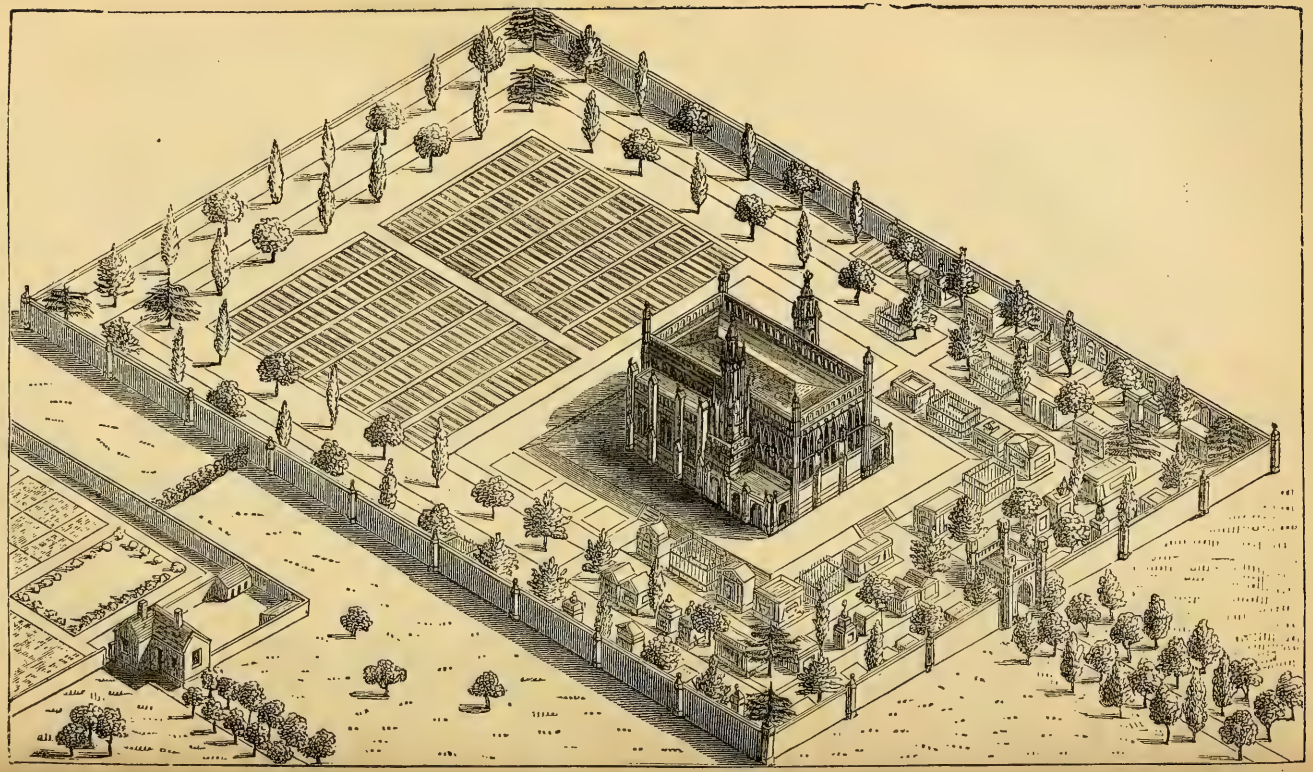

Fig. 58. *Isometrical View of a Design for a Country Churchyard.*

number of gentlemen's seats possessing many natural beauties, but exhibiting very little good architecture or landscape-gardening, the absence of the latter easily ascertained by the isolated clumps and the want of scattered trees in the parks and lawns, we come to Lauder, close to which is Thirlstane Castle. The building is of great antiquity, and, besides one or two very ancient rooms, it contains a number which were richly finished in the Louis XIV. style, prevalent in the time of Charles II. These rooms are chiefly remarkable for their gorgeous ceilings, exhibiting wreaths of fruit, foliage, and flowers, in very high relief; arabesques of extraordinary combinations; and, in some of the rooms, domes raised in the centres of the ceilings, and painted in imitation of the sky, with gilt stars. The beauties of arabesque decoration are not generally understood. Many object to them because they are not natural, but it is their fanciful character which constitutes their beauty. Reason gives up the reins to the fancy, and we delight to be led about by that power into regions where every thing is not only new but strange. Nonsense in the midst of sense is often a relief to a mind kept on the rack, and arabesques are the nonsense of high art. Thirlstane Castle is undergoing extensive alterations and additions under the direction of Mr. Burns, and, when finished, will probably be one of the finest things of the kind in Scotland. A new kitchen-garden, and an extensive range of hothouses, have been formed under the direction of Mr. C. H. Smith, and they do him very great credit.

The landlord of the inn at Lauder has travelled a good deal in America, and is very intelligent. It is always refreshing to meet with a man who has seen the world, but more especially when this is unexpected. The mind delights in being transported from the present time and the surrounding circumstances to other times and countries. Contrast of ideas is as effective in producing enjoyment, as contrast of form or of light and shade is in producing picturesque effect.

In descending from the Lammermuir hills, we look down on the rich plain of the Lothians as on a map. Pass on the left some overpruned plantations of larches, and on the right a temperance hotel. An excellent inn at Dalkeith.

Aug. 4. — *Oxenford Castle;* the Earl of Stair. The castle is in a commanding situation, but has the common fault of being entered on the side that has the best views, and showing a stranger not only these, but the whole of the lawn, before he alights at the main entrance. The kitchen-garden is undergoing a thorough reform by Mr. Gardiner, a master in his art. A great many hollies are planted in the young woods, and the plants are protected from hares and rabbits by circular fences, 1½ ft. high, and 2 ft. 6 in. in diameter, formed entirely of the

branches of young larch trees; their ends being stuck in the ground so as to form a circle round the plant, and their points woven into one another, as in the finishing of a common wicker-work hamper. There are a new church, new parsonage, handsome new factor's house, lodges, cottages, farm offices, all seen more or less from the public road, and all most substantially built of stone, and in good taste, at the earl's expense. The Edinburgh approach to the castle is excellent, but the other is less fortunate, showing only one side of the house, instead of coming up to it diagonally, so as to show two sides. Additional to the main door, there is a side or subordinate one, called the luggage door; a characteristic of Scotch mansions, arising, no doubt, from the hospitable habits of the country.

Preston Hall; —— Dick, Bart. The park is crowded with magnificent trees, of a number of which we were promised the dimensions. There are a large and very superiorly designed kitchen-garden, and an excellent gardener's house of three stories, large enough for a farmer; but, as we generally enquire into details, we found this house, like many, we may say most, other gardeners' houses in Scotland, without a convenience essential both to delicacy and cleanliness. The number of large and commodious gardeners' houses in Scotland which are altogether defective in this particular would not be credited in England. Forty different kinds of fig are cultivated in the garden here, and, by the aid of glass and artificial heat, figs are sent to table from the middle of May till winter.

Newbattle Abbey; the Marquess of Lothian. The abbey is finely situated in a bottom, surrounded on every side by high banks covered with wood. It stands close to the Esk, with a considerable portion of level ground on one side, varied by old trees; the whole expressive, in a high degree, of the peaceful combined with the grand. There are many fine trees, both on the level ground and the declivities, the most remarkable of which are, an immense beech, a sycamore, and a Scotch elm, the dimensions of which are given in our *Arboretum.* In the kitchen-garden, which, with the gardener's house and some flower-garden scenery, is most picturesquely situated, we found a raspberry plantation which had not been renewed for forty years, and which still continued to bear abundant crops.

Dalkeith Palace; the Duke of Buccleugh. As we had not time to see this place properly, we shall say little about it. There is an excellent kitchen-garden, newly formed; but the walls, in our opinion, are altogether deficient in architectural dignity. We would have had rich Elizabethan gateways and doorways, an architectural coping, and various other details, which, without interfering in any way with culture, would have lent dignity and character to what, speaking always with refe-

rence to architectural design, is mean and commonplace. We were the more surprised at this, because, from Mr. M'Intosh's remarks on the "entrance to the kitchen or culinary garden," in his *New and Improved Practical Gardener*, p. 27., we were led to expect something very different. The chimneys are not, as usual, carried up in the back wall, but very judiciously behind in the outer or lower wall of the back sheds, in order to prevent the soot, which the coal here produces in immense quantities, from dropping on the glass. As far as we recollect, there was not a pond in the centre of the garden, which is always desirable, in order that the water in summer may be warmed by the sun, to the same temperature as the soil. The great importance of this has been admirably pointed out in our Volume for 1840, and will be recurred to in a future page of this article. The crops, both in the open garden and in the forcing-houses, were excellent, and the order and keeping unexceptionable. The design of the flower-garden to the south of the kitchen-garden will, no doubt, be reconsidered.

Aug. 5.—Dalkeith and Dalhousie Castle to Edinburgh. Walked to some magnificent viaducts for facilitating the transit of coals to Edinburgh by railroad, which have been erected by the Duke of Buccleugh; and we cannot help expressing the great satisfaction that we felt at seeing the various public works at Dalkeith and Granton erected by this nobleman. They will not only greatly benefit his own property, but prove beneficial to the public. Would that His Grace were imbued with similar ideas to ours on the subject of increasing the comforts of the labourers on his extensive estates, by improving their dwellings, adding gardens to them, providing schools for educating their children, and taking care, as in Germany, that they were all educated, and bearing in mind the wants of the aged and infirm! Would that His Grace had the same ideas as the Rev. Dr. Gilly, and the late Rev. William Gilpin, on the subject of improving the condition of the cottager!

"Suppose," says Dr. Gilly, "70*l.* to be the average cost of a substantially good cottage, will the comfort of a faithful dependant and his family be heavily bought at this price? [The average of what Lord Roseberry's cottages have cost.] Why is the happiness of rural life to be nothing more than a romance, a poetical image, when it is in the power of so many land-proprietors to realise all that is imagined of smiling gardens, and snug habitations, and contented cottagers? The true beauty of a landscape, as Gilpin has said in his *Forest Scenery*, consists, not 'in the mere mixture of colours and forms, but in the picture of human happiness presented to our imagination and affections in visible and unequivocal signs of comfort.'

"Oh, when will the law of love be felt in its supremacy?

When will it be felt that there is no security for property like the affection of those whose labour is our wealth?

"Oftentimes when I see ornamental lodges, and pretty dairies, like fairy bowers, in a cool and sequestered corner of the park; and gardener's houses, decorated without and full of accommodation within; and dog-kennels, which may be called canine palaces; and stables, like sacred temples, so totally free from every pollution, that you would suppose it profanation to suffer a particle of filth to remain one moment on the pavement; often when I see these things do I indulge the ardent hope, that the time will come, when the peasantry on a property will have as much taste and forethought expended on them, and that snug cots and happy-looking inmates will be considered the chief ornaments of an estate." (*The Peasantry of the Border, &c.*, p. 37.)

To show that the cottages on some part of the Duke of Buccleugh's estates require his interference, or did so in 1831, we refer the reader to a passage in our eighth Volume; but, as this volume is now out of print, we shall quote it in a note.*

* "We are persuaded that many absentee landlords are ignorant of the sort of cottages which already exist, and still continue to be erected, on their estates. It is difficult for us to persuade ourselves that the wives, who are perhaps mothers, of these men of wealth are aware of the large families that are born and live together in one square room, open to the roof, with no division but that formed by wooden bedsteads, and with no floor but the earth. We cannot believe, for example, that the Duchess of Buccleugh, whom we know to be highly cultivated, and who has the reputation of being kind-hearted and charitable, ever entered any one of the fourteen cottages lately erected on one of her husband's estates, not far from his magnificent palace of Drumlanrig, in Dumfriesshire. On crossing the country from Jardine Hall to Closeburn, Aug. 9. 1831, we passed the farm of Cumroo. The farm-house and farmery are ample and most substantial-looking buildings. The dwelling-house is more than usually large, with two rooms in its width; a part of its exterior wall is covered with large well-trained fruit trees; and there is an excellent kitchen-garden, well stocked, and apparently in good order, in which a professed gardener (judging from his blue apron) was at work; so that the whole, had it not been for the farmyard behind, might very easily have been taken for a mansion residence. Passing this house, and advancing about a furlong, we came to a row of fourteen cottages occupied by yearly servants of the farmer and occupant of the large house, who, we were told, came from the best cultivated district in Scotland, East Lothian. Observing that to every door in the row of cottages there was but one window, we entered one of them, and found a woman sitting at a table, writing a letter (which seemed in a very good hand for a person in her rank of life), while she rocked the cradle with her foot. The room, which comprised the whole cottage, was about 14 ft. square, without a ceiling, and open to the roof; the floor was of earth, and the walls were left rough, just as the stones were put together in building, but whitewashed; there was a fire-place, but only one fixed window of four small panes. In this room there were two box beds, placed end to end, and behind them a space of about 2 ft. in width for fuel and lumber. The furniture and utensils, though scanty, were clean and neat; more especially when contrasted with the floor, which, underneath the beds, was of earth, quite loose; though, near the fire, were laid some flat stones, which the woman said her husband had picked up and put down himself. The cottage window, as already ob-

Dalhousie Castle; the Earl of Dalhousie. The castle has much of appropriate character, and, indeed, is one of the best habitable really old castles which we have seen in Scotland. Here the gateway, formerly shut with a portcullis, comes in as a feature with admirable effect. As the gardens and grounds are described and illustrated by engravings in our first Volume, we shall say little about them. The finest part of the place is the walk along the banks of the river to the kitchen-garden, and the walk back again on the other side through a wood. The late earl was much attached to this place, and greatly improved it, and his lady, it is well known, was an excellent botanist. Many American trees and shrubs were sent over by the earl whilst he was governor of Canada, only some of which are in a thriving state, owing to the poverty and humidity of the soil, and the proximity of more robust-growing trees. The best we saw was *P*ìnus Banks*iàna*, 14 ft. high. A hedge of evergreen hollies, the main stems of which have been cut at 3 ft., in order to throw vigour into the lateral branches, and cause them to spread out, forms the separation of the river walk from the kitchen-garden, and is decidedly the finest thing of the kind we have ever seen. The great variety of ground outline formed by the extension of the branches over the lawn, and of the outline against the sky from the different heights to which their extremities have turned up, the different kinds of variegation, and the different degrees of vigour, are sources of endless variety; while, all the plants being of the same species, the principle of unity is not interfered with. A most picturesque and beautiful screen is thus produced in a very limited space. No part of this hedge is above 7 ft. high, and many parts of it not more than 3 ft., and it varies from 6 ft. to 18 ft. in width. The line of these variegated hollies is indicated in the plan in our first Volume, p. 252. The silver firs on this estate were all killed a few years ago, when they were between 30 and 40 ft. high, by the mealy bug. A plant of *H*eracl*èum* aspérrimum was 11 ft. high, with the radical leaves covering a space 12 ft. in diameter.

The road from Dalkeith to Edinburgh is broad, kept in excellent repair, and passes through a country so much altered from what it was in 1806, when we last saw it, that we should never have recognised it to be the same territory. Every farmyard has now a high, and often handsome, chimney for its steam-

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served, was fixed, and incapable of opening to give air. There was no back door, and no opening either in the roof or walls for ventilation, except the entrance door and the chimney. There was no appendage, or garden ground of any sort, behind these cottages; but, across the road, in front of them was a narrow strip of ground, divided so as to allow one fall (36 yds. square) to each cottage. In these gardens there was no structure of any kind."

engine, which reminds us much more of Birmingham than of any part of Scotland, except Glasgow. The low round towers, often with the walls ragged at top, so as to give the idea of the remains of high towers, built over the orifices of the old coal pits, are also to us a new feature; to which we must add, that the direction of the road has been changed, in some places so much so that we could not recognise Libberton Kirk (where we went to school in 1796), and that plantations newly made when we left the country are now grown up, furnishing by their thinnings useful timber. We were much gratified with the prevalence of the balsam poplar in the plantations at St. Catherine's near Edinburgh, because that is the first tree that comes into leaf in the spring in every part of the northern hemisphere, and nothing can be more beautiful than the delicate gamboge yellow of its foliage when it first expands. This tree does not attain so large a size as the other poplars, nor does it produce much timber; but it is, as we think, by far the most ornamental species of the genus. The largest trees we saw were at Valleyfield, where they are as high as those which we have figured in the *Arboretum* from Syon; but, having been drawn up by other trees, they are much less handsome in their shapes. We stopped at present only one night in Edinburgh, and, after dining at an advertising hotel in Princes Street, and being imposed on both by the master and servants, we took an incognito stroll in the old town, and visited some of the closes and wynds that were formerly familiar to us. Nothing struck us more forcibly than the appearance of the Norloch, covered with trees that were not even planted when we left Edinburgh.

Aug. 6.—*Edinburgh to Kinross.* At North Queen's Ferry we went to see a beautifully situated small place which once belonged to Captain Maconnochie, author of *Australiana*, now in Australia, and where his amiable and accomplished lady displayed her taste and skill in the flower-garden. The outer gate was open, and we passed through the whole place, including the lawn, shrubbery, and kitchen-garden, without seeing a human being. This, however, is not so rare an occurrence as one unaccustomed to see a great many places might imagine. We were much gratified with the situation of the house, entered from behind, the views from the windows in front, and from the walks in the beautifully varied grounds. The whole place, however, was in a state of comparative neglect. There is a curious piece of architecture in the little town of Inverkeithing, which we should have been glad to have had a sketch of. Pass *Fordell*, Sir Philip Durham's; the gate between two obelisks, each of one stone; and the road within raked in the manner almost peculiar to the Continent and to Scotland, and which has probably originated in the want of binding gravel.

Blair-Adam, Admiral Sir Charles Adam, has been already beautifully and faithfully described by Mr. A. Mackenzie (p. 357.). It is a place extremely interesting, both from its natural beauties and the great improvements which have been made on it by three generations of the same family. The approach to the house is partly through a dense wood of silver firs, with trunks clear to the height of from 50 ft. to 70 ft., and the trees stand so close together that the number of cubic feet per acre must be enormous. There is a fine Italian feeling evinced in the kitchen-garden by its massive stone walls, with bracketed cornices, piers, and vases, and with the gardener's house forming the central portion of the north wall. On the south side the garden is open to a lawn and shrubbery, with a winding brook, the whole managed in a manner which produces the very best effect. In the interior of the garden there are some pedestals and vases artistically placed along the walks, that is, placed in recesses of gravel, as we have recommended on various occasions; and we were gratified to learn from Mr. Mackenzie that he had adopted this mode from principle. The garden was well cropped, and was particularly rich in small herbs, perfumery, and medicinal plants, and there was also a very excellent collection of herbaceous plants, including ferns, arranged according to the Linnean System, and named. This collection was made by the late gardener, Mr. Henderson, for some years foreman of the Edinburgh Botanic Garden, in conformity with the practice of the last century, when the culture of flowers was carried on in the same enclosure as that of fruits and culinary vegetables, except in the very largest gardens.

Lochleven Castle is a ruin on an island in the loch, chiefly interesting as having been the prison of Queen Mary. We examined the walls of the room in which she is said to have been confined, and found some curious details characteristic of the rude contrivances of the age, even where royalty was concerned. The water of the lake has been lowered several feet by draining, so that the wall containing the window from which Queen Mary is said to have dropped into the boat is now several yards from the water's edge. The island on which the castle stands is deprived of much of its interest by having been trenched and planted with trees, for the purpose, as our guide informed us, of protecting game for the proprietor, at present a minor. When these trees are grown up, the remains of the castle will be completely obscured by them; but the proprietor, when he comes of age, will, we trust, have sufficient taste to restore the island to the state it was in a few years ago.

Kinross House; —— Graham, Esq. The mansion stands on the mainland, on a promontory jutting into the lake. It was built by Sir William Bruce, a celebrated architect in the latter

end of the 17th century (1685), for his own residence; but he did not live to see it completed. A more symmetrically arranged house and gardens there could not well be. The approach to the house is a straight avenue on one uniform slope, very nearly a level, produced by cutting through hills and filling up hollows, in a manner most instructive to the landscape-gardener. The whole place has been unoccupied for nearly half a century; but the walls being substantial, it might be restored at a moderate expense, and be one of the finest things of the kind in Scotland. An excellent hint for the walls of kitchen-gardens might be taken from those of Kinross House, and the terraced platforms, though in ruins, are not less instructive. Even the walls of the sunk fences here are finished with massive stone copings, with mouldings, weatherings, and throatings, so substantial as to appear as sound as when they were first put up. In the woods there are some fine old sycamores, pines, beeches, and elms. There is a good inn at Kinross, and the trout caught in the lake are excellent.

Aug. 7.—*Kinross to Kincardine.* After spending some time in examining the scenery of the Rumbling Bridge, well known for its romantic rocks and waterfalls, we enter

Blair Hill; —— Haig, Esq., a residence finely situated, and capable of immense improvement. Nothing can be finer than the situation of the north wall of the kitchen-garden, which, if it had been artistically built, with a broad border and terrace walk in front, would have been quite unique. This idea, indeed, is adopted, but not artistically carried out; and, though there are a wall and walk already existing 1300 ft. in extent, they are as different in style and execution from what they ought to be, as a mud hut is from a stone-built cottage. *Ribes* sanguíneum with very large, slightly acid, agreeable fruit, Nemóphila atomària with double flowers, and an excellent variety of early potato, were pointed out to us by the gardener, Mr. Bar, who had every thing in excellent order. The farmyard is very complete; and there is a threshing-machine driven by an overshot water-wheel 25 ft. in diameter; the water is brought across a hollow way by an inverted siphon.

The Botanic Garden at Dollar belongs to the Dollar Institution, which was founded by a native of the place, Mr. M'Nab, who came to London without being able either to read or write, made a large fortune, and, having no child, left his property for the education, free of expense, of the natives of Dollar, and, under certain restrictions, of the children of the adjoining parishes. There is a large well arranged building for the classes, lectures, and library, and good houses and gardens for masters of the different departments of knowledge; but, strange to say, the managers have been quarrelling among themselves for several years past, so that the good that would have been done by the

Institution has been greatly diminished. The Botanic Garden contains also a horticultural collection, so that the inhabitants of this part of the country have an opportunity of seeing the best kinds of culinary vegetables and fruits, as well as a named collection of trees, shrubs, and herbaceous plants. Mr. Westwood, the curator of the garden, a most intelligent man, informed us that, to secure the means of supporting it properly, he was obliged to turn great part of it into a nursery. In consequence of the facilities afforded by the Institution of procuring a good education at a moderate expense, many houses have been erected in the neighbourhood by persons of moderate fortunes, attracted by its educational advantages, and landed property has in consequence been greatly increased in value.

The Villa of Dr. Walker, in the neighbourhood of Dollar, we found one of the best laid out and highest kept places in Scotland; ranking in these respects with Crosslee Cottage. The art of growing low alpine plants on cones and hemispheres of pebbles is here carried to the highest degree of perfection; and it is difficult to imagine how much beauty and effect is thus produced by the saxifrages, sedums, thymes, the minor campanulas, and such like plants. Each cone or hemisphere is kept quite distinct, and they are displayed to most advantage when standing on a lawn or on a flooring of pebbles. They look well, however, on common borders. *C*eanòthus azùreus stands the winter here without protection; and, though the place only contains two or three acres of pleasure-ground, yet, by not planting more than one or two plants of any one species or variety, the collection of trees and shrubs is so considerable, that it includes all the species procurable in the Edinburgh nurseries, and many procured from London.

Tullyallan Castle, Count Flahault, is an extensive and splendid place, remarkable for a terraced garden on a large scale, with parapets, statues, vases, &c., in the Italian style. This garden was laid out, as we were informed, from the designs of Baroness Keith. Adjoining it there is some very interesting scenery arranged in the natural manner, and richly stocked with rhododendrons, and other American trees and shrubs. Our time would only admit of our taking a hurried view of the place, but it has left the impression in our minds of being among the finest we saw during our tour. The house is a castellated building, but the towers and chimney tops want elevation and relief; instead of being bold and free, they are too tame and lumpish.

The inn at Kincardine is a very indifferent one; we pointed out various defects to the landlord and landlady which might very easily be remedied, and they promised that this should be done.

Aug. 8.—*Kincardine, by Culross and Valleyfield, to Stirling.* We shall not attempt to describe the bold and varied scenery

of the north bank of the Forth, rising high above the water, and presenting many warm slopes and sheltered prominences for houses and gardens; the ancient town of Culross, or the various curious old places about it: suffice it to say, that the greater part of the scenery that we passed through or saw, between Dollar and Stirling, was of surpassing beauty. The agriculture was every where excellent, and some very handsome new farm buildings in the Elizabethan style, with noble columnar chimneys to the steam-engines, were being eretced between Kincardine and Culross. The only drawback we recollect was in the long rows of comfortless-looking cottages, without gardens either before or behind, occupied by colliers. The windows were in general of cast iron, and in most places fixed, so that there could be no efficient ventilation within.

Valleyfield, Lady Preston, is, we believe, the only seat in Scotland where Mr. Repton was employed. He did not visit the country himself, but sent, as we have heard the late Mr. Nasmyth say, who was also employed there, his two sons. The kitchen-garden is on a sloping bank, and exhibited at one time a fine display of terraces, fruit trees, and ornamental borders; but the whole is now comparatively neglected, and some of the terrace walls have actually fallen down. In the plantations are some black Italian poplars, planted in 1803, which have attained the height of 100 ft., with trunks 3 ft. in diameter; and there are very large balsam poplars, some of them 60 ft. high. The white poplar has also attained an incredible size; the soil being deep, rich, and moist, and the situation sheltered.

Valleyfield Cottage Garden, of which an account will be found in our Volume for 1840, p. 402., is chiefly remarkable as having been the scene of the experiments of Mr. George Drummond, made with a view of bringing French pears into an early state of bearing. These experiments were originally published in the *Horticultural Transactions*, but they are given at length in the volume of the *Gardener's Magazine* just referred to. They deserve the attentive study of the scientific gardener, particularly those which relate to the influence of water on the temperature of soil. The result is, that all water to be applied to the roots of plants ought to be exposed to the temperature of the atmosphere in which they grow, for a sufficient length of time to attain the same temperature. Hence the rule that every kitchen-garden ought to have a large shallow basin in a central situation, where the water being expanded in a thin stratum can be easily heated by the rays of the sun. As the warmest layer will always be on the surface, the water ought not to be drawn up by means of a pump, which will raise it from the bottom and colder part, but the watering-pot should be dipped into it. If the water, instead of being conducted to the basin by pipes or drains under ground, can be led to it in open gutters, or de-

livered by a jet, so as to diffuse it through the air before it falls into the basin, it will acquire the temperature of the air more rapidly than by any other mode; and hence jets d'eaux, which are commonly considered as nothing more than ornaments, are in reality, in gardens at least, most useful agents of culture. These remarks as to the temperature of water apply to flower-gardens, and to every description of plant structure, with this difference, that in these, where there are flues or hot-water pipes, the requisite temperature can be given in a shorter time.

There is a large tank here for the preservation of sea fish, viz., flounders, soles, turbot, skate, sperlings, smelts, haddocks, whitings, salmon, herrings, &c., all found in the Forth. It is bordered with a bank, cased on both sides with stone, and finished with a parapet on the outer side, in which parapet there are stone boxes for receiving plants. A sluice admits the sea at high water, and, being shut when the tide begins to ebb, retains it. This tank was originally constructed by the late Lord Dundonald for producing salt by the natural evaporation of the sea water, but the scheme did not succeed. The garden is not extensive, and the cottage is small; but both must have been very ornamental and very interesting, when under the care of Mr. Drummond.

Culross Abbey was the ancient seat of the Dundonald family, and the building, though in ruins, was held in much veneration by the country round, till it was almost entirely pulled down by the late Sir Robert Preston, who, however, made the *amende* by building the present abbey in an ancient style. The place is chiefly remarkable for a lime tree avenue, and a terrace walk bordered by a high wall of pear trees, and terminated by alcove seats. The lime trees are of great age; they stand 60 ft. apart in the row, and the avenue, or space between the rows, is 120 ft. The trees in each row are within a few feet of touching one another; but, as they do not touch, every individual tree shows its particular shape, all somewhat different, and yet in a general view all alike, so that this avenue is among the best open avenues which we have ever seen. All avenues in which the road is open to the sky ought, in our opinion, to have the rows of trees completely detached, even if there should be a few yards of daylight admitted between them. On the other hand, when the trees are allowed to touch and grow into one another, they ought also to grow over the road, and form a continuous arch, like the elm avenue at Christ Church, Oxford, or the lime tree avenues at Ampthill, and Woollaton Hall. An avenue, when the trees grow into one another without arching over the road, is lowered to the rank of a road between two lofty hedges. It is true, these hedges may be of flowering trees, like the avenue of horsechestnuts at Hampton Court; but how much more grand and beauti-

ful would that avenue have been, had the trees been gradually thinned out or cut in, so as to leave only one third part of what there are at present. Some persons may allege that thinning out the trees would disfigure the avenue for a time; but, by fixing on the trees that are finally to remain when the avenue is planted, the others could be cut in as they advanced in growth, in such a manner as to maintain the avenue character throughout its whole progress to maturity.

The terrace to which we have referred crowns a bank some hundreds of feet high above the Forth. There are a number of lower terraces, slopes, and platforms, of great antiquity, some with stone steps, balustrades, and vases, and among them some very old fruit trees; two large sweet chestnuts (5 ft. in diameter at 4 ft. from the ground) which ripen fruit every year, and from which large trees have been raised; five or six cedars, from 50 ft. to 70 ft. high, and 3 or 4 feet in diameter; two Eastern arbor-vitæs, 25 ft. high; and many old yews. The parish church is close to the abbey, and might have been connected with it architecturally, so as to produce a good effect.

Castle Hill, or *Dunimarle*, Mrs. Erskine, is a residence on the summit of the same high bank as that on which Culross Abbey stands. It is chiefly remarkable, in a garden point of view, for a new garden wall flued and built with towers and battlements; the lower parts of the towers serving as stokeholes for the furnaces, and the upper parts as chimneys to the flues. The appropriation is satisfactory. In front of this wall, and on the verge of a steep declivity to the sea-shore (?), 300 ft. below, there is a broad border, and, next, a terrace walk between two rows of Irish yews. Near the house is a greenhouse, the front of which is formed by a wall made sufficiently high to conceal the gardener when at work among the plants. This feeling on the part of the proprietor is not so singular as may at first be imagined: no one likes to come into a room while the housemaids are at work. In the grounds, a portion of the remains of M'Duff's castle is shown, and near it is a tower 60 ft. high, which commands a view of the Forth and the adjacent country, from Stirling Castle to North Berwick Law. The steep bank is covered with fruit trees, among which are some pears known to have been planted A. D. 1600, and of which the particulars have been given in our Volume for 1841, p. 464.

There are a chapel and burying-ground near Culross with many curious tombs, which we regret we had not time to see; and there are ancient architectural combinations in the town itself, well worth the attention of the architect as hints for composition. The road to Alva passes Clackmannan Tower and the walls of the Earl of Mar's park, and exhibits some fine views and rich culture.

Alva; James Johnston, Esq. A long and rather steep road

brings us to this demesne, which skirts the base of the Grampians, and rises high up their sides, and is remarkable for its extensive woods, and the rich prospect of the vale of the Forth, from the house and from the drives and walks in the grounds. There is a large well arranged and very productive kitchen-garden, and throughout the woods there are numerous large Portugal and common laurels, yews, hollies, and deciduous cypress. Among the trees there are many wild cherries, the leaves of which in the autumn become as red as blood; and this is also frequently the case with the birch on this estate. At our request Mr. Duncanson, the gardener here, gave us the following dimensions: various larches, fifty years planted, girting from 13 ft. to 14 ft., with clean straight trunks; Scotch pines, with trunks 3 ft. in diameter, and 75 ft. in length to the first branch; cedars of Lebanon 4 ft. in diameter, with 22 ft. of a clear trunk, and wide-spreading conical heads; silver firs 3 ft. 6 in. in diameter, and 100 ft. high, feathered with branches to the ground; oaks 5 ft. and 6 ft. in diameter, with erect trunks and majestic spreading heads; sweet chestnuts 5 ft. and 6 ft. in diameter, with clear trunks of 30 ft. and widely spreading heads; a walnut 13 ft. in circumference, with 15 ft. of a clear trunk, and a wide-spreading open head, containing some very large boughs, a splendid tree, and considered by Mr. Monteath, the author of the *Forester's Guide*, to be the largest in the country; numerous specimens of hemlock spruce 30 ft. high; and a number of pinasters, and some stone pines.

August 8.—*Stirling to Airthrie Castle, Deanston, and Blair-Drummond.* The weather was unfavourable, but, notwithstanding, we were delighted with the day's excursion, which displayed to us a great variety of scenery, wood, water, rocks, hills, mountains, cottages, mansions, and manufactories.

Airthrie Castle, Lord Abercrombie, is a noble place, from its woods backed by the Grampians, the beautiful varied park, with a large artificial lake, the house judiciously placed, and the kitchen-garden perfect, as regards culture and neatness, and the abundance and fine quality of the fruit. We regret we are unable to give the dimensions of some of the fine old trees, particularly the beeches, ashes, oaks, and sycamores, skirting the base of the hill which forms the north boundary of the park. What we were most struck with was the excellence of every thing pertaining to the kitchen-garden, even to the gardener's house, which was not only well situated with reference to the kitchen-garden, and placed in an airy healthy situation, but had a proper water-closet within the house, a circumstance of rare occurrence in Scotland, even in the houses of the wealthy farmers. In most kitchen-gardens that we visited in Scotland this year, we found very little fruit on the walls, but here, there

was a good crop, and the grapes which we saw in the graperies obtained afterwards the first prize at the Caledonian horticultural show in September. The floors of the vineries are covered with large pebbles, we suppose, to reflect heat and retain moisture, and the plants are frequently watered with liquid manure; but on this subject the gardener, Mr. Cathie, has promised us an article. The only deficiency which we saw about the place was, a want of gravel in the walks of the pleasure-grounds, in consequence of which their edges were too deep and raw. Adjoining the kitchen-garden are the remains of the old church of Loggie, which, with its bell turret, forms a very picturesque and venerable object from various parts of the grounds. Much might be said on this ruin, the burying-ground which surrounds it, and Ellen Smith, the last of her race, who lives in a cottage near it; but to do the subject justice would require more time and room than we can at present spare, and we therefore refer to *Chambers's Journal* for 1841, and to the *Ladies' Magazine of Gardening*, vol. i. p. 323.

Deanston; —— Smith, Esq. This gentleman not being in the country was to us a great disappointment. We saw through the works, which are executed in the most substantial manner, and liberally conducted with a view to the good of all concerned. Even the workmen are spared the degradation of paying the rent of their cottages weekly, which is the case in other parts of Scotland, and in various parts of England. There is a room containing 300 looms; it is 45 yards broad, 68 yards long, lighted by 24 skylights. The looms and all the other works are driven by an overshot water-wheel 36 ft. in diameter, and equal to a power of 360 horses. The flat roof of the room is covered with grass, and either was, or is intended to be, grazed by sheep.

Keir; —— Stirling, Esq. An extensive place, well wooded, and commanding fine views. We were prevented from seeing it so effectually as we could have wished from the continued rain. The evergreens were remarkably luxuriant; and, indeed, the whole place appears rather overgrown by them. Mr. Niven, the gardener, occupies a very good house.

Blair-Drummond; —— Drummond, Esq. This place has long been celebrated, as having been laid out by Lord Kames, and also for His Lordship's improvements in the Flanders Moss. We thought it a most delightful place when we first saw it, in 1800, and so we do still; but it is rather overgrown with wood, and cannot be a healthy place to live at. There is, or appeared to us to be, a far greater extent of pleasure-ground and garden scenery kept up than can be done justice to. There are a great many fine trees, and especially oaks, beeches, and Scotch pines, the dimensions of which, with their ages, the soil in which they grow, and other particulars, are given by the very intelligent

gardener, Mr. James Drummond, in our Volume for 1841, p. 505. Great attention has been paid to preserve these trees from injury, and to allow them to take their natural shapes. Hence no animal has ever been allowed to graze in the park, except sheep; and hence all the trees may be said to be feathered to the ground with branches. There are some very remarkable spruce firs, Nos. 33. to 37. in the table in p. 507., the branches of which rest on the ground, and cover a space between 40 ft. and 50 ft. in diameter. Many of the lower branches have struck root at their extremities, and are sending up a circle of regular trees round their parent; a circumstance not uncommon with the black spruce, and only seen in the common spruce when it is in rich moist soil and of considerable age. One spruce fir at Blair-Drummond has six young trees round it, four of which are about as high as the parent in the centre. Some of the larches are above 100 ft. high, and there is a white poplar 106 ft. high. One larch, which was cut down, contained above 100 cubic feet of sound timber; another, which girted 9 ft. 2 in., had thirty-six circles of solid red wood; it grew on a red clay loam, on red sandstone. The highest larches now standing are between 103 ft. and 105 ft. From previous measurements, the larches at Blair-Drummond do not seem to have gained above 4 or 5 inches in circumference in the ten years preceding 1836, while some of the beeches and oaks have added above 1 ft. to their circumference in the same period. By comparing the measurement of the trees made in 1836, as given in our preceding Volume, pp. 506. and 507., with the measurement of the same trees made in August, 1841, as given in p. 508., the progress they have made since 1836 may be ascertained with accuracy.

In the park there is an artificial lake 1000 yards in length, and varying from 20 to 30 and 40 yards in breadth. At one end it contains a beautifully wooded island, on which there are a heronry and numerous jackdaws. On the water are swans, wild ducks, and other aquatic fowls.

The walks in the grove behind the house command fine views of the western extremity of the Ochil Hills, Abbey Craig, Stirling Castle, Craigforth, Touch, and Campsie Hills, the village of Cambusbarn, and several gentlemen's seats. From the two approaches, to the north and west are views of Ben-Lomond and some of the Grampian Mountains, such as Ben-Ledie, Ben-Virlich, with several others, and the fine old ruins of Doune Castle. The Flanders Moss being now all brought under cultivation, the Persian wheel which raised the water for floating away the moss has been suffered to fall into decay, and is no longer, as it used to be, one of the sights eagerly visited by strangers.

The labour of keeping the pleasure-ground here, as in all old places, might be considerably diminished by leaving off the digging, hoeing, and raking of the borders, and giving up the idea of growing herbaceous plants, roses, and such like articles in them. There is a kind of keeping appropriate to every place, according to its age. A newly formed place may have the shrubberies dug for a few years, till the permanent shrubs are firmly established; when herbaceous plants, roses, and such temporary shrubs as some of the short-lived species of *G*enísta, *C*ýtisus, *Ribes*, *R*ùbus, &c., should be removed, and the ground sown down with grass, turfed up to the points of the recumbent branches, or allowed to become covered with moss, according to soil, situation, and other circumstances. After a place attains a certain age, such as Blair-Drummond, all the deciduous shrubs that are under the shade of trees should be removed, for assuredly there is no deciduous shrub that will thrive under trees, and only broad-leaved (as opposed to needle-leaved) evergreens retained, as they alone thrive in the shade. When evergreens among old trees are allowed abundance of room, they form splendid objects; the colour of the foliage becomes much darker than when the plants are fully exposed to the light; and it also shines more. In winter, nothing can be more delightful than to walk in such a wood, where, owing to the radiation being checked by the trees, the temperature is much milder than in an open shrubbery. There might be many fine walks of this kind at Blair-Drummond, if these hints were followed out.

Aug. 10. — *Stirling.* We devoted this day to seeing the Castle, Messrs. Drummond's Agricultural Museum, the King's Knot, supposed to be the gardens of James II., the Bowling Green, and some other places. There are many curious architectural remains in the castle, which, owing to some misunderstanding between the governor and the keeper, we had great difficulty in seeing. There never appears to have been any good taste in the architecture; for the proportions of the members are clumsy, and the sculpture and statuary incorrect and unpoetical imitations. The view of the Forth from the castle is reckoned one of the finest things of the kind in the world; but at the time we saw it it was low water, and we could not detect the windings of the river.

Messrs. Drummond's Agricultural Museum is the first concern of the kind that was established in Scotland, and it is impossible too highly to estimate the good which it has done, not only in the immediate neighbourhood, but throughout Scotland; we might even say throughout the world, for Messrs. Drummond not only send agricultural implements to England and Ireland, but to the East and West Indies, and to North and South America. To England and Ireland they not only send

implements, but horses of an improved breed, and expert ploughmen to manage them.

The building which contains the museum is new, large, and appropriately arranged, both for exhibiting the articles and carrying on the nursery and seed business, as well as the sale of implements. We cannot pretend to describe the building, or enumerate the articles. Specimens appear to have been sent from all quarters, both at home and abroad, including dried plants, seeds, soil, manures, minerals, and geological collections. Among the latter is a section of the strata passed through in sinking a shaft to a coal mine; the whole being executed to a scale, and every stratum filled in with specimens of actual minerals. This is effected by means of a shallow box, 6 or 8 feet in length, and 6 in. in breadth, and about 2 in. deep. The minerals are filled in, each stratum being separated by a thin slip of board, and, when completed, the box is set on end. The specimens of different varieties of wheat, oats, and barley are numerous and extremely interesting, as are boxes of different soils. We were much surprised at the number of implements, and we marked a few in Messrs. Drummond's printed catalogue, of which they have kindly sent us the following sketches and details.

" *Articles noted by Mr. Loudon in the Agricultural Museum of Messrs. Drummond at Stirling.*

Gooseberry Sucker Extirpator. (*fig.* 59.) A handle of the length and shape of a spade handle is inserted into the hose, and the implement is found exceedingly useful in wrenching off suckers from gooseberries or other shrubs.

Fig. 59. *Sucker Extirpator.*

Dibble for Mangold Wurzel. (*fig.* 60.) First used at Deanston. Mr. Smith caused them to be made with the shoulder, to prevent his people from putting the seed too deep. The person using it walks in the middle betwixt two drills with one in each hand; another follows putting in the seed.

Fig. 60. *Dibber for Mangold Wurzel.*

Loudon's Hammer and Hatchet (*fig.* 61.), used for pruning, and also for driving or drawing nails, in the case of wall trees.

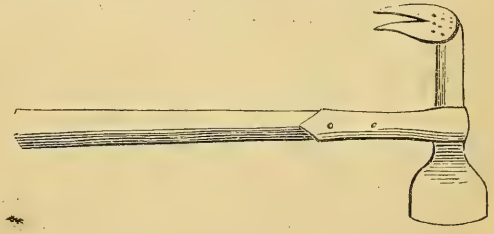


Fig. 61. *Loudon's Hammer and Hatchet.*

A Magpie Trap, for screwing on the top of a pole.

Rabbit Traps, made by Greig at Crail. Great numbers of these are sold by us; the maker has established his character for excellence of workmanship; they are made of various sizes for all sorts of vermin.

American Hatchet. (*fig.* 62.) This hatchet was sent to us from Canada as the one used in felling timber. The workmen do

Fig. 62. *American Hatchet.*

great execution with it. The blade is thicker near the edge than ours, and more like a wedge, so that it clears itself at every stroke, and never sticks in the wood. The shape of the handle is a very great improvement.

Bull Ring. (*fig.* 63.) This is made to press the cartilage of the nose, and effectually commands the most refractory animal. The screw (*a*) is tightened more or less as required, and a small halter (*b*) is used for leading the animal. Fleshers [butchers] should be compelled to use these rings in taking bulls to the slaughter in towns.

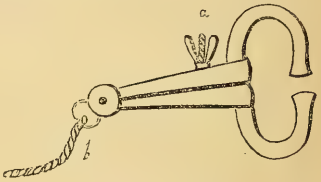


Fig. 63. *Bull-ring.*

Rain Gauge: made of zinc, and very cheap and simple; and adapted to be sunk to the rim, or nearly so, in any open space in a garden.

Zinc Labels. Some are plain with tubular stems; others with sunk panels and tubular stems. Price 1*s.* 6*d.* per dozen; considered very cheap, and durable as well as neat.

Vases for Plants. These are of an elegant shape, manufactured by Mr. Bald, at the Brick and Tile Works, Alloa.

Valve Mole Trap. (*fig.* 64.) The mole, entering at *a b*, is prevented from returning; the valve (*c*) being made of such a length, and placed in such a position, as to admit of its opening inwards only, and, from the narrowing of the hole, the animal cannot turn itself. *c*, the valve on a larger

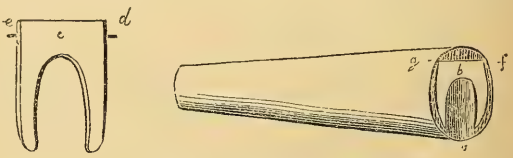


Fig. 64. *Valve Mole Trap.*

scale; *e d*, a pin on which it moves: this pin is fixed into the tube at *f g*.

Seed-lifter. (*fig.* 66.) Made of tin for seed-lofts or granaries; very useful and light; a sort of spade handle is attached.

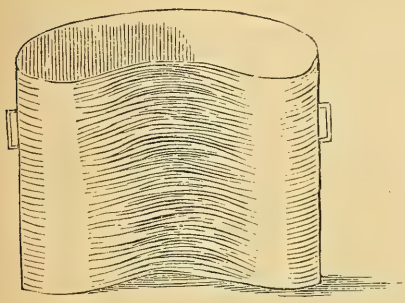


Fig. 65. *Tin Flask for gathering soft Fruit.*

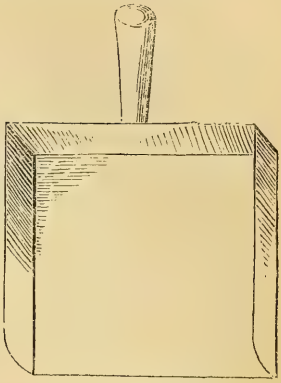


Fig. 66. *Tin Seed-lifter.*

Tin Flask. (*fig.* 65.) Attached by straps to the person, and convenient and safe for gathering soft fruit, as cherries, &c.

Square Pans for growing Seeds or striking Cuttings.

Hand Turnip-Sower. (*fig.* 67.) It may be used either for sowing continuously along the drill, or, by a single shake, depositing a few seeds on the dibbled portions of manure.

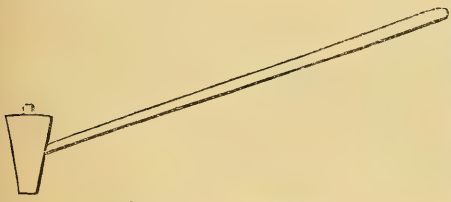


Fig. 67. *Hand Turnip-sower.*

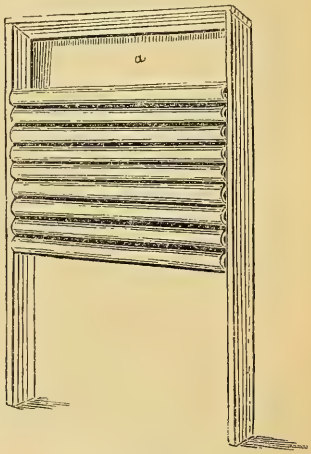


Fig. 68. *Washing Implement.*

Implement used in washing Clothes. (*fig.* 68.) This is a simple board fluted or grooved, and it is found more efficient, as well as safer for the clothes, than hand-rubbing. The soap is held in the sunk panel *a*. The lower or opposite end rests on the tub. Said to be much used in North America.

Instrument for scraping off Moss, &c., from Fruit or Forest Trees. (*fig.* 69.) *a* is a flat piece of iron, the concave side (*b*)

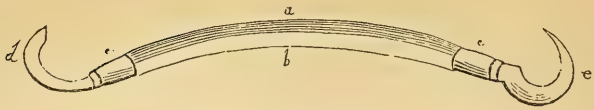


Fig. 69. *Moss-Scraper.*

being applied to the stems or trunks; *c c* are the wooden handles; *d* is used for cutting off small spray; and *e* for scraping the clefts and small branches.

Stirrup Iron, with Lantern and Lamp attached.

Peat Flower-pot, made of compressed Peat. From Mr. Murray, gardener at Taymouth Castle, who finds the plants thrive remarkably well in these.

Telescope Branch for a Garden Syringe. Used for reaching to the higher shelving in greenhouses.

Peas Stob [*Stake*] *of Cast Iron.* (*fig.* 70.) Used for placing at intervals along the rows, the peas being supported by running tarred twine, or small rods, from one stake to another.

Paling Hammer Iron.

Galvanic Plant-Protector. (*fig.* 71.) In the shape of a flower-pot without a bottom, and made of zinc, with a border of copper placed at *b b.*

Fig. 70. *Cast-iron Peas Stake.*

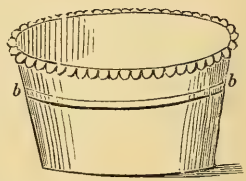


Fig. 71. *Galvanic Plant-Protector.*

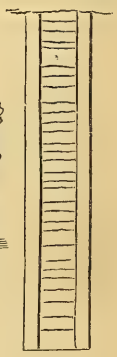


Fig. 72. *Section of the Coal Field at West Plean.*

Section of Plean Coal Field. (*fig.* 72.) Constructed with specimens of the strata according to a scale, as before noticed (p. 597.). This model is much admired. It is the invention and execution of Mr. Peter Mackenzie, gardener at West Plean, near Stirling.

Models of the different Kinds of Drains.

Specimen of Sherriff's White-seeded Tare. This variety grows luxuriantly, and promises well. A plant from Rochester Seed Store, United States, under the name of grass pea, yields abundance of foliage.

A Stalk, 12 *ft. in length, of the* Melilòtus leucántha, *or Bokhara Clover; also various cut Specimens, from Seed sown in May last,* 1842. The stem of this plant acquires a degree of hardness at even an early stage of its growth, which may prove an objection to its further cultivation.

Model of a self-acting Canal Lock, by Mr. Smith of Deanston.

Web Harrow. Used for covering grass seeds. This implement is newly invented by Mr. Smith; it produces the effect of the bush harrow in a perfect manner.

Gate Latch. (*fig.* 73.) *a b* is a bolt for screwing into the gate post, and *c d e* a bolt for screwing into the gate. In shutting, the cylindrical iron or bolt *e* strikes against the part *f* of the latch *f g h*, which, being jointed at *i*, is moved through

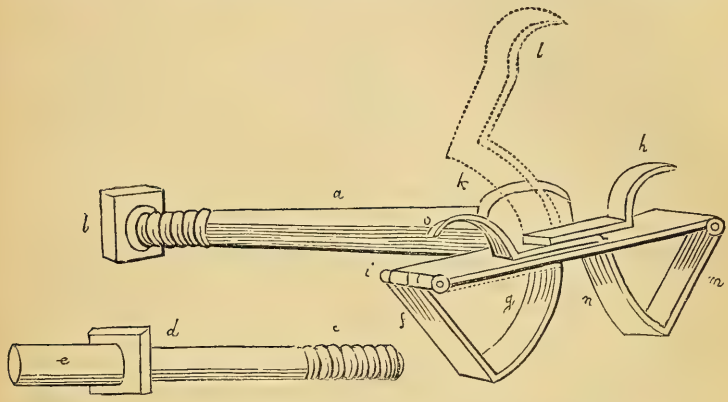


Fig. 73. *Gate Latch.*

an opening in the plate into the position of the dotted lines *k*, *l*, until, on the bolt passing, it resumes its place by its own weight; and, the part *n* of the latch *m n o* opposing further progress, the bolt remains fixed; and *vice versâ* in shutting from the other side. In opening, the proper latch can easily be raised by the hand or a whip-handle, &c. This kind of latch is found very convenient for common field gates, and does not soon get out of order.

Casts from the Sculptures and other Ornaments on the Walls of Stirling Castle.

Models of Cottages and Moss-Houses.

Suspension Beams used in the construction of the staircase, &c.

Roadmaker's and Drainer's Sector and Plumb Rule. (*fig.* 74.) This instrument consists simply of a piece of board, $1\frac{1}{4}$ in. thick, the upper end pierced for the sight in the direction of the dotted line *a b;* the hole fitted for the eye at *a*, the cross wire being at *b*. A saw draught is passed from *c* to *d*, from which the plummet (*e*) is suspended. *f g*, an arc of a circle described about the centre *d*, and divided into ten degrees, commencing from the perpendicular indicated by the plumb line, each degree having subdivisions of ten minutes; *h*, a hole cut through the board to allow free motion to the plummet; *i*, *k*, two legs, which are stretched out in setting the instrument, the narrowed

end or foot of the board being stuck into the ground. The inclination, whether ascent or descent, of the surface surveyed is marked along the line of each degree, and the whole, with the subdivisions, is given in a table pasted on the board, and sold along with it. The mode of using this instrument is as follows. Set the instrument as upright and steady as possible, by striking its foot fast in the ground, with its head longitudinally in the direction in which you intend taking the inclination. Let a person mark the height of the instrument upon a staff, and take his station within reach of the eye, where you wish to know the difference of level; and exhibit the mark on the staff to the person at the instrument. The head of the instrument must then be inclined to the mark, by the eye looking along or through its sight; and when the wire crosses the mark, observe upon what line the plummet has settled, and you will find the inclination marked in degrees and minutes, which are given in feet, from 10 minutes, which is a rise of 1 in 343·8, to 10 degrees, which is a rise of 1 in 5·5, the scale being in 10-minute divisions. This instrument is a combination of all the instruments used for plumbing, levelling, and giving inclinations; is simple in its construction, easily adjusted, and can be used by any person; entirely superseding the use of costly instruments and long calculations. Invented by Mr. Archer, Road-Contractor, Auchterarder."

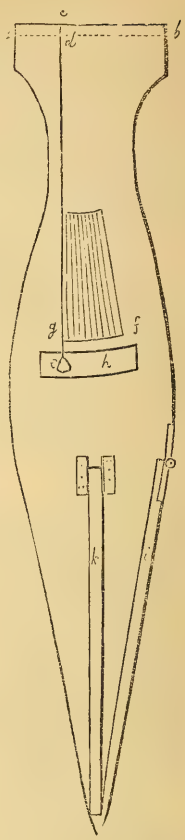


Fig. 74. *Roadmaker's and Drainer's Sector.*

The Bowling Green at Stirling adjoins a curious old garden, with numerous evergreens cut into curious shapes, the most complete of which is an arm-chair in box. The green for playing on is an oval 35 yards by 29, and the house for keeping the balls is 7 ft. square, surrounded by divisions for two balls each, marked 1 to 54. Round the grass plot there is first a sunk path 18 in. wide, to receive the balls when they go beyond the grass; next a rising slope of grass 2 ft. in height, forming an angle of 45°, and, lastly, a border of shrubbery 5 ft. wide.

The most remarkable garden antiquity about Stirling, or indeed in Scotland, is a piece of ground which, at some former period, has been laid out in terraces and slopes, and probably surrounded by a canal. The surface is naturally quite flat, the

soil a sandy loam, moist rather than dry, so that the artificial disposition of it must have been effected at a trifling expense. The extent of the whole has probably been 3 or 4 acres. A plan and section of the most interesting part of this garden have been kindly taken for us by Messrs. Drummond (*fig.* 75.), who also furnished the following extracts:—

Notices of the King's Knot at Stirling Castle.— In the gardens is a mound of earth in form of a table, called the Knot, with benches of earth around, where, according to tradition, the court sometimes had *fêtes champêtres.* Vestiges of the walks and parterres, with a few stumps of trees, are still visible.

"Barbour, in his account of the battle of Bannockburn, makes mention of a round table, which was then at the foot of the castle. He says that, when Edward of England was told by Mowbray, the governor, that he could not expect safety by being admitted into the castle, 'he took the way beneath the castle by the round table.' It is of great antiquity, and was possibly in that place long before the gardens were formed. Here probably they exercised the pastime called The Knights of the Round Table, of which several of the Scottish monarchs, particularly James IV., are said to have been fond. Mr. Gough remarks that a similar table had, not long before he wrote, existed at Windsor. (*Edition of Cambden*, 1789.) Among the gardens are vestiges of a canal, on which the royal family and court aired in barges." (*Nimmo's History of Stirlingshire.*)

"*The King's Gardens.* — Their present condition is that of a marshy piece of pasture ground completely desolated, so far as shrubs and flowers are concerned. The utmost exertion of the memory of the present generation can only recollect an old cherry tree which stood at the corner of one of the parterres, and which was burnt down by the wadding of a shot which some thoughtless sportsman fired into its decayed trunk, as he happened to pass it on his way home from the fields. An octagonal mount in the centre of the supposed garden is called 'The King's Knote,' and is said by tradition to have been the scene of some forgotten play or recreation, which the king used to enjoy on that spot with his court. In an earlier age this strange object seems to have been called 'The Round Table,' and, in all probability, it was the scene of the out-of-doors game of that name, founded upon the history of King Arthur, and of which the courtly personages of former times are known to have been fond. Barbour, in his heroic poem of *The Bruce* which he wrote at the conclusion of the fourteenth century, thus alludes to it:—

> 'And besouth the Castill went they thone,
> Rycht by the Round Table away;
> And syne the Park enwiround thai,
> And towart Lythkow held in by.'

"Lyndsay, in his *Complaynt of the Passings*, written in 1530, thus also alludes to it: —

> 'Adieu fair Snawdoun with thy towris hie,
> Thy Chapill Royal, Park, and Tabill round;
> May, June, and July would I dwell in thee,
> Were I ane man to hear the birdis sound
> Whilk doth against thy royal rocke resound.'

"To give further countenance to this supposition, we have the ascertained fact that James IV., with whom Stirling was a favourite and frequent residence, was excessively fond of the game of the Round Table, which probably appealed in a peculiar manner to his courtly and chivalric imagination.

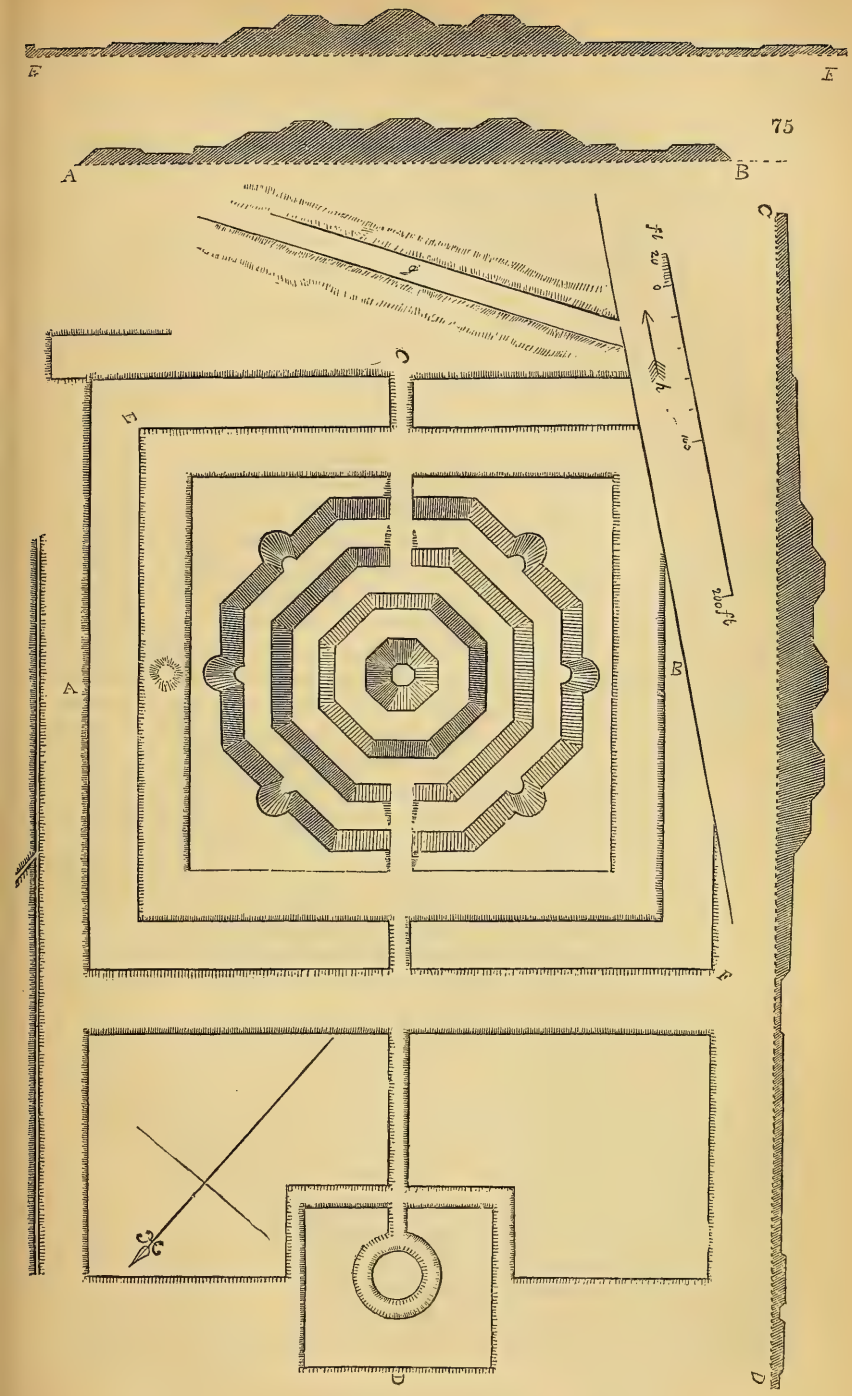
"It is a circumstance not to be omitted, that a piece of ground to the west, not so distinctly marked as this, but within the limits of the gardens, is called the Queen's Knote." (*Picture of Stirling* 1830; *the descriptive part by Robert Chambers.*)

"Besides the above, there are no other traditionary notices that can be obtained. There can be little doubt but that a round table did exist here prior to the formation of the gardens, or the reign of the Jameses; whether it may have been altered or renovated by any of these monarchs it is now impossible to determine.

"The circle called the Queen's Knote has been by some considered a miniature of the other; but, on a minute examination, it indicates nothing at present but a plain surface with a few old mole hills, of which it has a proportion along with the other parts of the field, and of which various figures might easily be constructed by a fertile fancy." — *William Drummond and Sons. Stirling, Oct.* 1842.

The plan and sections (*fig.* 75.) require very little explanation. There is a cross section, A B; a diagonal section, E F, and a longitudinal section, C D; all to the same scale. The road to Stirling is shown at *h*, and the old canal at *g*. The surface is in grass, and grazed by sheep and cattle. As this and great part of the adjoining lands are the property of the crown, we hope the "Knote" will be carefully preserved as a piece of antiquity.

An Arboretum at Stirling. — We were agreeably surprised by Messrs. Drummond informing us that the Commission of Woods and Forests had it in contemplation to devote a portion of the crown lands surrounding the town to a public garden, and to plant in it a collection of trees and shrubs. The idea is excellent, and worthy of the present enlightened times. The Messrs. M'Nab of Edinburgh have examined the ground and reported on the subject, and we hope as little time as possible will be lost in carrying the scheme into execution. The trees and shrubs, we trust, will not be crowded, drawn up, and impoverished by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nurses (planted too near at first, and neglected to be thinned afterwards), as is too generally the case in Scotland; and we trust all the specimens will be named, as is now being done by the Woods and Forests, at our suggestion, in St. James's Park and Kensington Gardens.

(*To be continued.*)

Art. II. *Dinbur Castle, its Gardens and its Gardeners.* By Peter Mackenzie.

(*Continued from* p. 499.)

Sandy MacAlpine now began to make preparations for his chemical experiments. He had procured an old gun-barrel from a blacksmith, about a yard of tin pipe, such as is used by those who provide gas furnishings: he had provided himself also with a box that would hold two or three gallons of water, to serve as a pneumatic trough; a few ounces of the black oxide of manganese: and he had likewise collected the largest bell-glasses from the hothouse, to be used as receivers. Sandy had learned some time before that a dancing was to take place in the neighbourhood of the garden, and that Bauldy had got an invitation to it; and he and the other two thought that if they could prevent him from attending it they would be doing him a good service; so it was resolved, if possible, to have their meeting that night in the bothy. A day or two before the time came, they told Bauldy what they intended to do. He appeared much disappointed at their arrangements, and said little. When the day came, there were signs which made them believe that Bauldy would not be one of their company at night. The arrival of his linen shirt, white trowsers, and stockings, from the washing, showed plainly that he had something else in view than stopping at home that night; however, the others were determined to go on with what they had proposed.

When the hour came which terminated the labours of the day, Bauldy made all haste to get home, and, scarcely taking time to eat any thing, began washing and dressing himself. After he was done, he found that he had still some time before his party would meet, so he thought he might as well remain in the bothy as anywhere else. The others were not idle during this space; they were busy assisting Sandy in arranging his chemical apparatus, Bauldy in the mean time looking on, a silent spectator. He knew what fiddling, and dancing, and singing were, but he could not comprehend what Sandy MacAlpine was about to do with an old gun-barrel, water in a box, and bell-glasses. His wonder increased when he saw him put some

black stuff into the barrel, then thrust the end of it into the fire, and put a cork with a hole in it into the mouth of the barrel, and into the hole in the cork a tin pipe, the other end of the pipe being placed under water in the box. During these operations he was forced to rise and draw nearer the fire, and watched, with intense interest, the whole of the proceedings.

When the barrel began to get heated, a bubbling commenced in the water. When Bauldy saw it he exclaimed, "Fair fa' ye, Sandy lad, ye are making cauld water boil!" "Have patience a little," replied Sandy, "and you will see something more to wonder at."

When he thought that the common air was expelled from the tubes, he filled one of the glasses with water, and placed it upon a small shelf which he had fixed in the box under water. There was a hole in the shelf, and in this hole he put the end of the tin tube, and the gas rose through it. He placed the glass full of water over it, and the gas ascended rapidly into the receiver, and soon displaced the water; as soon as it was filled he removed it, and, turning it upside down, put a piece of window-glass over the mouth of it. In this manner he filled all his glasses. Some may be wondering how he managed to get the bell-glasses to remain steady after they were filled with gas, with their mouths upwards, but it was very simply done; he filled a number of flower-pots with sand, and inserted the handle of the glass into the sand, with the shoulder resting upon the rim of the flower-pot.

When Sandy had got all his glasses filled, he told the other lads that he would now begin and make an explanation of what he had been doing, and also that he had still some very interesting experiments to make, and hoped that Bauldy would give up all thoughts of going to the dancing for one night, for he thought that he would receive more profitable instruction by remaining where he was. "They may wallop laverock height for me," replied Bauldy; "I am determined to see the end o' this wark; for I hae paid gude siller for sights and seen less." The men were glad they had succeeded in turning his attention to the object they had in view.

Sandy then commenced his discourse, by telling them that he intended only to state a few things about a substance of which it was of great importance to know something, namely, oxygen. He told them how this simple substance was discovered by Dr. Priestley in 1774; that it had received several names since it was found out, such as vital air, empyreal air, &c., and that the French school had given it its present name. He told them that it was one of the most important agents in nature, and that few operations occurred in which it had not a place. The air of the atmosphere contains one fifth of its bulk of it, and water 75 parts

in every 100. It was a supporter of both life and fire; animals could not live in air deprived of it, and flame is soon extinguished when there is no oxygen to support it: also, all combustible bodies burn in oxygen with increased brilliancy; this may be easily shown. So, taking a piece of charcoal attached to wire, and making it redhot in the fire, he lifted the cover from one of the glasses and put the burning charcoal into it; the charcoal burned with great splendour, throwing out beautiful sparks in all directions. He also showed them how iron would burn in oxygen gas. He took a piece of fine iron wire, coiled it up in a spiral form, fastened a little cotton to one end of it, and dipped it in melted sulphur; the other end of the wire he fixed to a bit of wood, in such a manner as to allow the spiral to hang straight down. He lighted the sulphur, and introduced the wire into the vessel containing the gas, suspending it by the wood, which he placed on its mouth; when the iron began immediately to burn with a most brilliant light, throwing out meteor-like coruscations of lighted sparks. He also showed them, in a small way, the beautiful experiment of burning a little bit of phosphorus in oxygen, producing a light so excessively dazzling that it was almost impossible to look at it. He also showed them how a candle just put out, and retaining part of the wick redhot, should relight again, with a small explosion, by being put in oxygen gas. He had stated already that a fifth part of the bulk of the air of the atmosphere is oxygen, and he should endeavour to demonstrate, in a rough way, that it is so. He had borrowed the dairy-maid's lactometer, a glass tube about 12 in. long and half an inch in diameter, divided into 100 equal parts, and closed at one end. Taking a bit of phosphorus, and placing it upon a small hollow cup of copper, on the shelf of the pneumatic trough, a little raised above the surface of the water, he inflamed the phosphorus, and then placed the open end of the graduated tube, filled with atmospheric air, over it. When the combustion ceases, the water will rise in the tube, and occupy the place of the oxygen gas consumed, and the division to which it has reached will show the number of parts of oxygen in the 100 of atmospheric air. This may not be the most accurate method of measuring the proportion of oxygen gas in the atmosphere, for the heat of the phosphorus will cause the air in the tube to expand, and part of it may escape; but it affords a pretty correct idea of it. He also showed them the method of transferring a gas from one vessel to another, and how to mix them in particular proportions; how to catch them, confine them, and experiment with them; how to divide and measure them, with as much ease as a merchant could measure a yard of cloth, or Nelly Walker measure the milk for their breakfast.

After Sandy had finished the few remarks he had intended to make, he told them, if any of them had a question to ask respecting the subject they had been hearing, he would endeavour to answer it.

Walter Glenesk said that he had learned more about oxygen during the short time they had been together than ever he did before in his life; but, if he recollected right, he had read somewhere about plants giving it out, and if he could give him any information about it he would take it kindly. "Yes," said Sandy, "they give it out and take it in too. We are informed, by chemists and vegetable physiologists, that the dark substance that remains after manure is rotten, and which gives the black colouring to the earth, is called humus; the oxygen of the atmosphere combining with humus, food is prepared for plants, carbonic acid is formed, water absorbs it, it is again decomposed by the plant, the carbon is fixed, and oxygen given off."

"Then it must be of great service," said Colin Forbes, "to vegetables, to keep the earth in such a state that the oxygen of the atmosphere may have free access to their roots."—"Yes," replied Sandy, "it is of great importance to keep them in such a state that they may freely come in contact with the air that surrounds them; and frequent hoeing, properly done, is of greater use to vegetables than many persons are aware of: by stirring the earth often, oxygen combines with the carbon of the soil, and food is provided for vegetation. It may not be the only way in which plants are nourished, which we may have an opportunity of showing some other time."

"Donald Blamart," said Bauldy, "used to say that the only use of hoeing was to kill weeds, and I have often wondered, since I came here, why I was set to hoe crops and no a weed amang them; but I think I understand the reason noo. But I would like to ken whar a' that gas came frae that filled sae mony bell-glasses."—"Oxygen," said Sandy, "has a powerful attraction for a great number of simple substances, and the act of combining with it is called oxidation, and the compounds formed in this manner are divided into acids and oxides. For instance, when 1 part of carbon and 2 parts of oxygen combine, carbonic acid is formed; again, when oxygen and hydrogen combine in certain proportions, water is formed; and, in chemical language, water is called protoxide of hydrogen. The affinity of iron for oxygen is also very great. When iron is heated to redness in the open air, it absorbs oxygen rapidly, and is turned into black scales, called the black oxide of iron, better known in some places by the name of "smiddy aise." There is also a metal called manganese, which combines readily with oxygen; this combination is commonly called the black

oxide of manganese, and is much employed as a scourer of oxygen (that was the substance which I put into the gun-barrel); and on exposure to red heat it gives out oxygen: so you will readily perceive that it may be found in a gaseous state, also in a liquid state, as well as in a solid form."

The young men said that the lessons they had received would not soon be forgotten, and hoped he would not be long in giving them more instructions in chemistry. Sandy replied that he would do so, for there were still many things worth knowing, and of importance for gardeners to know, connected with gaseous chemistry; such as hydrogen, carbonic acid gas, nitrogen, &c., and the important parts they performed in the economy of nature.

West Plean, Oct. 13. 1842.

ART. III. *Notice of some Gardens and Country Seats in Sussex, visited in October,* 1842. By the CONDUCTOR.

OCT. 14.—*London to Wadhurst Castle.* The scenery, as observed from the railroad to Tunbridge, is pleasing, from the fresh green of the pastures, and the rich yellows of the oak woods on each side; but, as there are but few deep cuttings or high embankments, nothing occurs that makes a very strong impression on a railroad traveller. We leave the railroad at Tunbridge, and proceed on the common road by Tunbridge Wells, passing a number of new villas, in various styles and degrees of taste, and some ornamental cottages with neat gardens. Beyond the Wells the cottages are more numerous, and many of them are highly ornamental. In short, we do not recollect a road, at the same distance from London, where so much has been done in ornamental cottage building. The impulse has, probably, been given by the Earl of Abergavenny, who has erected many lodges for the different entrances to Eridge Park, besides others seen from the road for his numerous tenants and dependants. Pass several of Read's improved hop-oasts; and also Highlands, an extensive establishment for insane persons, remarkable for the beauty of its grounds, 60 acres in extent, and the elegance of the buildings. Here, we were informed, Mr. Read was gardener for many years, and invented his very excellent syringes, which, with his subsequent improvements, far surpass all others.

Wadhurst Castle, Benjamin Harding, Esq., occupies a conspicuous situation, commanding extensive views over a richly wooded country, the central feature being a long winding valley. The castle is a modern erection with four octagon towers; but it is being enlarged and remodeled under the direction of E. B. Lamb, Esq., and will, when completed, exhibit a specimen of good interior arrangement, correct taste, and excellent work-

manship. The park is already well furnished with native oak woods, and will be improved by the addition of pines, firs, cedars, and other evergreens, especially near the castle. There are an excellent kitchen-garden, and some delightful shady and terrace walks; besides a flower-garden, which will be connected with an architectural conservatory entered from the drawing-room. We anticipate at Wadhurst Castle, at no distant period, such a collection of ornamental trees and shrubs as will form a select arboretum; and there are few places where, from the shape of the grounds and the facilities for walks and drives, an arboretum could be set off to so much advantage. The church of Wadhurst has a spire covered with shingles, which is seen from some parts of the grounds; and within the church are some monuments of cast iron; Sussex, to the middle of the last century, having been the chief seat of the iron manufacture in England. A small nursery has recently been commenced here by Mr. Macdonald, formerly gardener to the Marquess Camden at the Wilderness in Kent.

Oct. 15.—*Wadhurst to Battle Abbey, Beaufort, and Rose Hill.* The day was fine, the roads smooth and firm, though hilly, and the foliage of the woods delightfully varied with autumnal tints. In some of the artificial plantations we observed here and there an American oak, the leaves of which were of an intense red, scarlet, yellow, orange, and sometimes purple. In the plantations to which we allude, there were also some American acers and the Norway maple, exhibiting dark reds and rich yellows. The degree to which these trees enhanced the interest of the plantations alluded to can only be conceived by those who are as fond of trees as we are, and who know a good many foreign kinds. At what a small expense interest of this kind might be created by planting foreign oaks, acers, &c., wherever plantations are to be made, and by grafting or budding wherever they already exist. It is true it requires rather an expert operator to graft the oak with success; but every gardener can graft or bud Grecian or American thorns on the common thorns of the hedges, American acers and scarlet horsechestnuts on the common sorts, *P*yrus spectábilis on crabs or thorns, the flowering ash on the common ash, with scores of other foreign trees or shrubs on native ones. If nothing more were done than grafting a few common sycamores or maples with *A*cer rùbrum or eriocárpum, the result would be an ample compensation for the trouble.

Battle Abbey; Lady Webster. The word Battle is impressive of itself, and the feeling is well supported by the abbey, which exhibits grandeur in all its dimensions, length, breadth, and height, enhanced by antiquity, by the high ground on which it stands, and by the grand entrance, forming the termination to the main street of the town. There are few gate-houses which

exhibit such a mass of building extending on each side of the gate, high, and flanked by towers. It must have been a lodging place for travellers, as well as a gate-house. The impression made by the gate-house is well supported by the first view of the main body of the abbey, as seen immediately after passing through the gates. There is a large mass of habitable building to the left, connected with a still larger mass, of which the walls are preserved; but the windows are without glass, and the interior neglected: this leads the eye, along a line of low ruined foundation-walls, to two lofty towers on the right, and completes the impression made by the embattled walls, that the building was occupied for military as well as for religious purposes, for defence as well as for devotion. There are a few lofty elms and other trees in a part of what has been the grand courtyard of the abbey edifice, and some trees also in the extensive park which the buildings overlook: but though there are as many trees as we could wish about the precincts of the abbey, yet there are rather too few in the park; and, what corresponds ill with the ruins, there are none in the park of any age; none, at least, that we could see, that carried the imagination back to the time when the abbey was in all its glory. We went over the whole of the ruins, and were kindly permitted to see the hall, staircase, and drawingroom of the inhabited part, though it was not the regular day for showing the place. The hall is lofty, venerable, and in appropriate keeping; and the drawingroom has a row of columns down the middle, supporting Gothic arches forming a groined ceiling resembling that of a low crypt under a church. We went over all those parts of the ruins which are seen by strangers, and were gratified to find the walls of the refectory displayed in such a manner as to show what the apartment had been; though the effect was necessarily much injured by the floor having been recently covered with flat tiles laid in cement, to prevent the rain from penetrating the arches to the ancient kitchen below. Underneath a bowling-green are a number of gloomy damp vaults, which we passed through, one after another, and were told that they were prisons: one of them has lately been repaired, and we hope the whole will be preserved as a historical monument, till the time arrives when offenders, instead of being sent to such places, to the treadmill, to solitary confinement, the penitentiary, the hulks, or being transported, will be sent to training establishments, where they will be reformed by kind treatment, administered by men and women trained on purpose. We are quite aware that this will be thought a visionary idea: but it will not be the only one of our visionary ideas that have been at first sneered at, and yet afterwards realised, even in our time; for example, teaching music to the masses. We request that it may be borne in mind that the

most vicious and abandoned convicts, even in Norfolk Island, the *ultima Thule* of crime and misery, have been reformed, in the manner to which we allude, by Capt. M'Konochie. There is also in Munich an establishment (the Ruhensfeste), founded by Count Rumford, for effecting the same object. The time will come when the state will not only have normal schools for training schoolmasters for the youth of the national schools, but colleges for training humanisers for the inmates of prisons; men who shall adopt as a profession what Capt. M'Konochie has adopted from philanthropy. If mankind had taken a tithe of the trouble to reclaim and humanise offenders against law and justice that they have taken to tame wild animals for amusement, how different, at the present time, would have been the statistics of crime in all countries! but it would appear that good is only to be attained as the result of a long experience of evil.

To return to Battle Abbey; there is a platform among the ruins, laid out symmetrically as a flower-garden, and very well planted and managed. On one side it is bounded by a covered yew walk, such as may sometimes be found in old French gardens; but a great part of the ground among the ruins is in a state of neglect. Much might be done by excavation, and showing parts in a more efficient manner, by adopting in part the style of ornament employed by the Bishop of Winchester in the ruins of Farnham Castle (Vol. XI. p. 503.), and by judiciously enriching the walls with other creepers as well as ivy. Trees scattered so as at a distance to form masses, and a piece of water, for which there are great facilities, would complete the beauty of the park. The gardener was not at home, but we found every thing under his care in very respectable order. There is a seed-shop in Battle, and a nursery adjoining the town, both belonging to Mr. Denyer, a very intelligent man, and a good gardener.

Beauport; Sir Charles Lamb, Bart. The grounds are extensive, delightfully and boldly undulated, and commanding fine views of the sea in some places, and of the interior of the country in others. They have been naturally covered by woody scenery, interspersed with glades of different forms and degrees of extent, smooth in some places, and rough with furze or fern in others. The park is many acres in extent, and throughout the whole a character of exotic planting and picturesque beauty has been given by the introduction of foreign trees and shrubs, and even of strong-growing herbaceous plants. Aristolochias, Virginian creepers, periplocas, menispermums, climbing roses, lyciums, wistarias, and other climbers, may be seen scrambling up the stems and branches of native trees; and among the native trees and bushes are grouped great numbers of American oaks, acers, thorns, and, in short, foreign trees of every description. This character of

foreign scenery is greatly heightened by the introduction here and there of single specimens of exotic trees of remarkable forms, standing out from conspicuous prominences of masses and thickets, and in the recesses and glades formed by them; while in other places native trees and plants are alone seen. An araucaria, a deodar cedar, a liquidambar, a purple beech, or a weeping tree of some sort, now and then engages the eye, and we forget for the moment that we are among native scenery in a transition state, till, as we advance, we see masses of fern, or groups of the birch or the common oak. In the masses there are a great many pines, firs, cedars, junipers, taxodiums, and, in short, every tree or shrub purchasable in British nurseries. There are some fine thriving araucarias, some of them 5 or 6 feet high; a deodar cedar, 10 ft. high; *P*ìnus variábilis, 15 ft. high; *P.* ponderòsa, 15 ft. high; some remarkably luxuriant plants of *P*ìnus Larício; and rhododendrons and azaleas without number. We have seldom seen a place improved so much after our own heart, as far as planting is concerned. The only fault that we could find with it was, the too hedge-like appearance of the laurels in one part of the approach, where they had obtruded on it so much as to require to be cut in a formal manner, inconsistent with the picturesque character which prevails everywhere else. However, two hours' work of a man with a hedge-bill would remove this deformity.

The house is Roman, large, but totally without merit as a piece of architecture. The kitchen-garden and farm offices are at some distance from the house, on the other side of a public road, and the walk to them is through a plantation of trees in masses, in which one kind always prevails in one place, but in which each mass is so blended with the mass adjoining as never to appear formal. We should prefer arriving at this garden by a tunnel under the road, and we would so contrive the walk, after it passed through the tunnel, that no part of the garden should be seen till we were half-way down the slope on which it stands. We should then enter the garden at a point where we would look up to the terraced walls, instead of looking down upon them; and, after passing through the garden in a horizontal direction, we should enter another walk on the opposite side (having a branch to the farm buildings), and return to the pleasure-ground scenery by a second tunnel, or even by the same one. The present mode of descending to the kitchen-garden, by the walk that passes the gardener's house, is bad, on account of the steep descent by a straight walk with steps. The garden itself is excellent, and does Mr. Main, who fixed on the situation eight or ten years ago, great credit. The outsides of the walls are sheltered from lateral winds by projecting constructions of wattled work, which are found very effective. There is a com-

modious and very handsome gardener's house, in a situation that overlooks both the garden and the farm. It must be recollected, in this and in all similar cases, that our suggestions are made after first, and we may say momentary, impressions, without time to test them by reflection and reasoning.

Rose Hill; A. E. Fuller, Esq., M. P. The grounds are of great extent, varied by hill and dale; and there are some effective masses of wood, with, however, too many unconnected clumps, and a great want of scattered trees throughout. The house has no pretensions, but there is a large and excellent kitchen-garden, and much glass, the whole kept in the highest order by Mr. Ogle, who has formed near it some beautiful ornamental scenery. On a knoll in the park there is a handsome temple, like that at Croome; and exterior to it, on the summit of a hill, there is a large observatory, conspicuous for many miles round, very substantial and commodious within, and containing some very superior astronomical instruments. The woods and plantations in this property appeared to us in a state of sad neglect, much too thick; and the trunks, particularly of the pines and firs, studded over with the stumps of decayed branches. There are some extensive and delightful shady and open walks, but we saw the place in far too great a hurry to be able to say much about it.

October 16. — *Eridge Castle;* Earl of Abergavenny. This is an immense place, being, as the *Guide to Tunbridge Wells* informs us, seven miles from north to south, and five miles from east to west. The house stands on a widely extending knoll in a park containing above 3000 acres, and it is surrounded by a demesne of 10,000 acres. The drives through the plantations measure fifty-four miles, and there is a lake of twenty acres. The plantations have been entirely made by the present earl; they have thriven in a most extraordinary degree, and they are kept in far better order than is generally the case. We have already noticed the numerous handsome lodges and cottages on the estate. The house is in the castle style, remarkable for the profusion of ornament with which it is covered, both externally and within. We were in all the principal rooms, and found the ceilings every where covered with carved work, generally oak, or an imitation of it. A peculiarity in all of the rooms is, that there are no curtains; the backs of the shutters, when they are closed, showing the same finish and ornaments as the walls of the room. The ornaments which are placed on the exterior of the house are chiefly portions of the quarterings of the Abergavenny arms, one of which is a portcullis, and another a St. Andrew's cross, and both these are used not only on the house, but in the grounds, on a large scale, as wicket-gates. The walls of the castle exteriorly are painted of a French grey, and the orna-

ments fixed on them are of a pure white, and in part gilt. They appear put on at random; and, notwithstanding their abundance on the plain part of the walls, yet the windows are without facings or labels of any kind. At the base of the walls there is a raised border of dug soil, with an embattled stone edging, planted chiefly with geraniums, which, though pretty in itself, is too much in the cottage style for a castle; and, besides, this border cannot fail to produce damp in the rooms within. In short, we should say that this castle exhibited the very reverse of good taste; but, as all these ornaments were made by the workmen of the country on the spot, much good was done by the employment given, and by the creation of a number of superior workmen. Every part of the buildings, fences, and roads, seemed in complete repair, and in high order and keeping, which, for such an extensive place, is saying a great deal.

In passing on to Tunbridge Wells, we observed the nursery-grounds of Mr. C. Hollamby, at Strawberry Hill, well cropped, showy, and in good order. At the Wells we examined those of Mr. Cripps, where we saw a variety of Nemóphila atomària with black flowers, a new cleome from Texas, Mr. Cripps's white fuchsia, and several other new things.

Art. IV. *Thoughts on modern Burying-Grounds* By A. S. M.

The associations connected with a place of burial are of a solemn and impressive nature, and therefore nothing that is light or gaudy should ever appear within its bounds. It is the fashion nowadays to turn cemeteries into flower-gardens; but surely a flower-garden and a burying-ground are places set apart for very different purposes, and therefore they ought to be kept separate from each other, and each in its own place. Let us take a walk through the new burying-ground of D——, and we shall there behold a specimen of the modern fashion of laying out places of sepulture. As we pass along the outside of the iron railing before we arrive at the entrance gate, the graves are hid from our view by a strange medley, by way of an outside border, where trees, shrubs, and flowers are planted in one confused mixture; the herbaceous plants being all tied in a bunch, as close as they will tie, so that the innermost stems are well protected from the effects both of light and air. The inscriptions on the stone pillars of the gate are excellent and well-selected; but, anon, we are in the midst of a gay and beautiful scene which might easily be mistaken for a flower-garden in reality, were the gravestones in the middle of the compartments only kept out of sight. The walks are fringed with flowers, and amongst them stand rows of trees arranged botanically, with

the name, natural order, and other particulars attached to each. This would be all well, if burying-grounds were intended to be places for the study of botany or of floriculture merely, or as places of amusement or recreation; but surely this ought not to be the case. As a contrast to the above, how much lovelier is the simple country churchyard, with its church and spire, and neat gravestones, and its broad gravel walk leading up to the church-door, with a row of lime trees on each side, and here and there upon the graves a modest flower peering out, planted by the hands of the relatives of the departed! The surrounding wall is low, and no iron railing is seen on its top to prevent the solitary wanderer from climbing over and sauntering awhile among the remnants of the dead. On the north side, the yew and the cedar and the spruce fir shelter the place from the blasts of winter, and here and there without the wall stands a gigantic elm, whose branches must be taught, however, not to overhang the graves, so as to keep the ground in a state of moisture. Every gravestone is inscribed with a lesson to the spectator. One tells him that he too must die; and on another he is reminded that death is only the door to everlasting life.

How simple, and yet how grand, are the memorials of the places where our ancestors of old lie entombed! A huge stone, up in yon wild glen, was all that was left to mark the grave of Ossian, that prince of Highland bards, that grey-haired descendant of the mist. It is known to this day as Clach-Oisean, or Ossian's stone. And on yon muir, to the westward of Loudon's Howe, stands a cairn which is computed to contain one hundred and forty cart-loads of stones, all thrown together, one by one, in passing, by those who wished to show their respect for the memory of their departed clansman. And on many a hill-side in Scotland, looking out among tufts of heather, and grey with moss, are to be seen the memorials of those who, in later times, sealed with their blood their testimony in the cause of truth and righteousness. Such are the burying-places among which I love to wander!

Perthshire, Sept. 20, 1842.

Art. V. *Bicton Gardens, their Culture and Management. In a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 567.)

Letter III. *The Heath-house. Potting in rough Soil and Training. Use of Fragments of Freestone and Pebbles. List of Heaths.*

According to your particular wish, I shall now give you a description of the Heath-house here, which is span-roofed, 47 ft.

long, 16 ft. wide, 14 ft. high; with a Portland stone table in the centre, the whole length of the house, 2 ft. 10 in. high; likewise a Portland stone shelf all round the house, 2 ft. wide. You noted down my method of *potting heaths*, I believe; likewise my plan of *training* the plants by tying them into shape with green threads, which appeared to interest you much. [We hope Mr. Barnes will be good enough to describe his method in some future letter.] You told me you had not seen it practised anywhere else in Devonshire to the same extent and perfection; only partly adopted by a neighbour or two of mine, that had been to see me. You said that you never could have believed, if you had not seen it, that the roots of heaths could be coaxed up amongst *stones and rough sods of earth.* Now you have seen the roots of the heaths here under my care actually all coaxed up in one mass of white fibres, from 4 in. to 10 in. above the rim of the pot, and the branches, in like manner, coaxed below the rim of the pot. I need not trouble any one further with my own observations, except to say that we have only to go to any common, where the native heath grows for an example. They do not have soil sifted for them; they do not have all the stones picked out of the earth to make them grow: no; they grow amongst the stones and vegetation continually springing up round them; and decay with the season, with their roots about them to nourish them. Again, go to the common, take a spot where the heath grows, dig the ground up, pick all the stones out of the earth, sift the soil, replant the heath plants, water them, nurse them, attend to them, &c. Do you think that would be assisting nature? Far from it. You would soon find that you had been acting in complete opposition to it in everything that you had been doing, instead of assisting; and I fear we may soon see that we have all so acted, in almost every thing we have hitherto practised.

On second thoughts, that you may have it from my own pen, I will take the present opportunity of making a few Remarks on Potting, not only heaths, but every thing, and leave you to make any observations you think in favour of, or against, my system.

My second letter explained to you how my potting-bench is furnished; and my practice is not to mix up any soil beforehand, except for such plants as balsams, chrysanthemums, pelargoniums, and plants of that description: but for orchideous stove plants, New Holland plants, heaths, &c., I handle and pot them, according to their constitution, with loam, heath mould, *pebbles, broken stones,* whole ones, charcoal and charcoal dust (which is the life and soul of almost all plants, as you will see as I go on), soot, lime, sand, bone-dust, &c. Now, for example, do you not think it would appear ridiculous of me, if I were going to fresh pot my New Holland plants, if I were to say to one or more of my men, Get so much heath mould, so

much sand, so much loam, and mix all well together, for we will pot the New Holland plants to-day; or to the boy, Get the pots all ready crocked? Do you think these plants would require all potting at the same time, and in the same soil? I think I hear you say, No. Some of these plants make their growth at a very different season from what others do; some are natives of high hills, others are natives of swamps and valleys; some grow amongst flints, stones, chalk, limestone, sandy places, loam, and rotten vegetable earth: therefore, do you not think I should be wrong in attempting to pot them all at one time, all in one mixture, because they all came from New Holland? Now this is precisely my system all through, even with pine plants (which I shall come to by and by), which is, to take the opportunity of potting each plant at any season when it wants it, and not to return home and pot a house full of plants, because I saw my neighbour do his yesterday.

Every man that is fond of the profession he follows will have a season of his own, and not do as I once saw a man do. He came to see me at a time when I was watering my bed of early cucumbers with cold water: he went home, watered his own the same way, but not considering whether his bed was in the same state as my own, he killed the whole of his plants, and the next day he came to abuse me for setting him a bad example, and was kind enough to tell me at once that I was the means of his killing his cucumbers. I reminded him that he had asked me if I often watered them in that way, and that I told him as often as they required it; that he saw where I fetched the water from, and that I had not advised him to water his in the way that I did. He said he suspected I had set a trap to catch him in. I told him to go home and begin to work himself in 85° of heat for three hours, come out in his shirt sleeves when a sharp east wind was blowing, and the temperature out of doors about 35°, to drink heartily at the pump; and then see if he should be able to eat a hearty supper afterwards. He thought not. Then why blame me for having killed your cucumbers? That man is now living, and had not forgotten the circumstance the last time I saw him.

The first time the thought occurred to me of using rough soil was when I was about eleven years old. I went with my father one morning, at five o'clock, to where there were some heaps of mould of different sorts, to assist him to chop it down, and fill the sieves. I remember as well the very spot, and what passed, as if it had happened this day; for I got very hungry towards eight o'clock, and fancied breakfast-time would never come. I asked my father if the mould would not do to grow cucumbers in if we were to chop it down, and knock it to pieces with the back of the spade, and pick out the stones. He asked

me how I could think of such a thing; and told me to make haste and fill the sieve, or the job would not be finished by breakfast-time: and it was more than half-past eight before it was, and my basin of bread and milk was nearly cold when I got home. However, in time, I kept thinking I would try if plants would not grow in mould without sifting. I begged a cucumber plant of my father, made a bed of any rubbish I could get, put a quantity of earth, rough as it was, for them to grow in, and succeeded in getting a famous crop, and sold enough to buy myself a new hat. However, no more notice was taken of it. We continued to sift mould for every thing except melons, both at home and wherever I worked as journeyman: but I always kept thinking, if ever I should be a master myself, I would see if things would not grow without the earth being sifted; and I have since many times been ridiculed for using it in such a rough state, but I passed it off by saying I had not time to sift it.

Dimensions, Height, &c., of a few of the Ericas growing at this Time in the Heath-house at Bicton Gardens.

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
Massòn*ii*, with 132 heads of flowers -	2	6	8	7
*H*alicácaba - -	1	6	6	6
gemmífera - -	2	0	6	10
mirábilis - -	1	2	6	8
spléndens - -	1	0	5	6
depréssa - -	0	2	2	4
Sprengèl*ii* - -	1	3	3	0
*e*chiiflòra - -	1	2	3	6
ventricòsa supérba -	1	0	4	6
juliàna - - -	0	6	4	3
ferrugínea - -	1	4	4	3
retórta màjor - -	0	6	3	0
*p*ínea - - -	1	0	3	2
ampullàcea vittàta -	1	0	2	6
cruénta - - -	2	0	6	10
viridiflòra - -	2	0	6	0
metulæflòra, with above 2000 heads of flowers - -	3	6	10	2
pilòsa - - -	3	0	7	4
refúlgens - -	2	6	7	2
vestìta álba - -	2	6	7	0
costàta - - -	3	0	9	0
*c*erinthòides màjor -	3	0	4	3
mágna - -	3	0	5	3
trícolor - - -	2	0	8	0
màjor - -	1	0	3	0
dumòsa - -	1	0	3	6
tenuifòlia -	1	3	3	8
Irby*àna* - - -	1	6	6	6
linnæ*oìdes* supérba -	1	0	5	2

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
pellùcida - -	1	6	5	6
sulphùrea - -	1	6	3	10
incarnàta - -	2	4	6	0
Parmentier*iàna* -	1	0	4	2
exímia - - -	1	0	7	2
præ'gnans coccínea -	1	0	5	0
reflèxa álba - -	2	0	5	10
rùbra - -	1	6	4	8
dilécta - - -	1	6	6	2
grandinòsa - -	2	6	6	6
vestìta *r*òsea - -	1	6	3	4
purpùrea - -	1	8	6	0
ventricòsa præ'gnans	1	0	4	6
cárnea -	1	0	6	0
fláccida - - -	2	0	7	5
Ewer*iàna* longiflòra-	1	10	8	0
acuminàta - -	2	0	7	10
campanulàta - -	1	0	4	10
scariòsa - - -	1	3	4	10
*g*naphalòdes - -	1	2	5	10
tubiflòra - -	2	0	6	10
imbricàta - -	1	4	5	0
grácilis - - -	1	6	5	2
translùcens - -	2	0	7	8
*P*ersóluta rùbra -	2	6	6	2
Paterson*iàna* - -	2	0	4	6
perspícua - -	1	2	7	8
elàta - - -	2	6	6	0
filamentòsa - -	1	4	8	0
assúrgens - -	1	2	7	11
Walker*iàna* - -	1	6	6	6
perspícua nàna -	1	0	4	6

Name.	Height. Ft.	Height. In.	Circumf. Ft.	Circumf. In.
exùdans - -	1	0	4	6
regérminans - -	1	6	5	8
Linnæ'*a* - -	1	6	3	0
dénsa - - -	1	6	4	6
tróssula - - -	1	0	4	6
flexuòsa - -	1	2	4	8
nítida - - -	0	10	3	6
propéndens - -	0	10	4	4
margaritàcea - -	0	8	3	0
báccans - - -	0	10	2	6
prínceps - -	0	1	3	4
decòra - - -	0	10	4	3
odòra *ròsea* - -	0	8	4	6
fastigiàta lutéscens -	0	4	3	3
ampullàcea - -	1	0	4	6
múndula - -	0	8	3	0
recurvàta - -	1	0	3	0
petiolàta - -	0	6	3	0
Aitoni*àna* - -	0	10	3	9
infundibulifórmis -	1	0	3	9
Westfalíng*ia* [Ross]	1	0	3	0
Lambert*iàna* - -	0	10	3	4
élegans - - -	1	0	3	0
*e*mpetrifòlia lanàta -	0	6	3	9
mammòsa - -	1	0	3	6
coronàta - -	0	10	3	0
intermèdia - -	2	0	3	9
suavèolens - -	1	0	4	0
péndula - - -	1	0	3	3
retórta - - -	0	7	3	6

With good plants of *E.* depréssa rùbra, Bowie*àna*, lanàta, sexfària, Russell*iàna*, Bánks*ia*, and many other species and varieties.

I beg to observe that the circumference of many of these valuable kinds of *E*rìca may be doubted by some, particularly when the height of the plants is considered. Who would ever think of *E*rìca Massòn*ii*, only 2 ft. 6 in. in height, feathering round the very rim of the pot with young shoots, with 136 heads of flowers on it, being 8 ft. 7 in. in circumference? I know many will say it cannot be in England. *E*rìca metulæflòra, 3 ft. 6 in. high only, but 10 ft. 2 in. in circumference, with young wood all above and below the edge of the tub; it is in bloom, with more than 2000 heads of flowers on it, at this very time. No one would believe that these and many others, two years ago, were as tall as I am, scraggy, and naked-stemmed; but so it was; and, if I should be spared another month, they will be still more dwarfish.

Bicton Gardens, Oct. 29. 1842.

Art. VI. *On the Nature and Habits of the common Wasp.* By J. Wighton.

Although the wasp is ferocious and cruel towards its fellow insects, still it is very lively; indeed, more so than the honey-bee. Some give wasps the credit of being "more polished in their intercourse with each other," that is, they do not attack and plunder others' dwellings like the hive-bees; but this praise is hardly due to them, for, unlike honey-bees, wasps store up nothing in their nests worth plundering. However, except their voraciousness, they are peaceable, and will seldom attack one without provocation: but it is useless for me to say any thing in favour of wasps; nobody likes them; few persons think such pests

worthy farther notice than destroying them. I know of no one, except Réaumur, who has kept wasps in glass hives to ascertain their habits. I have done the same thing, and found their habits are, in some respects, similar to those of the honey-bee, but in others widely different, as the following will show.

During this season, I suspended in the top of a bell-glass a wasp's comb containing brood, eggs, and six working wasps, but no queen. The headless colony had their liberty, fed the grubs, but added nothing to the nest, neither made any attempts to create a queen, as it is said bees do when put to such a test. To ascertain the latter was the grand object I had in view. The wasps became weak, and I destroyed them. This agrees with what a writer says: — "If, by any accident, before the other female wasps are hatched, the queen mother perishes, the neuters cease their labours, lose their instinct, and die."

I furnished the bell-glass with another comb similar to the other, with the mouths of the cells upwards, being the reverse of the usual way, which is downwards; likewise six workers and a queen wasp. I confined them three days, and gave them food; they fed the grubs with great care, but took little interest about their nest until they had their liberty. I put another queen into the nest, which was soon cast out dead. I repeated this with another queen, and instantly the rightful queen destroyed her. This agrees with the habits of queens in a beehive.

As the bell-glass was tight and in darkness, one might have thought that the inmates would have dispensed with the paper covering to their cells; but no, the comb was soon covered over, except the entrance below, which shows their instinct cannot be altered. In this respect, it surpasses that of the hive-bees. Though the latter block up all little crannies in the hive, they never make the least attempt to protect their combs from the weather, even in cases where it is wanted, for instance, when they construct their cells in the open air. I examined the nest, and found the position of the cells was altered, from their mouths being upwards to downwards. This constant rule of structure by wasps is easily accounted for; like the honey-bees they begin their nest at the top of the cavity; do not range their combs vertically as they do, but horizontally; and form many distinct parallelograms, some say sixteen, but eight or twelve comes nearer the mark. The cells are hexagonal, and formed of the same kind of water-proof paper that covers them, not divided by double partition walls, as Dr. Barclay says. Probably he was led into error by examining cells that had contained brood, where a film, or rather a part of the cocoon, is left by the insect. The cells of the wasp that builds on a branch show this the most; indeed, so much so, that they appear round. Wasps' combs are merely for rearing the brood; they are not arranged

in two opposite layers of cells, like the bees', but in one only, consequently the top of the combs is composed of the bases of the cells, and forms nearly a level floor, on which the insects can pass and repass. Spaces about half an inch high are left between each comb, supported by many little pillars formed of the same kind of materials as the combs, except more glue in their composition, perhaps saliva from the insects. There is a space also between the combs and the outside shell; in short, except a few of the upper ones, they are not attached to it at all; consequently have no support from it, but from the pillars fixed at the top of the cavity. The lower end of the first formed, or principal, one forms the basis of the first cells; in truth it is the beginning of the nest. The same may be said of each succeeding division of combs. The nest, at first, is about the size of half a pigeon's egg, containing about three cells, enlarged during the season by coatings on the outside, the inner ones being wrought up with them, or, more properly, into cells; a few, however, are always left, as a sure defence against the weather. A nest before me measures 2½ feet round, having nine divisions of combs, varying in size according to the shape of the cone, or nest; the entrance is in the side, as it usually is in the ground wasp's nest; but not so with the one that builds on a branch, there it is always below.

Sometimes there are two entrances to a wasp's nest, from one of which it is said the inmates uniformly issue, and enter the nest through the other. I have no experience of this, indeed I doubt it. I ought to mention, if the cavity admits of excavation, there is space between it and the nest. By these ingenious contrivances the insects have free access, both within and without, to their "paper metropolis." There are exceptions from their general rules of structure, especially when the space chosen will not admit of excavation by the wasps, who are expert miners. They seldom quit the nest without a load in their mandibles. It is astonishing what excavations they sometimes make, enough to hold a common beehive.

Some assert, I think Réaumur does, that wasps, like bees, have three different-sized cells; this, however, is wrong. The queens and drones are reared in the same comb and in the same-sized cells; the only difference is in the cocoon of the queens being raised a little higher than that of the drones, caused by the grubs being longer. Both come forth about the latter part of August, and are numerous, especially the latter, which, like the workers, vary in size, have an additional segment in their abdomen, have no sting, and are easily known by their long dark feelers. Unlike the drones in a beehive, they search for food; having no proboscis they cannot suck from cup or tube flowers; may be seen on the snow-berry and fennel blossoms, but rarely in a rotten plum. I never discovered the young queens abroad

at this period, perhaps they are fed by the workers, as they feed one another in the nest. A writer says that the drones take an active part in the colony, and for this reason they are not destroyed by the workers like the drone bees. This is not at all clear, for the grand business of the colony is drawing to a close when they appear. As the nest contains no store, the charge of eating and not adding to it cannot be laid to them. In truth, what use would it be for the workers to slaughter the drones, when they themselves are about to quit the nest, leaving both them and the females to their fate? After they have met to secure a future increase the drones perish, and, luckily, many of the queens also. What of the latter survive the winter in a torpid state amongst dry moss, &c., appear in spring to commence fresh colonies.

At first each is an insulated being, and begins the nest as already stated. As soon as the cells are partly finished, an egg is deposited in each, sometimes, but very rarely, two, not at the bottom, as in bees' cells, but on one side a little above it, to give room for the excrements from the insects, which are of a dark substance, and the only store, if I may say so, found in a wasps' nest. In about four days the eggs are hatched, and the brood are fed by the queen. While in the grub state they are very voracious; after they spin the cocoon they cease to eat. In about two or three weeks they cut through their cocoons and come forth perfect wasps. After this the queen does not go abroad; her sole occupation seems depositing the eggs; indeed she gets too heavy to fly. A writer tells us that the brood are "educated by the queen before they can assist her in her great design." Though really curious to hear of the education of insects, I reply to it, I have seen wasps without a queen emerge from their cells, and instantly feed the starving brood. Who taught the queen to raise so interesting a structure after lying four months torpid? Saying more is useless. The queen is soon surrounded by numerous workers plundering every where; some say three thousand, but this is stretching. Though in the first-formed cells there may be reared three successive broods during the season, there cannot be above one in the last-formed combs, which are the drones and queens. There appears no foundation for Perrot's belief that the eggs to produce the former are laid by smaller queens. Where can they meet with males to make them fruitful? Indeed the fact that both appear at one time is enough to upset it. I question if the young queens deposit eggs until the following season; but, if an accident happen to the old one, the case may be altered. I am led to think so by having once taken the old queen from a nest of hornets. In two weeks after there were fresh eggs in several cells; the nest contained several hundred young queens. That young queen bees deposit eggs is no criterion, for their colony

exists throughout the year. There seems a mystery about the impregnation of the queen wasps, like that of the queen bees; but the former must meet with the males before they disperse from the nest. I have doubts about what operates on the insects to cause their destruction; it cannot be altogether owing to the cold, as generally supposed, for sometimes wasps' nests are found tenantless before the cold sets in; for instance, this season I cut one from a branch on the 25th of August; at that time it was hot indeed. By the by, the nest belonged to a rare kind of wasp in this part of the country, though common in the north. The texture of the nest is firmer and darker than that of the common wasp, and very like the nest of a larger wasp, though less common than the ground one, which builds in the ground also, whose nest is formed of ligneous fibres from wood not so rotten as that which the common wasp uses, whose nest is very brittle, at least the covering. In some situations the more varied materials that wasps scrape with their mandibles will, of course, alter the colour and texture of their nests. Still, different kinds of wasps have their favourite materials. This I know by having different kinds at work close together. Their nests varied in colour like those just hinted at. In the darker one there appeared as if cow-dung were in the composition. But with regard to the wasp that builds on a branch, if the reader knows its habits perhaps he will notice it. Mudie seems to have mistaken this wasp for the common one, says but little about it, and observes that "idle boys plug up the entrance to the nests with clay, and then set them adrift down a cascade." May not the habits of this wasp be more fitted for a northern climate? If so, that may account for the insects leaving the nest so soon. Though the other kind of wasps do not leave them until about the first or middle of October, yet they get careless about their nests after the drones and queens come forth, which shows they have fulfilled the grand object of their being, that is, reared others to increase their species in the manner before stated. In a former paper I noticed the necessity of encouragement being given to prevent such increase. It is useless for me to mention the various ways to accomplish this, for they are well known to those concerned about wasps. I think some, with me, will doubt Sir Joseph Banks's statement, though it seems to have the sanction of Mr. Knight: "If you can once seize and destroy the sentinels at a wasps' nest, the remainder will not attack you." Mr. Knight, however, truly observes: "If one escapes from within, it comes with a very different temper."

I conclude with observing that the old saying, "A plum year will be a wasp one," has been fulfilled this last summer, for wasps have been numerous indeed.

Cossey Gardens, Oct. 5. 1842.

Art. VII. *On thinning Plantations.* By Archibald Gorrie, F.H.S., &c.

The frequency wherewith ill-managed plantations of forest trees meet the eye in every direction, all over the country, may render any attempt to point out the neglect a little hazardous, and in many instances unsuccessful. It very often happens that all the sympathies of the proprietor are in favour of allowing all trees, in anything like a thriving condition, to remain. Few proprietors have had leisure or inclination to study the subject so closely as to enable them clearly to foresee the consequence either of judicious thinning, or its neglect. In some, a wish to make something of the thinnings prevents the operation being entered upon till such mischief has occurred as even time, with skilful management, cannot altogether remedy. Hence the almost branchless skeletons of forest trees that in close order disfigure the demesnes around many a country seat, where such management is scarcely excusable. In forests, where very large masses have been planted in one or two seasons, the supply of thinnings may exceed the demand in a contiguous market, and the forester's account of expense for thinning and pruning may, in such cases, exceed the proceeds of the sale. From the same causes, we often see on the lawn groups of trees planted with the full intention on the part of the planter, in the outset, that the nurses should be timely removed, to allow those trees intended ultimately to adorn the grounds to assume their natural forms: but these very nurses are, in nine cases out of ten, allowed to become robbers, excluding the light and the air from those trees which they were at first only intended to shelter while young, and sucking up the food from the soil that should go to foster the reserves; so that nurses and nursed soon indicate, by their tall, slender, and leafless shanks, that they have outlived the means of nourishment, and entirely defeated the purposes of the planter. It were easy to point out many places where the lawn is disfigured by stiff outlines of plantations, enclosing masses of miserable trees struggling for light and air till scarcely a leaf remains on the summit of the sapless pole to elaborate the sap, whereof the numerous matted roots of too many contending neighbours prevent anything like a full supply. There are a few exceptions, but they are still too few to furnish sufficient stimulating examples to proper management. One would think that in such a city as Edinburgh, the metropolis of Caledonia, the seat of learning, the "Modern Athens," any small patches of trees would afford a specimen of the very *ne plus ultra* of skilful management in bringing forward the trees to form *beau idéal* specimens, whether for ornament or utility. But no; just look along Prince's Street, and you will

see one of the finest streets in the world horribly disfigured by a heterogeneous mass of trees crowding upon each other in endless confusion. Oak, elm, ash, poplars, birch, maple, beech, lime, and laburnum appear in a sort of medley too monotonous to show anything like variety.

In the olden time, indeed, such was the common mode of forming plantations, implying a tacit confession on the part of the planter that he did not clearly understand what kinds of trees were most suitable for the soil and situation, leaving the trees to determine that point, as being the best judges in the matter; and, while the science of arboriculture was in its infancy, the practice had at least the air of prudence supplying the place of skill. In the neighbourhood of smoky towns, such as "Auld Reekie," another element connected with the health of plants had to be considered; and here the range for observation and experience was, from the very nature of the locality, much limited, which may account for the closely planted mixtures of trees in the squares and open spaces in Queen's Street and the Nor' Loch; but now that the trees have, for the most part, proved by their healthy appearance and vigorous growth that they stand in a congenial soil and climate, unscathed by smoke or sooty particles, it is high time that something decisive should immediately be set about, to render those plantations, which at present form an eyesore to every practised eye, an ornament to the town, and an example of ornament and utility to the country. The necessary operations would afford useful employment to a few of those labourers who are at present in want of work; and, what must recommend it to the authorities concerned, the proceeds would likely more than pay the labour in the mean time. This would place the plantations in question in such a position as to insure, what must have been originally intended, proper specimens of trees in their natural form; and also, where that was an object, properly trained specimens of trees for producing timber.

If it be asked how all this is to be effected, I would say, in the first place, let a properly qualified person (and surely there are many such among Scotsmen, who would give their services, either *gratis* or on very easy terms, for so laudable an object) select and mark all trees that should ultimately stand for reserves. In doing this he would mark, at proper distances, such trees as would appear to him best suited for standing, whether to form objects of ornament or utility, timber trees or trees of natural form, in such places as might be fixed on by those in authority. In making his selections he would be able, from the present crowded and mixed state of the trees, to throw the whole into distinct masses of every genus by itself; the masses blending harmoniously into each other. The individual trees

so marked should not be deprived totally of shelter at once; only a few trees should be taken down next to them, to give room for allowing them to acquire proper form of head and range of root for supplying nourishment, taking out nurses from time to time, as those selected filled the space around them. This would give the ground a clothed appearance during the period that the trees were acquiring maturity.

In the lower parts of the ground, groups might be trained to become lofty timber trees where such might be desired; but on the banks, and near the street, trees should be left at proper distances to assume their natural forms, and each group or mass should consist of one genus, with the lowest-growing and most ornamental species next the street; and ample space should be left ultimately, when all intervening trees were taken away, to show each individual tree to advantage, surrounded by grass touched by its descending branches.

The thinnings absolutely necessary to be removed in the meantime might, in such a town as Edinburgh, sell for billet wood, and would more than cover the expense of labour; or, perhaps, some of the plants might be sold for the purpose of giving immediate effect to villa grounds and lawns in the vicinity of the town. Should any portion be destined to be trained as timber trees, they would require a little judicious pruning, as well as instant relief from their encroaching neighbours. Those intended for what may be called lawn trees would require no pruning, except where it was rendered necessary by the presence of decaying branches. Should these operations be instantly gone about, Edinburgh may, at a future period, be as famous for its lofty specimens of forest trees as is Syon House at the present day; but a few years' neglect, and those fine trees, which now have the appearance of an unshorn hedge, are irrecoverably lost, either for ornament or usefulness, and their tall timber and branchless stems will set the powers of nature and of art, to reduce them to goodly forms, at defiance.

Annat Cottage, Braes of Gowrie, Oct. 28. 1842.

[We sincerely hope that the very judicious remarks contained in Mr. Gorrie's article will not be lost on the Lord Provost and town council of Edinburgh. It was, no doubt, a great step, thirty years ago, to get trees planted in the Nor' Loch at all; and the effect on us, when we first saw these plantations, in August, 1841, was like enchantment, as compared with the state of the ground when we left Scotland. But it was not then customary to pay much attention to the kinds of trees planted; or to their disposition in groups, or in such a manner as to have always one kind prevailing in one place. Neither were the value of

evergreens, either as trees or undergrowths, more especially the latter, so well understood then as at present. Were these plantations to be made again, a very different feeling would be evinced, and the space now covered with the commonest trees, almost all deciduous, and without evergreen shrubs, would probably be made to contain such a collection as would constitute a tolerably complete arboretum. We do not suppose there is a finer situation any where for peat-earth trees and shrubs than the bottom of the Nor' Loch; and, hence, rhododendrons, azaleas, kalmias, and all the numerous and beautiful species of American trees and shrubs, which delight in a moist, peaty, rich soil, might produce there a splendid effect. The sloping bank of the Castle Hill is equally well adapted for a pinetum, and it is quite large enough to afford space for one plant, or even two, of all the hardy Coníferæ, and half a dozen of such species as the Araucària imbricàta, the deodar cedar, and the cedar of Lebanon. The bank on the Prince's Street side might be devoted to the common kinds of trees, and the shrubs (exclusive of the peat-earth kinds to be planted in the bottom) might be distributed along the walks. One plant of each species might be named, as in the London parks (see p. 643.); and in the open places here and there, near the walks, but so as never to interfere with breadth of effect, there might be small circular beds, from 2 ft. to 6 ft. in diameter, for masses of flowers, one kind only being sown or planted in a bed, in order to produce masses of colour. It is not yet too late to carry out these suggestions in connexion with the thinning recommended by Mr. Gorrie; but it would be necessary to give up the idea of pasturage, and of letting part of the ground as a nursery, and to keep the grass short by mowing. If this mowing, however, were followed up closely on the growth of the grass, it would, in a few years, weaken the roots so much as to diminish the frequency of its recurrence.

If these suggestions of ours are considered extravagant, the same objections cannot be made to those of Mr. Gorrie, which, we again say, will, we trust, meet with due attention in the proper quarter.] — *Cond.*

Art. VIII. *On Sèdum Sieboldi, and other Plants of low Growth.* By Richard Tongue, Esq.

"Sèdum Sieboldi, a plant which, although hardy, does not grow to perfection in the open air, but succeeds best when treated as a greenhouse plant." (*Gard. Chron.*, p. 671. 1842.)

Lest the above should deter any one from placing Sèdum

Siebóldi in the open border, I wish to state that it is now, October 20th, in as great perfection, in my garden, as could be desired, furnishing it with a little plot of rosy bloom, when all hardy and low-growing perennials, besides itself, are out of flower.

Plants of humble growth, and those which creep or trail upon the ground, are never seen to much advantage when merely dotting or starring rockwork, a use for which it is customary to recommend them. It is when spreading over miniature hills, or creeping down the steeps of tiny ravines, after nature's own fashion, that they surprise the eye with a blaze of beauty surpassing, if possible, that which is cast upon mountains by a glorious sunset. It is then, too, that they, though out of flower, can give us superior delight, if the artist can make good use of the various shades of green and grey which they afford him. A little knoll of grass-green saxifrage, and a monticule of variegated stonecrop (the latter appearing as if gilded with the rays of the setting sun, and the former resembling a rich pasture in May), are of themselves beautiful objects in the month of March; but when forming with others a *scene*, they become doubly interesting, even at that bleak time of the year, for there are then, for relief, the darker greens of speedwells, the grey, almost the white, foliage of mouse-ear chickweed, the grey-green of *A*lýssum saxátile, the snow-white flowers of the alpine rock-cress, the pink bloom of *E*rìca cárnea, and, to darken nooks and dells, our native heaths and periwinkle.

We frequently witness how much elegance and beauty can be produced out of the commonest materials, when arranged by the dexterous hand of a woman of taste; and the most neglected moor plants of our own country need but the same mind to direct their arrangement, in order to become surpassingly beautiful. The truth of this will be evident to any one who, alive to the beauties of nature, has seen mountain or moorland brightened in one spot by the numerous flowers of procumbent bedstraw, and glowing in another with wild thyme or with *E*rìca cinèrea; but more strikingly true will the observation appear to him who in his rambles may have been fortunate enough to find large spaces

"gleaming with purple and gold;"

notwithstanding that imperial conjunction of colours be made by nothing more than valueless heaths and dwarf whins.

Forton Cottage, near Lancaster,
Oct. 2. 1842.

REVIEWS.

Art. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

The Suburban Horticulturist; or, an Attempt to teach the Science and Practice of the Culture and Management of the Kitchen, Fruit, and Forcing Garden, to those who have had no previous Knowledge or Practice in these Departments of Gardening. By J. C. Loudon, F.L.S., H.S., &c. Illustrated with Engravings on Wood. 1 vol. 8vo, pp. 732, and 383 woodcuts. London, 1842.

We have taken a great deal of pains with this volume, and we hope we have produced a work which will be more useful to the amateur and the young gardener than any other of the kind. We shall only, at present, give an extract from the Contents.

"Names of the Fruits and Culinary Vegetables cultivated in British Gardens, in different Languages, &c. List of Engravings. Introduction.

Part I. Facts relative to Plants, the Soil, Manures, the Atmosphere, &c., on which Horticulture is founded.

Chap. I. Plants considered with reference to their Culture in Gardens. Sect. 1. The Analogy between Plants and Animals considered with reference to Horticulture. Sect. 2. Classification of Plants, with a view to Horticulture. Sect. 3. Nomenclature of Plants with a view to Horticulture. Sect. 4. Structure of Plants with a view to Horticulture. Sect. 5. Functions of Plants with reference to Horticulture. Sect. 6. The Geographical Distribution of Plants, and their Stations and Habitations, with reference to their Culture in Gardens.

Chap. II. Soils considered with reference to Horticulture. Sect. 1. Origin and Kinds of Soils. Sect. 2. The Improvement of Soils with a view to Horticulture.

Chap. III. Manures considered with reference to Horticulture. Sect. 1. Organic Manures. Sect. 2. Inorganic Manures. Sect. 3. Mixed Manures.

Chap. IV. The Atmosphere considered with reference to Horticulture. Sect. 1. Heat considered with reference to Horticulture. Sect. 2. Atmospheric Moisture considered with reference to Horticulture. Sect. 3. The Agitation of the Atmosphere considered with reference to Horticulture. Sect. 4. Light considered with reference to Horticulture.

Chap. V. Worms, Snails, Slugs, Reptiles, Birds, &c., considered with reference to Horticulture. Sect. 1. The Earth-worm considered with reference to Horticulture. Sect. 2. Snails and Slugs considered with reference to Horticulture. Sect. 3. Insects considered with reference to Horticulture. Subsect. 1. Of the Nature of Insects, and their Classification. Subsect. 2. Transformation of Insects. Subsect. 3. Food of Insects. Subsect. 4. Distribution and Habits of Insects. Subsect. 5. Uses of Insects. Subsect. 6. Means contrived by Nature to limit the Multiplication of Insects. Subsect. 7. Means devised by Art for arresting the Progress of Insects in Gardens, or of destroying them there. Sect. 4. Amphibious Animals considered with reference to Horticulture. Sect. 5. Birds considered with reference to Horticulture. Sect. 6. The smaller Quadrupeds considered with reference to Horticulture.

Chap. VI. Diseases and Accidents of Plants considered with reference to Horticulture.

Part II. Implements, Structures, and Operations of Horticulture.

Chap. I. Implements of Horticulture. Sect. 1. General Observations on the Construction and Uses of the Implements used in Horticulture. Sect. 2. Tools used in Horticulture. Sect. 3. Instruments used in Horticulture.

Sect. 4. Utensils used in Horticulture. Sect. 5. Machines used in Horticulture. Miscellaneous Articles used in Horticulture.

Chap. II. Structures and Edifices of Horticulture. Sect. 1. Portable, Temporary, and Movable Structures. Sect. 2. Fixed Structures used in Horticulture. Subsect. 1. Walls, Espalier Rails, and Trelliswork. Subsect. 2. Fixed Structures for growing Plants with Glass Roofs. Subsect. 3. Edifices used in Horticulture.

Chap. III. Operations of Horticulture. Sect. 1. Horticultural Labours. Subsect. 1. Horticultural Labours on the Soil. Subsect. 2. Garden Labours with Plants. Sect. 2. Operations of Culture. Subsect. 1. Propagation. § 1. On Propagation by Seed. § 2. On Propagation by Cuttings. § 3. Propagation by Leaves. § 4. Propagation by Layers. § 5. Propagation by Suckers, Slips, Offsets, Runners, and Simple Division. § 6. Propagation by grafting, inarching, and budding. § 7. Grafting by detached Scions. § 8. Grafting by approach or inarching. § 9. Budding or grafting by detached Buds. Subsect. 2. Rearing. § 1. Transplanting and Planting. § 2. Potting and Repotting or Shifting. § 3. Pruning, § 4. Thinning. § 5. Training. § 6. Weeding. § 7. Watering. § 8. Stirring the Soil and Manuring. § 9. Blanching. § 10. Protection from atmospherical Injuries. § 11. Accelerating Vegetation. § 12. Retarding Vegetation. § 13. Resting Vegetation. § 14. Operations of gathering, preserving, keeping, and packing. § 15. Selecting and improving Plants in Culture. § 16. Operations of Order and Keeping.

Chap. IV. Operations of Horticultural Design and Taste.

Chap. V. Operations of general Management.

Part III. The Culture of the Kitchen, Fruit, and Forcing Garden.

Chap. I. Laying out and planting the Kitchen and Fruit Garden. Sect. 1. Laying out the Kitchen-Garden. Sect. 2. The Distribution of Fruit Trees in a Kitchen-Garden. Subsect. 1. Wall-fruit Trees. Subsect. 2. Fruit Trees for Espaliers and Dwarfs. Subsect. 3. Fruit Shrubs. Subsect. 4. Selection of Fruit Trees adapted for an Orchard.

Chap. II. Cropping and general Management of a Kitchen-Garden Sect. 1. Cropping. Sect. 2. Rotation of Crops. Sect. 3. Planting, sowing, cultivating, and managing.

Chap. III. The Forcing Department. Sect. 1. Culture of the Pine-apple, and Management of the Pinery. Subsect. 1. Natural Data on which the Culture of the Pine-apple is founded. Subsect. 2. Culture of the Pine-apple in British Gardens. Sect. 2. Culture of the Grape Vine under Glass and on Walls. Subsect. 1. Natural Data on which the Culture of the Grape Vine is founded. Subsect. 2. Propagation, pruning, and training the Vine. Subsect. 3. Culture of the Grape Vine under Glass. Subsect. 4. Growing the Grape on open Walls, and on Cottages. Subsect. 5. Insects, Diseases, &c., of the Grape Vine. Sect. 3. Culture of the Peach and Nectarine under Glass. Subsect. 1. Natural Data on which the Culture of the Peach is founded. Subsect. 2. Culture of the Peach under Glass in British Gardens. Subsect. 3. The Details of a routine Course of forcing the Peach for two Years. Sect. 4. Culture of the Cherry under Glass. Subsect. 1. Natural Data for the Culture of the Cherry. Subsect. 2. The Practice of Cherry-forcing in British Gardens. Sect. 5. Culture of the Fig under Glass. Subsect.1 . Natural Data on which the Culture of the Fig is founded. Subsect. 2. The forcing of the Fig as practised in British Gardens. Sect. 6. On forcing the Plum, Apricot, Gooseberry, and other Fruit Shrubs. Sect. 7. Culture of the Melon. Subsect. 1. Natural and experimental Data on which the Culture of the Melon is founded. Subsect. 2. Culture of the Melon as practised in British Gardens. Sect. 8. Culture of the Cucumber. Subsect. 1. Data on which the Culture of the Cucumber is founded. Subsect. 2. Culture of the Cucumber in a Dung Bed. Subsect. 3. Culture of the Cucumber in Pits heated by Dung Linings, Flues, or hot Water. Subsect. 4. Culture and Treatment of the Cucumber for Prize Exhibitions. Subsect. 5. Cultivation of the Cucumber in the open Air.

Sect. 9. Culture of the Banana. Sect. 10. Forcing the Strawberry. Sect. 11. Forcing the Asparagus, Sea-Kale, Rhubarb, Chicory, and other fleshy Roots. Sect. 12. Forcing the common Potato, the sweet Potato, and other Tubers. Sect. 13. Forcing Kidneybeans and Peas. Sect. 14. Forcing Salads, Potherbs, Sweet Herbs, and other culinary Plants. Sect. 15. Forcing the Mushroom. Subsect. 1. Data on which the Culture and Forcing of the Mushroom is founded. Subsect. 2. Forcing the Mushroom in British Gardens.

Chap. IV. Catalogue of Fruits. Sect. 1. Hardy or Orchard Fruits. Subsect. 1. The Apple. Subsect. 2. The Pear. Subsect. 3. The Quince. Subsect. 4. The Medlar. Subsect. 5. The True Service. Subsect. 6. The Cherry. Subsect. 7. The Plum. Subsect. 8. The Gooseberry. Subsect. 9. The Red and White Currant. Subsect. 10. The Black Currant. Subsect. 11. The Raspberry. Subsect. 12. The Strawberry. Subsect. 13. The Cranberry. Subsect. 14. The Mulberry. Subsect. 15. The Walnut. Subsect. 16. The Sweet Chestnut. Subsect. 17. The Filbert. Subsect. 18. The Berberry, Elderberry, Cornelian Cherry, Buffalo-berry, and Winter Cherry. Sect. 2. Half-hardy or Wall Fruits. Subsect. 1. The Grape. Subsect. 2. The Peach and Nectarine. Subsect. 3. The Almond. Subsect. 4. The Apricot. Subsect. 5. The Fig. Subsect. 6. The Pomegranate. Subsect. 7. The Peruvian Cherry. Sect. 3. Tropical or Sub-tropical Fruits. Subsect. 1. The Pine-apple. Subsect. 2. The Banana. Subsect. 3. The Melon. Subsect. 4. The Cucumber. Subsect. 5. The Pumpkin and Gourd. Subsect. 6. The Tomato, the Egg-plant, and the Capsicum. Subsect. 7. The Orange Family. Subsect. 8. The Guana, Lo-quat, Granadilla, and other Fruits little known in British Gardens. Subsect. 9. Remarks applicable to Fruit Trees and Fruit-bearing Plants generally.

Chap. V. Catalogue of Culinary Vegetables. Sect. 1. Brassicaceous Esculents, or the Cabbage Tribe. Sect. 2. Leguminaceous Esculents. Subsect. 1. The Pea. Subsect. 2. The Bean. Subsect. 3. The Kidneybean. Sect. 3. Radicaceous Esculents. Subsect. 1. The Potato. Subsect. 2. The Jerusalem Artichoke. Subsect. 3. The Turnip. Subsect. 4. The Carrot. Subsect. 5. The Parsnep. Subsect. 6. The Red Beet. Subsect. 7. The Skirret, Scorzonera, Salsify, and Œnothèra. Subsect. 8. The Hamburgh Parsley. Subsect. 9. The Radish. Subsect. 10. *O'*xalis Déppe*i*, *O.* crenàta, and Tropæ'olum tuberòsum. Sect. 4. Spinaceous Esculents. Subsect. 1. The common Spinach. Subsect. 2. Orach or French Spinach. Subsect. 3. New Zealand Spinach. Subsect. 4. Perennial Spinach. Subsect. 5. The Spinach Beet, and the Chard Beet. Subsect. 6. Patience Spinach. Subsect. 7. The Sorrel. Sect. 5. Alliaceous Esculents. Subsect. 1. The Onion. Subsect. 2. The Leek. Subsect. 3. The Shallot. Subsect. 4. The Garlic. Subsect. 5. The Chive. Subsect. 6. The Rocambole. Sect. 6. Asparagaceous Esculents. Subsect. 1. The Asparagus. Subsect 2. The Sea-Kale. Subsect. 3. The Artichoke. Subsect. 4. The Cardoon. Subsect. 5. The Rampion. Subsect. 6. Substitutes for Asparagaceous Esculents. Sect. 7. Acetariaceous Esculents. Subsect. 1. The Lettuce. Subsect. 2. The Endive. Subsect. 3. The Succory. Subsect. 4. The Celery. Subsect. 5. The Lamb's Lettuce, Burnet, the Garden Cress, Winter Cress, American Cress, and Water Cress. Subsect. 6. Small Salads. Subsect. 7. Substitutes for Acetariaceous Esculents. Sect. 8. Adornaceous Esculents. Subsect. 1. The Parsley. Subsect. 2. The Chervil, the Coriander, the Anise, Dill, Fennel, Tarragon, and Purslane. Subsect. 3. The Indian Cress, Borage, and Marigold. Subsect. 4. The Horseradish and Substitutes. Sect. 9. Condimentaceous Esculents. Subsect. 1. The Rhubarb. Subsect. 2. The Angelica, Elecampane, Samphire, Caper, &c. Sect. 10. Aromaceous Esculents. Sect. 11. Fungaceous Esculents. Sect. 12. Odoraceous Herbs. Sect. 13. Medicaceous Herbs. Sect. 14. Toxicaceous Herbs.

Supplementary Notes. A Monthly Calendar of Operations. General Index."

The Ladies' Companion to the Flower-Garden: being an Alphabetical Arrangement of all the ornamental Plants usually grown in Gardens and Shrubberies; with full Directions for their Culture. By Mrs. Loudon. Second edition, with considerable additions and corrections. 12mo, pp. 350. London, 1842.

It may be sufficient to state of this work that it has already come to a second edition, and that this edition is brought down to the present time. This the author has been enabled to do in consequence of the work not being stereotyped; a practice which has led, in various instances that we could name, to the deception of the public, the injury of authors, and the retardation of science. We could name a work in which successive impressions of the stereotype plates have been designated on the title page so many editions, and in which even the date of the preface, as well as that of the titlepage, has been altered without consulting the author. We know of no remedy for this, unless it be a law to compel those who stereotype books to have that stated, and the year in which it is done, on the titlepage.

The Botanical Text-Book for Colleges, Schools, and private Students: comprising Part I. An Introduction to structural and physiological Botany. Part II. The Principles of systematic Botany; with an Account of the chief natural Families of the Vegetable Kingdom, and Notices of the principal officinal or otherwise useful Plants. Illustrated with numerous Engravings on Wood. By Asa Gray, M.D., &c. 8vo, pp. 413. New York and Boston, 1842.

We have received this book just in time to take a rapid glance at its pages, and to say that it appears to us a very excellent work. Part I. treats of structural and physiological botany, and Part II. of systematic botany. There are numerous woodcuts, which are very well executed; and the paper, type, and printing, are equal to those of any London publication.

Botany for Ladies; or, a Popular Introduction to the Natural System of Plants, according to the Classification of DeCandolle. By Mrs. Loudon, Author of "Instructions in Gardening for Ladies," "Year Book of Natural History," "Companion to the Flower-Garden," &c. 12mo, pp. 493. London, 1842.

The author, after stating that, when a child, she found the Linnean system so repulsive, that, though she frequently tried, she never could learn botany, goes on to say, that, after she married, she determined to try whether she could succeed any better by the natural system. At first she was in despair, on account of the hard names of Vasculares, Cellulares, Monocotyledons, Dicotyledons, that seemed to stand on the very threshold of the science, as if to forbid the entrance of any but the initiated.

"Some time afterwards, as I was walking through the gardens of the Horticultural Society at Chiswick, my attention was attracted by a mass of the beautiful crimson flowers of Malope grandiflora. I had never seen the plant before, and I eagerly asked the name. 'It is some Malvaceous plant,' answered Mr. Loudon, carelessly; and immediately afterwards he left me to look at some trees which he was about to have drawn for his *Arboretum Britannicum*. 'Some Malvaceous plant,' thought I, as I continued looking at the splendid bed before me; and then I remembered how much the form of these beautiful flowers resembled that of the flowers of the crimson Mallow, the botanical name of which I recollected was Malva. 'I wish I could find out some other Malvaceous plant,' I thought to myself; and when we soon afterwards walked through the hothouses, I continued to ask if the Chinese Hibiscus, which I saw in flower there, did not belong to Malvaceæ. I was answered in the affirmative; and I was so pleased with my newly-acquired knowledge, that I was not satisfied till I had discovered every Malvaceous plant that was in flower in the garden. I next learned to know the Cruciferous and Umbelliferous plants; and thus I acquired a general knowledge of three extensive orders with very little trouble to myself. My attention was more fairly aroused, and by learning one order after another, I soon attained a sufficient knowledge of botany to answer all the purposes for which I wished

to learn it, without recurring to the hard words which had so much alarmed me at the outset. One great obstacle to my advancement was the difficulty I had in understanding botanical works. With the exception of Dr. Lindley's *Ladies' Botany*, they were all sealed books to me; and even that did not tell half I wanted to know, though it contained a great deal I could not understand. It is so difficult for men whose knowledge has grown with their growth, and strengthened with their strength, to imagine the state of profound ignorance in which a beginner is, that even the elementary books are like the old Eton grammar when it was written in Latin — they require a master to explain them. It is the want that I have felt that has induced me to write the following pages; in which I have endeavoured to meet the wants of those who may be now in the same difficulties that I was in myself.

"The course I pursued is also that which I shall point out to my readers. I shall first endeavour to explain to them, as clearly as I can, the botanical characteristics of the orders which contain plants commonly grown in British gardens; and at the end of my work I shall lay before them a slight outline of all the orders scientifically arranged, which they may study or not as they like. Most ladies will, however, probably be satisfied with knowing the orders containing popular plants; and these, I am confident, they will never repent having studied. Indeed, I do not think that I could form a kinder wish for them, than to hope that they may find as much pleasure in the pursuit as I have derived from it myself. Whenever I go into any country I have formerly visited, I feel as though I were endowed with a new sense. Even the very banks by the sides of the roads, which I before thought dull and uninteresting, now appear fraught with beauty. A new charm seems thrown over the face of nature, and a degree of interest is given to even the commonest weeds. I have often heard that knowledge is power, and I am quite sure that it contributes greatly to enjoyment. A man knowing nothing of natural history, and of course not caring for any thing relating to it, may travel from one extremity of a country to the other, without finding any thing to interest, or even amuse him; but the man of science, and particularly the botanist, cannot walk a dozen yards along a beaten turnpike-road without finding something to excite his attention. A wild plant in a hedge, a tuft of moss on a wall, and even the lichens which discolour the stones, all present objects of interest, and of admiration for that Almighty Power whose care has provided the flower to shelter the infant germ, and has laid up a stock of nourishment in the seed to supply the first wants of the tender plant. It has been often said that the study of nature has a tendency to elevate and ameliorate the mind; and there is perhaps no branch of natural history which more fully illustrates the truth of this remark than botany."

With this quotation we leave the work in the hands of the reader, simply observing that we think it by far the best introduction to the natural system of botany, for grown up persons, amateurs, whether male or female, that has yet appeared.

The Little English Flora, or a Botanical and Popular Account of all our common Field Flowers, with numerous Woodcuts and Engravings on Steel of every Species. By G. W. Francis, F.L.S. Second edition, greatly improved and augmented. 12mo, pp. 213. London, 1842.

We noticed the first edition of this work in our Volume for 1839, p. 87., and are glad to find that it has come to a second edition. It is certainly a remarkable example of concentration and exceedingly cheap, and, we can most strongly recommend it to every young lady living in the country.

An Analysis of the British Ferns and their Allies. By G. W. Francis, F.L.S. Second edition. 8vo, pp. 88. London, 1842.

We have spoken in favour of this work in a former volume, and at present have little more to say, than that the ferns are now becoming a very fashionable study, and their collection in gardens is so frequent, that we ob-

serve Mr. Pamplin, and some others of the London nurserymen, advertising ferns for sale. The study of ferns recommends itself in a particular manner to persons living in moist districts, not only because ferns thrive best in a moist climate, but because in such climates a great variety of ferns will generally be found indigenous; for example, Devonshire and Ayrshire. The same thing may be observed of mosses and lichens.

Rivers's Selected Catalogue of Roses, for the Autumn of 1842 and the Spring of 1843.
Lane and Sons' Catalogue of Roses for 1842–3.
Wood and Sons' Descriptive Catalogue of Roses, for the Autumn of 1842 and Spring of 1843.
Hooker's Catalogue of Roses for 1842-3.

These are all delightful harbingers of spring, and they come in suitably to fill up the pause that would otherwise occur between leaving off and beginning again. We hail them, therefore, with pleasure, and strongly recommend them to intending purchasers.

The Book of the Farm. By Henry Stephens, Editor of the 'Quarterly Journal of Agriculture.' Part VIII. 8vo, pp. 96. Edinburgh and London.

The present number is the commencement of the second volume, and is illustrated with a profusion of very well executed wood cuts. In other respects the work maintains its high character.

What can be done for English Agriculture? A Letter to the Most Noble the Marquess of Northampton, F.G.S., F.A.S., &c. &c., President of the Royal Society. By J. F. W. Johnston, M.A., F.R.SS.L.& E., &c. Pamph. 8vo, pp. 39. Edinburgh, London, Durham, Dublin, and all Booksellers. Price 1*s.*

We ought to have noticed this pamphlet before. It is a fit companion to Greg's *Scotch Farming*, noticed in our last Number, p. 569.; and, like it, is in favour of leases of 19 or 21 years, corn rents, and payment chiefly in kind to agricultural labourers. Without the first, neither capital nor skill will ever be applied to agriculture to any extent, and consequently no improvement worth mentioning can take place; without a corn rent no man is safe in taking a farm on lease while the present corn law exists; and, without labourers paid in kind, there can be no certainty of having workmen sufficiently fed to do the work required of them, in years when the necessaries of life are dear. We do not know any change that would be so much for the benefit of the English agricultural labourer, as paying him in flour, potatoes, and a certain quantity of butcher's meat, butter, and milk; with something also in money to procure clothes, groceries, &c. We feel confident that the advantage to the farmer would be equally great.

First Additional Supplement to the Encyclopædia of Cottage, Farm, and Villa Architecture and Furniture; bringing down Improvements in these Arts to 1842. *Illustrated by nearly* 300 *Engravings of Designs by thirty different Contributors.* By J. C. Loudon, F.L.S., &c. 8vo, pp. 161. London, 1842.

The best mode of giving the reader an idea of what this work contains will be to copy its Contents.

"Chap. I. Cottages for Country Labourers and Mechanics, and for Gardeners, Foresters, Bailiffs, and other upper out-of-door Servants in the Country, including Gate-Lodges and Gates. Sect. I. Designs for Model Cottages. Subs. 1. Agriculturist's Model Cottage, No. 1. Subs. 2. Agriculturist's Model Cottage, No. 2. Subs. 3. Mechanic's Model Cottage. Subs. 4. Placing the Model Cottages in Rows. Subs. 5. Forming Combinations of Dwellings of the humblest Class. Sect. II. A Selection of Plans of Cottages which have been erected in different Parts of the Country.

Sect. III. Miscellaneous Designs for Cottages (chiefly ornamental). 1. A Cottage, with ornamental Elevations, in the Style of the ancient half-timbered Houses of England. 2. A Gate-Lodge, combining a Stable in the Swiss Style. 3. A Gate-Lodge and Gates. 4. A Gate-Lodge at Ravensworth Castle. 5. A Cottage in the Style of the Wingfield Station House, on the North Midland Railway. 6. A Cottage in the Style of the Eckington Railway Station. 7. A Cottage in the Modern Italian Style. 8. A Cottage in the Style of the Belper Railway Station. 9. A Cottage in the Style of the Ambergate Railway Station. 10. The Edensor Gate-Lodges and Gates at Chatsworth. 11 to 14. Four Ornamental Cottages, with the same Accommodation as in the Model Cottage, No. 1. 15. A Cottage in the Style of Heriot's Hospital, Edinburgh. 16. The Dairy Lodge, erected at Chequers Court, Buckinghamshire, for Sir Robert Frankland Russell, Bart. 17 to 26. The Cottages in Cassiobury Park. 27. A Gate-Lodge or Cottage. 28. A Turnpike Lodge. 29. A Cyclopean Cottage. 30. The Penshurst Gate-Lodge at Redleaf, the Seat of William Wells, Esq. 31. The Home Lodge at Chequers Court. 32. The Keeper's Lodge at Bluberhouses. 33. A Cottage in the Gothic Style for an upper Servant. 34. Double Cottages for two upper Servants. 35. A Cottage in the Old English Style. Sect. IV. Construction and Materials of Cottages. Sect. V. Cottage Fittings-up and Furniture. Sect. VI. Villages.

"Chap. II. Cottage Villas and Villas. 1. A Villa in the Swiss Style. 2. A Villa adapted for a Situation in the Neighbourhood of Ayr. 3. A small Villa in the Modern Style. 4. A small Villa for a Gentleman much attached to Gardening. 5. Annat Cottage, near Errol, Perthshire. 6. A Cottage in the Old English Style. 7. A small Roman Villa. 8. A Roman Villa, designed for a particular Situation. 9 to 12. Small Villas in the Gothic Style. 13. Sir John Robison's House, Randolph Crescent, Edinburgh. 14. A Land-Steward's House in the Neighbourhood of Inverness. 15. A Villa in the Italian Style. 16. A small Gothic Villa, suited to the Suburbs of a large Town. 17. An Anglo-Grecian Villa.

"Chap. III. Farm Buildings.

"Chap. IV. Schools, Inns, Workhouses, and Almshouses. 1. A School in the Italian Style. 2. Description and Specification, with Details, of Dunchurch Sunday School. 3. A Union Workhouse. 4. The Almshouses at Oving. 5. A Public-House. 6. The Hand and Spear Hotel, at Weybridge, Surrey.

"Chap. V. Details of Construction applicable to Cottages, Farm Buildings, Villas, &c. Sect. I. Foundations and Walls. Sect. II. Roofs and Floors. Sect. III. Windows and Doors. Sect. IV. Chimney-Tops and Smoky Chimneys. Sect. V. Ventilation. Sect. VI. Tanks and Cottage Privies. Sect. VII. Construction and Arrangement of a Bath Room. Sect. VIII. Gates and Fences. Sect. IX. Miscellaneous Details. Sect. X. Materials.

"Chap. VI. Fittings-up, Finishing, and Furnishing. Sect. I. Modes of Heating. Sect. II. Interior Fittings-up and Finishing. Sect. III. Kitchen Fittings-up and Furniture. Sect. IV. Bed-room Furniture. Sect. V. Furniture for Living-Rooms.

"Chap. VII. Hints to Proprietors desirous of improving the Labourers' Cottages on their Estates."

To those who are not likely to procure the work, we give the following as the most important part of it as far as respects labourers' cottages; though the greater part will apply to houses of every description.

"2242. *The essential Requisites* for a comfortable labourer's cottage may be thus summed up:—

"1. The cottage should be placed alongside a public road, as being more cheerful than a solitary situation; and in order that the cottager may enjoy the applause of the public when he has his garden in good order and keeping.

"2. The cottage should be so placed that the sun may shine on every side

of it every day throughout the year, when he is visible. For this reason, the front of the cottage can only be parallel to the public road in the case of roads in the direction of north-east, south-west, north-west, and south-east; in all other cases the front must be placed obliquely to the road, which, as we have previously shown, is greatly preferable to having the front parallel to the road.

"3. Every cottage ought to have the floor elevated, that it may be dry; the walls double, or hollow, or battened, or not less than 18 in. thick, that they may retain heat; with a course of slate or flagstone, or tiles bedded in cement, 6 in. above the surface, to prevent the rising of damp; the roof thick, or double, for the sake of warmth; and projecting 18 in. or 2 ft. at the eaves, in order to keep the walls dry, and to check the radiation of heat from their exterior surface.

"4. In general, every cottage ought to be two stories high, so that the sleeping-rooms may not be on the ground floor, and the ground floor ought not to be less than from 6 in. to 1 ft. above the outer surface.

"5. The minimum of accommodation ought to be a kitchen or living-room, a back-kitchen or wash-house, and a pantry, on the ground floor, with three bed-rooms over; or two rooms and a wash-house on the ground floor, and two bed-rooms over.

"6. Every cottage, including its garden, yard, &c., ought to occupy not less than one sixth of an acre; and the garden ought to surround the cottage, or at all events to extend both before and behind. In general, there ought to be a front garden and a back yard; the latter being entered from the back-kitchen, and containing a privy, liquid-manure tank, place for dust and ashes, and place for fuel.

"7. If practicable, every cottage ought to stand singly and surrounded by its garden; or, at all events, not more than two cottages ought to be joined together. Among other important arguments in favour of this arrangement, it may be mentioned, that it is the only one by which the sun can shine every day on every side of the cottage. When cottages are joined together in a row, unless that row is in a diagonal direction, with reference to a south and north line, the sun will shine chiefly on one side. By having cottages singly or in pairs, they may always be placed along any road, in such a manner that the sun may shine on every side of them; provided the point be given up of having the front parallel to the road; a point which, in our opinion, ought not for a moment to be put in competition with the advantages of an equal diffusion of sunshine.

"8. Every cottage ought to have an entrance porch for containing the labourer's tools, and into which, if possible, the stairs ought to open, in order that the bed-rooms may be communicated with without passing through the front or back kitchen. This, in the case of sickness, is very desirable; and also in the case of deaths, as the remains may be carried down stairs while the family are in the front room.

"9. The door to the front kitchen or best room should open from the porch and not from the back-kitchen, which, as it contains the cooking utensils and washing-apparatus, can never be fit for being passed through by a stranger, or even the master of the family, where proper regard is had by the mistress to cleanliness and delicacy.

"10. When there is not a supply of clear water from a spring adjoining the cottage, or from some other efficient source, then there ought to be a well or tank partly under the floor of the back-kitchen supplied from the roof, with a pump in the back-kitchen for drawing it up for use, as hereafter described in detail. The advantages of having the tank or well under the back-kitchen are, that it will be secure from frost, and that the labour of carrying water will be avoided.

"11. The privy should always be separated from the dwelling, unless it is a proper water-closet, with a soil pipe communicating with a distant liquid-manure tank or cesspool. When detached, the privy should be over or adjoining a liquid-manure tank, in which a straight tube from the bottom of

the basin ought to terminate; by which means the soil basin may always be kept clean by pouring down the common slops of the house. No surface being left from which smell can arise, except that of the area of the pipe, the double flap, to be hereafter described, will prevent the escape of the evaporation from this small surface, and also insure a dry and clean seat.

"12. The situation of the liquid-manure tank should be as far as possible from that of the filtered water tank or clear water well. It should be covered by an air-tight cover of flag-stone, and have a narrow well adjoining, into which the liquid should filter through a grating, so as to be pumped up or taken away without grosser impurities, and in this state applied to the soil about growing crops.

"13. In general, proprietors ought not to intrust the erection of labourers' cottages on their estates to the farmers, as it is chiefly owing to this practice that so many wretched hovels exist in the best cultivated districts of Scotland and in Northumberland.

"14. No landed proprietor, as we think, ought to charge more for the land on which cottages are built than he would receive for it from a farmer, if let as part of a farm; and no more rent ought to be charged for the cost of building the cottage and enclosing the garden than the same sum would yield if invested in land, or, at all events, not more than can be obtained by government securities.

"15. Most of these conditions are laid down on the supposition that the intended builder of the cottage is actuated more by feelings of human sympathy than by a desire to make money; and hence they are addressed to the wealthy, and especially to the proprietors of land and extensive manufactories or mines.

"2557. *Designing Cottages.* In page 1140 we have summed up the essential requisites for a labourer's cottage, with a view to convenience, comfort, and other directly useful properties. The following Rules are to be considered as additional to those given in the page referred to, and as having for their object to superadd to comfort and convenience the beauties of Architectural Design and Taste.

"1. Every exterior wall should show a plinth at its base, and a frieze or wall-plate immediately under the roof. In the case of earthen walls, the plinth should be of brick or stone, and the wall-plate of wood. The stones of the plinth should be larger than those used in the plain parts of the wall which are above it; and the upper finishing of the plinth may be the outer edge of a course of slates, flag-stone, tiles, or bricks, laid in cement, extending through the entire thickness of the wall, in order to prevent the rising of damp; the appearance of the edge of this course as a moulding or string course crowning the plinth will, therefore, be highly expressive of utility: or the entire plinth may be built in cement, which will be equally effective in preventing the rising of damp, as well as expressive of that important use.

"2. The pitch of the roof, whatever may be the material with which it is covered, should be such as to prevent snow from lying on it; and for this purpose the cross section should in many cases be an equilateral triangle. Cottages which form gate-lodges in the Grecian or Italian styles form exceptions to this rule; but such lodges never express the same ideas of comfort as high-roofed cottages, with high and bold chimneys. Such lodges, indeed, are commonly called 'boxes;' and in fact many of them are so deficient in height, and in every other dimension, that they give rise to ideas the very opposite of those of freedom and comfort.

"3. When the wall of a house is built of rubble-work, small stones, or bricks, the sharp right angles formed at the sides of the doors and windows, and at the corners of the building are liable to be injured by accident or the weather; so that first the mortar of the joints, and afterwards the stones or bricks, drop out. To guard against this evil, or the idea of it, larger stones are used in building jambs and corners, or the jambs are splayed or rounded off; while the lintels and sills of the doors and windows are formed of single

stones. Hence all doors and windows in such walls should be surrounded by casings of some sort; or have the jambs, sills, or lintels, splayed. Hence, also, the propriety of quoin-stones at the angles of corners, of coping-stones to the gables, of cut and dressed stones to the chimney-tops, and of larger stones to the plinths than those generally used in the plain parts of the wall above them. In the case of earthen walls, the jambs, sills, and lintels may be of timber, or formed of brick carried up from the plinth.

"4. Every stack of chimneys should consist of four parts: a plinth, which should be distinctly seen above the roof; one or more base mouldings, or splayed weatherings resting on the plinth; a shaft rising from the base mouldings, of analogous proportions to the doors and windows; and a capital or cornice moulding and cap or blocking, as a termination to the shaft. The materials of the chimney-tops ought in general to be superior in quality to those of the walls; for example, if the walls are of rubble stone, the chimneys should be of stone squared and dressed. When the walls are of earth the entire stack of chimneys will, of course, be built of brick or stone.

"5. When the flues of the chimneys are carried up in the outer wall, there ought always to be a projection outwards in that wall, beneath the chimneys, carried up from the ground, so as to give the necessary space for the flues, the strength of a buttress to the wall, with a sufficient breadth for supporting the chimney-tops, and the architectural expression of all these purposes.

"6. Eaves-gutters, and ridge and hip coverings, with similar details essential as 'finishings,' as well as for habitableness and comfort, should never be omitted. The eaves-gutters should be properly supported by brackets, these being of stone or brick, except in the case of earthen walls, where they ought to be of wood.

"7. Over the front door or porch of every cottage, there ought to be a worked stone, on which should be cut the name of the cottage, the initials of the first occupant, a number, a sign, or some distinctive mark of the cottage, by which it may be registered in the Book of the Estate.

"8. In rendering cottages ornamental, the most important parts and members of structure are those on which most decoration should be bestowed; such as the porch, entrance door, window of the principal room, upper parts of the gables, chimney-tops, &c.: and, in ornamenting each particular part, the most important details of that part should receive the highest degree of decoration; for example, the hinges and latch or lock of a door should be made richer than the muntings and styles, and the muntings and styles richer than the panels; and, hence, a door in which no ornament is bestowed on the latch or the hinges ought not to have the muntings, styles, or panels, studded over with ornamental nail heads as is often done.

"9. Nothing should be introduced in any design, however ornamental it may appear to be, that is at variance with propriety, comfort, or sound workmanship. The mind revolts at the idea of tacking the walls of houses with ornaments that have no connexion with construction or use.

"2558. *For the Labourers' Cottages on Estates managed by Agents*, we would recommend a tour of inspection by a competent person, and a Report drawn up on their present state, and on the means of their improvement. The Report should include the character of the surface soil and subsoil on which each particular cottage stands; the state of surface and underground drainage; the aspect of the different sides of the cottage, and its shelter or exposure; the sources of water and of fuel; the state of the back-yard, &c., if any; the state of the garden; and the connexion of the cottage with the nearest public road. The cottage itself ought next to be examined as to plan and accommodation, height of the side walls, thickness of the walls, roof and gutters, floor, windows, stair, fireplace, bed-rooms, exterior appearance, &c. The Report should then point out the additions and alterations necessary to render the cottage what it ought to be, illustrating these by plans, sections, and sketches, and giving lists of fruit-trees and shrubs, where these are wanting for the garden. Would that we could hear of some of the first landed pro-

prietors in the country having such Reports made on the labourers' cottages, and the school-houses, on their estates! The practice would soon after become general, and the good that would ultimately result to the cottager and his children, and the accession of beauty, and appearance of comfort, to rural scenery, would be immense.

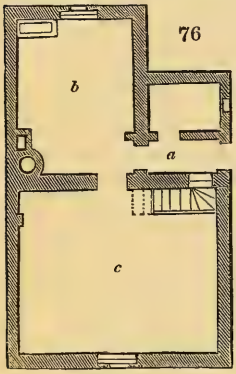
"To be a possessor of landed property, we consider the greatest worldly privilege which any man can enjoy. No other kind of property is calculated to afford to the possessor so much rational enjoyment, whether in the occupation required for its cultivation and improvement, or in the recreation which it procures in its embellishment. In many, if not in most cases, landed property enables its owner to contribute, in a more immediate and direct manner than many other kinds of property, to the happiness of his fellow-creatures, by improving the dwellings of those who reside on it; and it enables him to procure the applause of the public, by combining improvement with embellishment in such a manner as to render his estate an ornament to the country in which it is situated. There are few or no landed estates which do not include a number of habitations, more or less scattered over the land, occupied by the humblest and most helpless class of society, common country labourers. These dwellings, as we have seen (§ 2233.), are in many places miserable within, and in few are they respectable without. Now our earnest desire is, to direct the attention of landed proprietors to this subject. On some estates the cottages may be already sufficiently comfortable; but in much the greater number we know that this is far from being the case: and what is lamentable, but nevertheless proved to be true beyond all doubt, is, that on those estates in which agriculture is arrived at the highest degree of perfection, for example, in the North of England and the South of Scotland (see Dr. Gilly and Mr. Donaldson in § 2233.), the cottages of the farmers' labourers are far worse than they are any where else. We would entreat landed proprietors to examine the cottages of their labourers themselves, or institute enquiry into their condition by competent persons. We would suggest that increasing the comforts of the labourer's home is the most effectual means that can be taken, not only for rendering him a better member of society, but a better labourer; and there is, also, no doubt that he will be more likely to bring up his family in moral and industrious habits. (See the description of an improved cottage and its occupants in p. 1136.) It used to be alleged by some that increasing the comforts of cottagers only increased their numbers, and ultimately added to the mass of misery among this class; but this opinion has more recently been found to be erroneous, for thinking parents, who possess a strong sense of comfort and future enjoyment, will not risk the diminution of the sources of happiness by burthening themselves with large families. As a proof of the effective working of this principle, we refer to those parts of Germany where the labouring population are highly educated; as, for example, Austria, Bavaria, Wurtemburg, and Prussia.

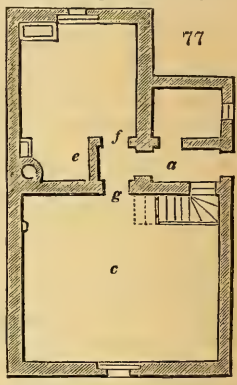
"The power of improving the health and adding to the comforts of a number of individuals, who in a great degree look up to and are dependent on us, must surely be a source of happiness to every rightly constituted mind. The increased attachment of the benefited party that will thus be produced ought equally to be a source of gratification; independently altogether of the increased value to the property, by more durable habitations, stronger and steadier workmen, and by families less likely to become paupers, vagrants, or pilferers.

"The improvement of labourers' cottages recommends itself to the landed proprietor in another point of view, viz. the ornament which such cottages will confer on his estate. What can have a more miserable appearance than a wretched cottage out of repair, and without a garden? No one blames the cottager for this state of things; but the idea of a thoughtless or inhuman landlord, or of an unfeeling mercenary agent, immediately occurs. What, on the contrary, gives a greater idea of comfort, and of an enlightened benevolent landlord, than to see every cottage on his estate rearing its high steep roof

and bold architectural chimney tops, indicating ample room and warmth within; the whole in good repair, and surrounded by fruit-trees, in a well stocked and neatly kept garden? Every one, in travelling through a country, must have observed how much of its beauty depends on the state of its cottages and their gardens. We would, therefore, entreat the possessors of landed property to consider how much of the beauty of the country depends upon them; and we would farther beg of them to ask themselves, whether it is not one of the duties entailed on them by the possession of landed property, to render it not only beneficial to their families and to all who live on it, but ornamental to the country."

In the *Gardener's Chronicle* for 1842, p. 436., an error, or rather an omission, was pointed out in one of our model plans, viz. that the entrance to the living-room was made through the back kitchen. This is unquestionably an error, but it is very easily corrected, not only on paper, but even in a house, should one be built with such an omission. This will appear evident by *fig.* 76. and *fig.* 77. In the former, *a* is the entrance, *b* the back-kitchen, and *c* the front kitchen. In the latter, the same apartments are shown with a partition at *e*, the door *f* opening into the back kitchen, and the door *g* opening into the front kitchen.





The Grasses of Scotland. By Richard Parnell, M.D., F.R.S.E., &c. Illustrated by figures drawn and engraved by the Author. 8vo, pp. 152. Edinburgh and London, 1842.

The grasses of Scotland include 133 species and varieties, all of which are here described and figured. In every instance these figures have been drawn and engraved by the author.

"Much attention has been bestowed on the definitions both of genera and species. In some instances new genera have been framed, and a few new species have been added, while the specific characters are determined throughout with the greatest possible care.

"Under the head of habitat the several countries in which each species is known to be produced are expressly stated. The range of the altitude of the places of growth is specified as accurately as possible. The time when the seed is matured (which it is often useful to know), as well as the time of flowering, is everywhere indicated; and notices are introduced of the agricultural and other properties of such species as are of any value."

It is almost unnecessary to say that, to the student in this department of botany, the *Grasses of Scotland* will be found invaluable, from the faithfulness of the figures and the copiousness and accuracy of the descriptions. Dr. Parnell's original intention was, to "embrace in this work all the grasses of the United Kingdom," and he was only deterred from the "want of recent specimens of the grasses peculiar to England and Ireland." We trust, however, that at no distant period he will be able to accomplish his original intention; and we hope that this notice may be the means of procuring him some cooperators.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notice.*

Ripe Grapes have been sent from Boston, U. S., to Chatsworth, packed in cotton wadding, and arrived in a sufficiently good state to admit of testing their flavour. (*Gard. Chron.*, 1841, p. 732.) It would thus appear, that, by means of steam and railroads, many of the fruits of one hemisphere might be distributed over the other ; and thus, not only the comforts, but the luxuries, of life will in time be in a great measure equalised all over the world.—*Cond.*

Art. II. *Retrospective Criticism.*

Transplanting large and small Trees. — I perceive that your *Suburban Horticulturist* has reached its 14th number; and, though you promised to conclude the work with the 12th number, it cannot be a disappointment to your readers, as every new number bears evidence of practical utility. My practice in transplanting large and small trees, however, leads me to differ from you, in both cardinal and minor points, either for immediate or for future effect. That your mode of transplanting, by "heading in," will succeed to the satisfaction of a proprietor who has not seen any other mode practised, and that good flourishing trees may be obtained, I have not the least doubt: but, that trees of the same age may be taken up and transplanted, and succeed better in giving immediate effect, and certainly as well, if not better, for the future, without the least mutilation of their branches, I am certain ; putting out of the question the chances of having unsound timber in the former case, while in the latter there is no more risk to run in this respect than there is in timber produced from seed on the ground where it was sown. Though I practise the "heading-in" mode with young trees from the nursery, after being planted out one or two years, I feel certain that it is as unsound as it is unnatural. A seed is put into the earth in a nursery, take an acorn for instance, surrounded by others in such a manner that when its cotyledons expand, the pressure of its neighbours is such that it has difficulty in protruding its corculum. When it has succeeded in this task, and appears above the surface of the ground, its foliage is almost smothered by the crowded state of the plants. It stands here one or two years, as the case may be, and then it is transplanted into a nursery line. Here it remains till it has undergone another degree of smother. After this it is more than probable that it gets transported to a clayey soil (where the proper drainers have never shed their balmy influence), and there planted in a hole 12 in. by 12 in., which had probably been made three months previously, by way of preparing the soil for the reception of the young plant, and which hole had held water the whole of that time, as would an India-rubber slipper. This is a very curious cradle to rear the wooden walls of old England in, but so it has been, for I have witnessed such a state of things frequently. Is it surprising, then, that if this plant, so improperly reared to this stage, does not die the first year after planting, that it remains almost stationary for two or three years? Certainly not. Not to mention the sudden change which the root of the plant has undergone, the top becomes paralysed by the extremes of temperature; and constricted bark is the consequence, which no effort of its broken down energies can remedy : but, by the time above specified, the soil having got condensed about its roots, it sends out lateral shoots from the collar; hence the notion of "heading in" suggested itself. That "heading in" is here necessary must be apparent to every person of the least pretensions to arboricultural knowledge; but, that it would not be necessary after a more natural treatment of the infant plant, I have not the smallest doubt. I am not supposing, for a moment, that the above opinion is new ; on the contrary, hundreds of practical persons are well aware of the fact, and I only mention it here, by way of showing that these

evils in part remain the same as they ever did in my day, and that it requires every person who is well acquainted with them to give them a kick in passing till they are brought down.

During the last twelve years we have planted here some hundreds of single trees and bushes on the turf, and in groups and thickets, with underwood, or rather blackthorn and bramble, gorse, broom, &c. The trees consisted of oak, lime, elm, walnut, ash, sycamore, Spanish chestnut, horsechestnut, and beech, and the single bushes were hawthorn; but by far the greater portion were oaks and Spanish chestnuts. They were of various sizes; the largest were about 30 ft. high, of 5 or 6 tons' weight; the middle size varied from 15 ft. to 20 ft.; and the smallest size varied from 10 ft. to 15 ft. The two last-sized trees were taken out of the young plantations, and thousands of the smallest size have been taken and planted on *trenched ground*, to form new plantations. These, I suppose, are about the same kind of *stuff* which you advise to be transplanted by "heading in." They were all taken up and planted, without any previous preparation of either roots or branches, save that necessary preparation, in all such cases, of having the plantations thinned every two years, or thereabouts; as, where the quality of the soil varies as it does here, no definite period can be given for the performance of such operations as that of thinning, wherefore the operator must be the discriminator. These, our smallest stuff, were taken up with as many roots as possible, and with as much earth, in the shape of a ball, as could not be conveniently got out of the roots. The bottoms of these balls were flattened, and two of them were placed on a small machine, or truck as it is here called, the trees standing upright; these were taken about a mile and a half, to their place of destination, by a horse and two men. The tops of the trees were tied together, and a cord from these to the handle of the truck, to prevent the trees from falling backwards, and another cord from the same point to a man behind, who prevented them from falling forwards, or right or left, as the unevenness of the road might change their centre of gravity. The men who guided the handle of the truck guided the horse also, by lines. The middle-sized trees were transported, one at a time, on the same machine.

This is a very expeditious mode of peopling a barren landscape with trees, both for immediate and future effect. The huge old oaks, and other large trees, were transplanted by Sir H. Steuart's three-wheeled machine, in favour of which too much cannot be said; as, where a gentleman determines to have the large-sized trees transplanted, they can be transported by that machine with the greatest ease, providing always that there is plenty of "sea-room," as my men term it, that is, plenty of room between the gateways, &c. &c. The young trees which we planted on trenched ground were taken up without balls, and were transported on a waggon with low wheels, 40 or 50 at a time. All has been executed on the non-mutilating system, save in those trees which we planted on the turf, where both young and old were pruned up to the browsing line, and they have succeeded to the satisfaction of my employer and every other gentleman who has seen them. It has been rumoured in the arboricultural world that we fastened the large trees in the ground by rails crossing the roots at right angles, the ends of the rails being nailed to stakes, and the whole being under the surface of the ground. This, however, has not been the case, as we never tied a tree, either large or small, with any tie, nail, stake, or rail, whatsoever; and, as Sir Henry Steuart justly observed, the largest trees resist the wind much better than the small ones; for, while many of the small trees got blown aside, the large ones never moved an inch from the centre of gravity which we left them at. Their security in this respect, nevertheless, depends on the execution of the work; it is hard work, and if it is slipped over, the trees will slip down. Wherefore, having practised thus much on the non-mutilating system of planting with success, and notwithstanding the practice of gardening teaching me, that, if ever I transplanted my grandfather, I ought to mutilate both his head and his heels, I no longer subscribe to the ancient practice of transplant-

ing by "heading in;" for, though the phytologists have written much of late years to maintain their favourite "balancing of the head to the capacity of the mutilated root," they must give way in the end to that doctrine which is more simple and more rational. Sir H. Steuart observes that "the great and leading doctrine with the planters of England respecting the removal of trees seems to be, that old trees and young possess similar properties, therefore, they should be removed on similar principles;" and he infers that if it were proved that mutilation of the roots and tops of young trees were necessary, it would thence follow that old trees should likewise be mutilated. I am convinced that both young and old trees should be removed on similar principles, but that no mutilation should be applied to the tops of either, and as little mutilation to their roots as possible.

The newly planted trees were protected from cattle by the tabular tree guard (or the dendrophylactic, see *Gard. Mag.* vol. vi. p. 48., communicated by John Hislop, from Ashtead Park); and, of the various tree guards which have come under my notice, it "bears the bell amang them a'."

As it is very natural to suppose that every gentleman will insist on having the stems of his newly planted trees protected from the mouths of cattle, it is no less the planter's duty, for his own credit's sake, to insist that the roots of the same should be protected from their feet, which double purpose the tabular tree guard serves.—*John Pearson. Kinlet, Oct.* 24. 1842.

Bicton Gardens. (p. 555.)—I have just received the last Number of the *Gardener's Magazine*, and have hastily run over Mr. Barnes's account of his proceedings at Bicton, with which I am much pleased. It would be well if many of his brotherhood were to adopt his or similar rules. I have for some time contemplated such a system, which is wanted in most large gardens. All the Barneses are thorough gardeners. A younger brother lived near this place several years, and he was an excellent manager. I hope you will induce the Devon one to be a frequent correspondent; something is to be learned from such men as he. With regard to charcoal, I have myself tried it in a small way, without perceiving the beneficial results mentioned by Mr. Barnes; my experiments, however, were only trifling, and imperfectly conducted. I shall try it again on a larger scale.—*T. B. Nov.* 3. 1842.

ANNUAL SUMMARY.

A Summary View of the Progress of Gardening, and of Rural Improvement generally, in Britain, during the Year 1842; *with some Notices relative to the State of both in Foreign Countries.* By the Conductor.

The increments of knowledge that can be added to any science in the course of a year must necessarily be very few, even in times when that science is undergoing more than usual discussion and experiment. Our annual summaries, therefore, are to be regarded in the light of a short recapitulation of, or references to, the chief subjects which have engaged the attention of the horticultural world during the past year. If we were to confine ourselves to what is really new, we should probably have nothing to say; for there are few inventions or discoveries which, at the time they have been brought forward so as to attract general notice, have not been known to some individuals long before. Thus, steam navigation had been tried nearly

half a century before we had steam-boats; heating by hot water was invented in Paris nearly as long before it was adopted in England, and the "frequent-drain" system, which is now effecting a revolution in the agriculture of the country, has been practised in Essex since the days of Mortimer. The chemistry of cultivation is the topic at present uppermost in the mind of the scientific cultivator; and, though it appears to present many new and important views, yet it may be questioned whether most of them were not known in the days of Chaptal and Sir Humphry Davy. Supposing this to be the case, however, it derogates nothing from the merit of individuals, but only shows their feeble powers, as compared with the influence of extensive associations, when these are brought to bear on any particular subject.

Science of Vegetable Culture.—The career of scientific enquiry, both in the horticultural and agricultural world, is at present rapid; and, if the researches of scientific men are continued and tested by experience, many new views will be struck out, and a great practical advance obtained. In the meantime it is of immense consequence that so much of the elements of science should be acquired by practical men, as may enable them to thoroughly sift the opinions brought forward, and judge for themselves as to their practical value. The past year has been distinguished by a great variety of efforts to elucidate the subject of manures; and the many tables published, opinions given, and experiments recorded, in the two leading Agricultural Journals, in the *Gardeners' Chronicle*, in this Magazine (see Contents, p. i.), and in the works of Johnston and others, have added immensely to the bulk of information from which rules for practice must ultimately be deduced. That much disappointment and many unaccountable results have been produced should not damp our endeavours. The difference of soils has a great effect in producing these; they vary so much in their physical properties, both naturally and artificially, that experiments will require to be often and carefully repeated on different soils, in different seasons, and on a large scale, before they can enable us to form rules for our guidance in practice; but, principles being once firmly established, rules will be deduced from them, from which practical advantages will arise, far greater than can at present be foreseen. The articles on manures and soils, of most direct value for cultivators, that have been published in the course of the year, are, in our opinion, those of Mr. Lymburn, p. 72. and p. 396; but a general summary for the year, on the subject of soils and manures, by this gentleman, we are unavoidably compelled to postpone till our next publication. There is perhaps no person in this country so competent to treat usefully on soils, manures, and vegetable physiology, as Mr.

Lymburn, who is at once an excellent chemist and physiologist, and a cultivator of great experience, and of extensive observation, both in gardens and farms.

The doctrines of Liebig have been criticised by Dr. Schleiden and some writers, and defended by Drs. Gregory and Daubeny and others; for these discussions we refer to the *Gardener's Chronicle* for 1842, p. 403. 435. 469. and 493. Liebig's leading principle, that the carbon of plants is chiefly derived from the atmosphere, appears to us to remain a truth; and one more remarkable has seldom been promulgated. Its great practical use is, that it suggests the immense importance of admitting air to the roots of plants, either by using rough, stony, turfy soil, as is now being done in the case of plants grown in pots, or in limited masses of soil; and, under ordinary circumstances of culture, of stirring the soil to facilitate the descent of air to the roots; or, in the case of fruit trees, of inviting the roots to the surface, by the shade and moisture produced by mulching.

As a general result of all that has been written or experimented on during the past year, we may state that the great value of animal manures is confirmed, and that the higher the animal is in the scale of organisation, and the better he is fed, the more valuable will be the manure. The preeminent value of night soil, and all the liquid matters produced in dwelling-houses, cattle sheds, and farm-yards, containing ammonia or any of the ammoniacal salts, though long known and duly appreciated on the Continent, has been brought prominently forward to the notice of British cultivators, both by reasonings and experiments. "The powerful effects of urine as a manure," Liebig observes, "are well known in Flanders, but they are considered invaluable by the Chinese, who are the oldest agricultural people we know. Indeed, so much value is attached to the influence of human excrements by these people, that the laws of the state forbid that any of them should be thrown away, and reservoirs are placed adjoining every house, in which they are collected with the greatest care." (*Chemistry and its Application to Agriculture, &c.*, 2d ed. p. 183.) The great value of wood ashes, and of the ashes of burnt vegetables generally, and especially those produced by a smothered combustion, has been long known, but comparatively forgotten, till the recent stimulus given by Liebig has brought them again conspicuously into notice. We may add that their value has been confirmed by Mr. Barnes (p. 558.), by what, to him, was as completely a discovery, as if wood ashes or charcoal ashes had never been used before.

Experimental Culture.—In horticultural practice perhaps the most important feature that has lately been introduced is, the

use of rough turfy soil, mixed with fragments of freestone and pebbles, in pot culture. The great advantages of this mixture are, a more perfect drainage, a more ready reception of water, a more free transmission of it through the whole mass, and, in consequence of the absorption of this element by the stones and pebbles, a supply of it from them to the roots, even when the soil is quite dry. Plants growing in soil thus composed can hardly ever suffer from being over-watered, or from the temporary neglect of watering; and, if this practice could be adopted in the open garden on a large scale, it would be found as beneficial for culinary crops and fruit trees in beds and borders, as it is for ornamental plants, pine-apples, or orange trees, in pots. For orange trees in tubs and boxes this mode of using strong rough soil will be found of immense advantage; and it will be no less so in beds and borders in conservatories, which, when composed of sifted soil, very often get compact and sodden. That excellent cultivator, Mr. Barnes, in addition to small stones uses charcoal, sometimes in small pieces, and sometimes in powdery refuse (see p. 558.). In looking into various works to ascertain how far charcoal had been before used in cultivation, we find in the *Nouveau Cours complet d'Agriculture*, ed. 1819, vol. iv. p. 71., that the places in the forests where heaps of charcoal had been burnt, and where a great quantity of charcoal dust is usually found, are sterile for a greater or less number of years. In sandy soils these spots will often bear crops the second year, while on clayey soils they have been known not to bear a crop for eight or ten years. These sterile places, however, when they are restored to fertility, bear immense crops; and the charcoal-makers, being aware of this circumstance, sow or plant on them tobacco, woad, and other plants which exhaust the soil. An English gentleman, who has been a good deal in the interior of France, informs us that it is customary about Lyons for the peasants to petition the proprietors of forests for permission to sow mustard seed (well known to be a very exhausting crop) in the places where charcoal has been burnt. The cause of the sterility of the charcoal spots is, doubtless, the excess of potash, which, in the case of sandy soil, is sooner washed in by the rains. The writer referred to, in endeavouring to account for the powerful effects of charcoal as a manure, first notices that the property of charcoal to absorb and retain moisture powerfully, and give it out again slowly and during a long time, was well known, and that this rendered it a valuable addition to light soils apt to suffer from great drought. A very good memoir on the use of charcoal, he informs us, has been written by M. Tatin, the essence of which is said to be embodied in his *Principes raisonnés et pratiques de la Culture.* Though charcoal is considered almost indestructible, yet it is found liable to decompo-

sition in a very slow degree, especially when on or near the surface of the ground. Fourcroy found that charcoal decomposed water, as having a greater affinity for oxygen than for hydrogen; and Sir Humphry Davy proved that charcoal was soluble in potash and soda. From these facts it is concluded that charcoal not only furnishes moisture, but, by slow decomposition, carbonic acid gas. Thouin, in his *Cours de Culture*, 1827, vol. i. p. 292., says that charcoal broken in pieces is favourable for chalky soils by absorbing moisture, and for absorbing heat from being black. He confirms the fact before stated, that the places on which charcoal has been burnt are extremely fertile. Powdered charcoal is a more powerful manure, he says, than when it is in larger pieces; acting, however, in the same manner by absorbing moisture from the air, and bringing it within reach of the roots of plants. By the experiments of Messrs. Allen and Pepys, charcoal was found to imbibe from the atmosphere in one day about one eighth of its weight of water. When recently prepared, charcoal has the remarkable property of absorbing different gases and condensing them in its pores, without any alteration of their properties or its own. (See *Ure's Dict. of Chem., and of Arts, Manufactures, &c.*) Charcoal ashes, Marshall, in 1800, states, are considered a good manure in the Midland districts; but these ashes arise principally from the sods used in covering the heaps, and contain but a very small proportion of pieces of charcoal. Arthur Young, it appears (*Annals of Agriculture*, published in 1784 and 1785, vols. i. and ii. p. 139—169., and 254—272.) made a great many experiments with powdered charcoal as a manure, but arrived at no definitive result, except that it was inferior to charcoal ashes, and still more so to wood ashes. Charcoal powder, we have seen by the experiments of Lucas (see our Volume for 1841), has been used successfully for striking cuttings; and Liebig, referring to these experiments, says, "common wood charcoal, by virtue merely of its ordinary well-known properties, can completely replace vegetable mould or humus. The experiments of Lucas," he adds, "spare me all further remarks upon its efficacy. Plants thrive in powdered charcoal, and may be brought to blossom and bear fruit if exposed to the influence of the rain and the atmosphere; the charcoal may be previously heated to redness. Charcoal is the most 'indifferent' and most unchangeable substance known; it may be kept for centuries without change, and is therefore not subject to decomposition. The only substances which it can yield to plants are some salts which it contains, amongst which is silicate of potash. It is known, however, to possess the power of condensing gases within its pores, and particularly carbonic acid; and it is by virtue of

this power that the roots of plants are supplied in charcoal, exactly as in humus, with an atmosphere of carbonic acid and air, which is renewed as quickly as it is abstracted." (*Chemistry, &c.*, 2d edit. p. 62.) Charcoal therefore, according to this doctrine, must act as a perpetual manure.

Some experiments have been made with moss as a substitute for soil (p. 447.) in the rearing and culture of plants; but no new results have been obtained, unless it be that the means of transplanting are in some cases facilitated. The evils of indiscriminately watering plants in pots immediately after being shifted have been ably pointed out in p. 11.; and the advantages of stirring the soil, and turning up new soil, in p. 160. and p. 396.

Agents of Culture.—New manures and new implements are almost every year being brought into notice. The latter we shall advert to in a separate paragraph. Among the new manures the most remarkable is Guano, or the excrements of sea-fowl, brought from Peru, where it has been used as a manure since the twelfth century. By analysis, it consists chiefly of urate of ammonia and other ammoniacal salts, and it requires to be used in very small quantities, otherwise it will destroy vegetation. An artificial guano is prepared in London, which is considered by many not inferior to that from Brazil. There are some other comparatively new artificial manures. Guano is recommended to be mixed, at the rate of 4 bushels, about 50 lb. each, and which cost at present about 13*s.* per bushel, with 1 bushel of powdered charcoal, which will fix the manure by retaining the ammonia in its interstices, and then drilled with green or grain crops, or spread on the ground and harrowed in with seed. (*Donaldson on Manures*, p. 74. See also more at length *Squarcy* and *Lymburn*, in p. 81.) With Daniel's manure we are not at present sufficiently acquainted. While so much manure of the most valuable description is lost or neglected in almost every dwelling-house, in many farm-yards, and at many railway stations; and while as much as would manure two or three counties is produced in the metropolis, only to pollute the water of the Thames; it seems an unjustifiable extravagance to pay a high price for ingredients of doubtful merit. Be these ingredients what they may, they cannot, except in the cases of bone-manure and guano, prove equal to what we have alluded to as being comparatively neglected or lost.

Brick-dust has been used successfully, as a substitute for sand, in striking cuttings; and the advantage is that, this material being an absorber and retainer of moisture, less frequent watering is required. (See *R. Drummond* in *Gard. Chron.*, 1842, p. 742.)

Implements, Instruments, &c. — A number of implements, and some instruments and utensils, new, curious, or useful, will be found figured in p. 474., and from 597. to 601.; and a machine for levelling, and other purposes, in road-making, in p. 602. A new dahlia stake is given in p. 453., and a very convenient carrying utensil in p. 306. Another utensil also deserves notice, because, though it does not belong to gardening as an art of culture, it may be referred to it as an art of design. We allude to the box for receiving the soil excavated from graves, and returning it with expedition without leaving fragments to disfigure the surface. An article for protecting peas, and one or two others, noticed under the head of Implements in our Table of Contents, may also be worth referring to.

Operations of Culture and Management. — A mode of working with two hoes, one in each hand, long in use by the market-gardeners in the neighbourhood of London, is noticed in this Magazine for the first time, by Mr. Barnes. (p. 555.) This mode of hoeing serves as a substitute for weeding, and is greatly preferable as stirring the soil. It is used in thinning all seedling crops, whether broad-cast or in drills. Mr. Barnes has seven different sizes, the largest having a blade $3\frac{3}{4}$ inches in width, and the smallest one of $\frac{3}{8}$ of an inch. He also uses one of the smallest width, but with the blade pointed, for stirring the surface soil of plants in pots. The whole will be figured and described in our next Volume. The only objection that we know of that can be urged against these hoes is, that they require the operator to stoop; for which reason many would prefer the crane-necked or sickle-hoe figured in our Volume for last year p. 258. The value of pure sand for striking cuttings is well known, but sometimes it is difficult to be had. The operation for separating this sand from the sweepings of walks is described by a very intelligent correspondent in p. 452. A mode of securely fastening the mats or other nightly coverings on the sashes of pits or frames is described by Mr. Ogle in p. 109., to the excellence of which we can bear witness, having seen it in use in the gardens under Mr. Ogle's care in Sussex.

Garden Vermin. — Our present Volume is enriched by a variety of papers on this subject, and more especially with some interesting ones on destroying vermin in small gardens (p. 292.), on song birds in flower-gardens (p. 254.), on the Italian owl, and on relative subjects, by our highly esteemed correspondent and great public favourite, Charles Waterton, Esq.

Garden Architecture. — We have observed, in some few cases, advantage taken of British sheet glass, which, our readers are aware, may be used in panes from 3 ft. to 5 ft. or even 6 ft. in length, at very little more expense than the best crown glass.

(See our Volume for 1839, p. 614.; and *Supplement to Encyclopædia of Cottage Architecture*, p. 1280.) A greater improvement has not been introduced into hothouse building since these structures were invented, as the splendid house at Chatsworth, where it was first used by Mr. Paxton, affords ample proof. We here repeat our recommendation of this glass, because we are rather surprised that it has not become more generally employed. In this country, where it is so desirable to have covered walks for exercise in wet weather, verandas might be glazed with it, and the arrangement might be such as to combine a conservative wall and border. Even verandas open to the south, and covered with Cubitt's patent roofing, consisting of boards without rafters; or with young larch or fir trees sawn up the middle, and used without rafters, on Mr. Cubitt's principle (see *Supplement to Cottage Architecture*, p. 1260.); or with zinc, asphalt, thatch, or reeds; are very great luxuries, and might be introduced with excellent effect in many places both large and small. A covered way to the kitchen-garden, the stables, or the farm, is often very desirable.

An economical description of greenhouse or conservatory has always been a desideratum, and we think we can refer to two which well merit imitation. The first is that of Mr. Barratt, in the Wakefield Nursery, noticed in our preceding Volume, p. 570., which is 85 ft. long by 10 ft. 6 in. wide, and cost only 170*l.*; and the second is one in the Exeter Nursery, which is a model of economical arrangement and appropriate beauty. It is 200 ft. long, 26 ft. wide, 16 ft. high at the centre, and 10 ft. high at the sides, with a span roof formed of sash-bar without rafters, except in two or three places where the roof opens for ventilation. The side walls and ends are of stone. There is a path round the house, within 2 ft. of the walls, which is of gravel; and the edgings to this walk are the small hot-water pipes by which the house is heated. The position of the house is north and south. The whole of the interior is planted with camellias, which are in a state of unsurpassed luxuriance, covered with blossom buds to the ground. The outsides of the walls are used for training fruit trees; but, if such a house were erected in a private garden, they might be covered with ornamental climbers; or the roof might be projected so far over the walls as to form a surrounding conservative wall, or as much farther as would constitute a veranda. Such a structure as this, connected with a dwelling-house by a covered way, would be a source of very great interest during winter and spring. What the total expense may have been we do not know, but, considering that there are about 6000 feet of roof, and 17 rods of walling, it cannot much have exceeded 400*l.*, a comparatively small sum for such an immense structure, and one capable of affording so much

enjoyment. If it were not considered desirable to cover the exterior walls with plants, they might be rendered architectural by pilasters, buttresses, or other means, so as to combine with the architecture of the mansion; or, under particular circumstances, we see no reason why the walls of such a house should not be erected with rough timber like log houses or with rockwork, and covered exteriorly with creepers or ivy. An excellent article on the construction of pits will be found in p. 457.; and another by the same author, on connecting a greenhouse with a library, in p. 396.

Landscape-Gardening.—The advantage of employing circles of different diameters, disposed in groups, as beds for flowers or for low shrubs, is beginning to be understood; and will at no distant time, we trust, banish from our lawns and flower-gardens those beds of incongruous shapes, put down at random in such a manner that they never can combine so as to form a whole, either among themselves or with surrounding objects. It is not that fanciful shapes cannot be so disposed as to form one connected figure, but that it is difficult for any one to do this who is not an artist; difficult for a gardener to cover such beds properly with flowers; and difficult to retain the shapes, unless they are edged with lines of concealed stone or brick. In general it may be observed that all flower-beds that are to be scattered over a lawn, and seen from a walk on the same level, should be of simple shapes, such as circles or ovals, the effect being produced by what may be called horizontal perspective; and all scattered beds which are to be seen from a walk considerably above their level, or to be seen on the side of a slope considerably above the level of the walk, should be of composite forms, calculated to fit into one another, so as to group and combine vertically as well as horizontally. It must not be forgotten, however, that these are only general rules, which in their application require to be varied according to circumstances; and further, that cases are continually occurring which form exceptions. Neither must these remarks be considered as applying to borders, or continuous beds along the margins of walks, which admit, to a certain extent, of the flowing lines and convolutions of the Elizabethan style and the arabesque.

Almost the only papers on Landscape-Gardening in the present Volume are translations from the principal professional landscape-gardener that Germany has produced, the Chevalier Sckell of Munich; but in the notices of our tours there are numerous remarks on the subject, which, we trust, will be found useful for the young gardener.

Arboriculture, more especially in the ornamental department, is making some progress, as appears by the greatly increased number of species and varieties of trees and shrubs now culti-

vated in the provincial nurseries; and we think that we may also add that the planters of pleasure-grounds are now introducing a much greater number of species than they did even a few years ago. There are also throughout the country, in several places, such considerable collections of trees and shrubs planting, as to entitle them to be called arboretums; while several pinetums have been planted in consequence of the greatly increased taste for the pine and fir tribe.

In order to make known what new trees and shrubs are to be found in the grounds of the principal British nurserymen, we have invited all of them to send us names of what they consider worthy of notice. We have received answers from upwards of thirty nurserymen and curators of Botanic Gardens, and from these we shall make up a report for our succeeding Number.

In the *Gardeners' Chronicle*, and also in this Magazine, there has lately been a good deal of discussion on the subject of pruning trees, with a view to the production of the greatest quantity of timber in a clean straight trunk, but nothing has yet appeared superior to Mr. Cree's system. This system, as our readers are well aware (see our Vol. for 1841, p. 435.), consists of plain rules founded on the soundest principles, and, in short, may be called the *ne plus ultra* of scientific practice.

The pruning of ornamental trees consists in general of removing dead or decaying branches; but it might often be applied in such a way as to add to the natural character of the tree, or to give it an interesting artificial character. For example, a large tree which has taken a heavy lumpish form may be improved in shape by thinning out a number of the smaller branches, so as to show more of the trunk and main limbs, or by shortening large branches so as to cut into the outline; and a tree which is already taking a good shape may have the characteristics of that shape aggravated by thinning out a number of branches, so as to throw all the strength of the tree into branches already large. Remarkable artificial characters may be given to trees by various modes. In the case of the pine and fir tribe, by removing entirely every alternate tier of branches, or by leaving any one tier out of three during the whole length of the stem, the branches which form the remaining tiers will acquire an extraordinary size, and produce a noble candelabrum-like appearance. In the spruce and silver fir the effect of this mode of pruning is very remarkable. Heading down the pine and fir tribe, by strengthening the horizontal branches, induces them to extend so far as to rest on the ground, and then to curve upwards towards the extremities, so as to form singular objects. In this way a coppice of spruce fir is sometimes formed for the protection of game. Cutting over large, healthy, broad-leaved trees, such as the oak, elm, beech, &c., at the height of 10 or

12 feet, or even at the surface of the ground, and afterwards thinning out the branches which have sprung up, will give rise to forms which, though not so grand as those of trees with bold erect trunks, will, at least, afford variety by being singular or picturesque.

The bad effect on the timber of the larch, when grown along with the Scotch pine, has been confirmed at Nettlecombe Court (see p. 485.). On the subject of pruning trees, and the previous preparation of the soil, some opinions will be found expressed by Mr. Selby, in p. 568., which are at variance with ours, and, we believe, with those generally adopted both by theorists and practical men; but, being the opinions of a planter of scientific knowledge and great experience, they deserve every attention. They have been opposed by Mr. Main, in our opinion one of the best authorities on the subject, in the *Gardeners' Gazette*, who says: "We were not a little surprised at finding Mr. Selby declare that he is not an advocate 'for the trenching of the ground previously to planting, being convinced, from personal observation and experience, that no adequate or remunerating advantage, either by the more rapid growth of the tree, or the improvement in the quality of the timber, is obtained, sufficient to compensate for the great additional expense incurred.' Now, this is so completely in the teeth of all past and present experience, that it should not be allowed to pass without some sort of qualification; for, if the author found it so in his own case, which is just probable, it cannot be admitted as a general rule. If Mr. Selby's soil was of a generous open quality, neither rocky gravel nor tenacious clay, his pitted trees might succeed passably well. Such style of planting we have executed ourselves, and seen executed by others, on deep rich loams; but in no case so well as if the ground had been trenched to the depth of fifteen inches. There are certain make-shift proceedings of sticking in trees any how, on inaccessible places, or on mountains of great extent, where neither plough nor spade is available; but who can assert that such mode is preferable to planting on previously prepared ground? If corn, culinary vegetables, &c., are benefited by deep or subsoil ploughing, how much more are trees, which root deeply, benefited by having the soil broken and ameliorated for their reception?" (*Gard. Gaz.*, Nov. 12. 1842. p. 734.)

Planters who are desirous of introducing the *P*ìnus Larício var. austrìaca on a large scale will now find abundance of plants in the nurseries; as they will also of *Q*uércus álba, the white American oak, which Cobbett so strongly recommended, but which is so difficult to introduce by means of acorns, as they germinate as soon as they drop from the tree, and often before.

This plant has, however, through the patriotic efforts of a private gentleman, been, in the autumn of 1841, introduced to the extent of 30,000 plants, 20,000 of which will be disposed of to nurserymen. We hope they will be tried in the south of the island, more especially in the warmer districts. At present, with the exception of the tree in Messrs. Loddiges's arboretum, we do not recollect one plant in England; the tree at Twickenham, recorded in our *Arb. Brit.*, p. 1868., on the authority of a correspondent, as *Q.* álba, being, as we ascertained after the *Arboretum* was published, *Q*uércus *P*rìnus, the white chestnut oak; and that at Muswell Hill having been cut down when the place was sold three years ago. The Woods and Forests a few years ago formed an experimental plantation in the neighbourhood of Southampton, in which there are a great many American oaks and other trees, and placed it under the care of Mr. Page. We hope to receive some account of it by Mr. Page, in addition to the notice already given in our Volume for 1839, p. 624.; or perhaps to inspect it ourselves in the course of next summer. Plants of the durmast oak, a strong-growing variety of *Q.* pedunculàta, which, it is said, has produced the best naval timber sent into the dockyard, have been raised in abundance in Mr. Rogers's nursery at Southampton. "Nearly all those majestic oaks which grow in North Stoneham Park, in Hampshire," says Dr. Lindley, "are the durmast; and some of the finest oak timber that now goes into Her Majesty's dockyard is from thence. There can be no doubt that oaks raised from the acorns of these noble trees are infinitely to be preferred to such as are obtained in the nurseries from acorns gathered at random from trees of all sorts of constitutions, none of which, perhaps, are really above the average in point of stature. As a Shetland pony is not likely to be the parent of a dray-horse, so a pygmy oak cannot be expected to produce anything better than a pygmy race of seedlings." (*Gard. Chron.* 1842, p. 724.) It would be well if the principle implied in this sentence were acted on in the case of propagating by seed every tree, shrub, and plant whatever. Gardeners are too apt to limit this principle, viz. that like begets like, to annual and biennial plants; whereas a more extended experience proves it holds good equally in the case of trees and shrubs.

Floriculture.—Since the publication of Chevreul's work, entitled *De la Loi du Contraste simultané des Couleurs, et des Applications,* noticed in a former Volume (1840, p. 563.), more attention is being paid to the massing of colours in flower beds. On the floricultural part of this work we shall give a translation in our Volume for the ensuing year, having already given a portion of it in the *Gardeners' Gazette,* p. 501. and 662., when that periodical was under our care; but in the meantime we

may observe that the two guiding principles laid down by M. Chevreul are, contrast and symmetry; the first regulates the colours that are to adjoin each other, and the second those which are to occupy opposite and correspondent parts of the same figure. A better selection of the kinds of flowers suitable for flower beds is also beginning to be made from the immense number of names that appear in catalogues. To be able to select suitable kinds can only be the result of considerable experience; because there are many plants that have suitable colours, which flower at the proper period; and have, as far as can be judged from a catalogue, all the qualities required, which yet, on trial, will be found to run to leaves rather than flowers, to assume a straggling habit, to grow too high, or in some way or other to defeat the end in view. The object is to select plants which, to all the other desirable properties, shall add that of exhibiting their flowers more conspicuously than their leaves. Plants which produce their flowers in close racemes or corymbs are particularly suitable for this purpose, such as the verbenas and pelargoniums: and, next, those which produce their flowers from the axils of the leaves, growing and flowering as they grow; and which have their flowers large or numerous, in proportion to their leaves, and produced at the same time, such as the *A*nagállis, Lobèl*ia*, &c. On this subject we have an excellent article by Mr. Ayres, which will soon appear; and Mr. Ayres has promised a separate publication on the subject (see p. 379.), which, we feel confident, will be of the greatest utility to the planters of flower-gardens. An article on Florist's Flowers, p. 454., and one on Flower-Baskets, p. 271., well deserve perusal. As a proof of the growing taste for ferns, we observe that one nurseryman, Mr. Pamplin, is advertising collections of them for sale. Mr. Cameron of the Birmingham Botanic Garden, and Mr. Shepherd of Liverpool, have long been celebrated for the culture of this tribe; and they must be gratified to see their taste becoming popular. Much of this is, doubtless, owing to the publications on ferns by Mr. Newman and Mr. Francis. The new plants figured in the course of the year are enumerated in the Contents, p. viii.

Horticulture.—Under this head, in the Contents, will be found an article applicable to the general management of fruit trees (p. 499.), which embodies some useful principles. The papers on the culture of the banana (a fruit as well deserving of attention, in our opinion, as the pine-apple or the melon, except that it does not bear carriage, p. 564.) reduce the treatment of that plant to the simplest principles. The use of charcoal in the cultivation of culinary crops in the open garden, as well as in that of pine-apples and bananas in pots, as practised by Mr. Barnes at Bicton, has been already noticed (p. 558.), and will

be recurred to again by the same experienced gardener, in the course of a series of letters which he is now kindly preparing for us, by the permission of his employer, Lady Rolle. Our report on the new culinary productions of the past year will appear in January.

Agriculture.—Necessity, which is at the foundation of most kinds of improvements, promises a great reformation in this art. We refer to the number of Journals, and other publications on the subject, which have appeared in the course of the year, notwithstanding the general stagnation of commercial literature. The circumstance of Mr. Smith of Deanston intending to settle in the neighbourhood of London, as an agricultural engineer, is a favourable omen; for, doubtless, he would not have taken such a step, had he not calculated on being consulted by many of the extensive landed proprietors of England. "The tariff," a correspondent observes, "seems to have had the effect of half-paralysing the wits of some of the farmers, and of doubly stimulating those of others. It must lead to good, and I am much mistaken if the farmers of the next generation will not be a very different class of men from those of the present. They must know something of the inside of a book, as well as of the outside of an ox." Whatever improvement takes place in the condition of farmers will, we trust, be extended to their labourers. Our opinion as to the amelioration of both is given briefly in p. 636. We were much gratified, while in the South of England, to hear of one gentleman in Cornwall, Sir William Molesworth, inviting his tenants to meet together, and joining them, and getting his gardener, Mr. Corbett, to deliver lectures to them in his presence, on vegetable culture, which lectures are reported in the local newspapers, and do great credit to Mr. Corbett; and of another proprietor in the North of Devon, Lord Clinton, establishing the Torrington Farmers' Club, at the monthly meetings of which His Lordship presides, and is at the expense of printing such papers read at them as are thought worthy of that distinction, in a pamphlet which appears occasionally. Among these papers are some by His Lordship's very scientific gardener, Mr. Cato, who is not only an excellent horticulturist, but has a perfect knowledge of farming as practised in the best districts in Scotland.

Domestic Economy and Bee Culture.—We are rather surprised that Fuller's ice-preservers, noticed in our Volume for 1839, p. 655., and found to be a great saving of labour and of ice by all that we have ever heard of having tried them, has not come into more general use. Mr. Wighton's articles on bees in this and preceding Volumes, and his very interesting treatise on their management (see p. 322.), will, we hope, induce a number of gardeners to try his improved Polish hive.

Rural Architecture is undergoing improvements, slowly in most places, but comparatively rapid in others (see p. 610.). By the improvement of cottages we do not mean merely ornamental chimney tops or labels over the windows, but a greater attention to drainage, raised floors, large windows, higher ceilings, and the other requisites to better health and comfort. We do not desire to have cottages in general otherwise than simple in their architecture: but we would have them ample in regard to room; always substantial in regard to execution; with high steep roofs to throw off rain and snow, and to prevent the wind from getting underneath the slates or tiles so as to blow them off; and high chimney shafts, so as to carry away the smoke. To every cottage we would add, and if possible surrounding it, a garden, of at least an eighth part of an acre. We repeat our opinions about cottages at the risk of being tiresome, in the hope that gardeners will enter into our views, and do what they can with their employers in favour of country labourers; for we believe, with a humane and enlightened writer, "that by far the greater number of our nobility and landed gentry would willingly stoop to the assistance of the wretched labourers, if they knew the dreadful privations under which the latter are suffering; and, if knowing the extent of that suffering, they could see the means by which it could be permanently relieved." (*Letter XIII. of One who has whistled at the Plough*, in *Morn. Chron.* Nov. 16. 1842.)

The Weather and Crops.—The weather of 1841 was remarkable for its great humidity; and in continuation, the same character generally prevailed till March, 1842. But in April a decided change to the opposite took place, and a warmer summer followed, with less interrupted and much brighter sunshine than had been experienced for several previous years. In general the crops were excellent, the shoots of woody plants well ripened, and the bulbs and roots of herbaceous plants well stocked with nutriment for the succeeding year.*

History and Statistics.—A considerable number of country

* "In November, 1841, the mean temperature was about the average; the amount of rain was nearly 3½ in., being an inch in excess. On the 16th there was an unusually severe frost for the period of the season, the thermometer being 17° below freezing. With the exception of a few days about the middle of December, rain more or less fell on every day throughout the month, the amount being 1½ in. above the average. The usual temperature was maintained. Slugs were never remembered to be so numerous or so destructive, not only to various kinds of garden crops, but also to those of the agriculturist.

"In January, 1842, the weather during the first week was dry, but cold. The mean temperature averaged about the freezing point, or 3½° below the average for the month. The thermometer indicated a continued low grade

seats are noticed in this Volume, as will appear by reference to our Table of Contents. Nothing contributes to improve the taste, as well as the knowledge, of a gardener so much as visiting different gardens; but, to derive this improvement, he must have been previously well instructed in his profession, be naturally fond of it, have a quick eye and an enquiring mind, and be eager to improve himself to the utmost. Every man acquires a great part of his knowledge from experience, but a still

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of temperature, but no remarkably severe frosts were experienced. February was damp, and often foggy; but the amount of rain was somewhat less than usual, and the temperature was fully an average. In March the amount of rain was about half an inch above the average for the month; but in intervals he drying power of the air was considerable. The temperature was about 2° above the average; the weather being, on the whole, favourable for vegetation. April was remarkably dry; it may be said there was only one wet day, the 13th; and slight showers fell on five others; the whole amounting to little more than the tenth of an inch. The heat of the sun's rays was greatly counteracted by north and north-east winds, which were by far the most prevalent. The horsechestnut was in leaf as early as the 5th. Sharp frosts occurred on the nights of the 4th, 5th, and 26th. In May the weather was very favourable for vegetation, with the exception of a frost on the night of the 2d, which affected the blossoms of apples to some injurious extent. Pears, plums, and cherries were, for the most part, previously out of blossom, and their young fruit was not much affected. June was a very hot month, the thermometer in the shade being frequently above 80°, and even as high as 90° on the 12th and 13th. No rain fell till the 18th; and, although there was a moderate quantity afterwards, it soon disappeared owing to the great heat and dryness of the ground and of the air. The mean temperature of July was lower than usual, being only equal to the average of that of June; and it may be observed that, on the contrary, the heat of June in the present season was so much higher than usual as to be equal to the average of July. The amount of rain was nearly an inch deficient of the usual quantity. August was excessively hot, exceeding in this respect any corresponding month in the present century; the thermometer in the shade was frequently above 80°, and sometimes as high as 93° in the shade. A large quantity of rain fell on the 10th, and towards the end of the month the supply was plentiful. September was rather a wet month, and of average temperature. In situations where the soil was too dry in the preceding months, many kinds of apples and pears were checked in their growth, but now increased considerably in size when they ought to have been ripening off, and the flavour was in consequence not so good in such cases as might have been expected, or as it would have doubtless proved had the rain been more abundant in summer, and dry sunny weather more prevalent in the present month. The mean temperature of October was 6° below the average; and even in the beginning of the month there were several frosty nights, which had the effect of checking, in a great measure, the ripening of grapes on walls. This production, always precarious in the open air in this climate, was not so far matured as is often the case in less remarkably hot summers, and was far short of the perfection it acquired in 1826. On the 20th and 21st as much as 10° and 12° of frost were successively experienced; and the beauty of the dahlias and other similarly tender flowers was spoiled for the season. The weather was, however, generally dry, and favourable for garden operations, and such continues to be the case up to the middle of November." — *N. Nov.* 15.

greater from observation if he is in active life, or from reading if he is a recluse.

The *Horticultural Societies* appear to be in general as well attended as ever. At the first meeting in the Horticultural Society's Garden, on May 14th, there were 5382 visitors, exclusive of exhibitors; at the second meeting, on June 11th, the number of visitors was 13,407; and on July 9th it was 3445; in all 22,234. The corresponding number for 1841 was 21,769, and for 1840, 19,137. It would be very desirable to have the statistics of the Provincial Societies in respect to attendance; this being one of the best tests of the prosperity of such societies, and of the state of horticulture throughout the country. The public are certainly much indebted to those proprietors who encourage their gardeners to exhibit at horticultural exhibitions, because these exhibitions have contributed more than perhaps any other cause to the present highly advanced state of garden culture. We sometimes hear of gentlemen who object to allowing their gardeners to exhibit, alleging, that they are apt to bestow so much of their time on the plants to be exhibited as to neglect what is under their charge generally. There is some truth in this; but a patriotic master will make allowance for it. In many cases, the fault, we think, is the master's, who ought to complain whenever he sees any thing out of order, or finds a deficiency of produce. When a gentleman shows indifference towards the state of his gardens, his gardener is strongly tempted to become indifferent also. A really good gardener will endeavour to grow every article in such a manner as that it will bear public exhibition, but he must be kept up to this point by judicious reprehension and judicious approbation. We must farther take into consideration, that it is more than can be expected of a gardener, or of a member of any other profession, to excel in every thing; and, therefore, on the supposition that it is a necessary consequence of a gardener's excelling in one thing that he must be behind in every thing else, it is for the proprietor to consider whether he will not derive more satisfaction from finding his garden and his gardener celebrated for some one or two kinds of production, than from having his garden and his gardener unnoticed.

Public Improvement.—The establishment of the Metropolitan Improvement Society, whose first *Report* we have noticed in p. 509., the discussions on the drainage bill in the Houses of Parliament, and the publication of the *Sanitary Report of the Poor-Law Commissioners* (see p. 472.), have directed general attention to the widening of streets, and the drainage of low moist situations. There is, besides, a very obvious improvement in the public taste in architecture, which may be con-

sidered as dating from the time of Mr. Nash's architectural alterations on the exterior of the Opera House, which commenced about 1813, and the formation of Regent Street immediately after, from which the stimulus thus given has been continued by the attempts to dignify architectually the public-houses of the metropolis, by the improvements of the shops which shortly after took place, and, lastly, by the noble examples of architectural and engineering works exhibited along the different railways. The improvements in the metropolitan parks, which were begun after the peace of 1815, enlarged the taste of the Londoners for rural walks and landscape. The establishments of Professorships of Architecture in the two London Colleges cannot fail to be attended with the happiest effects; even if nothing more were to be gained than educating the eyes of amateurs. The formation of public parks and gardens, by the government and by patriotic individuals, will contribute to the same desirable end, and, in addition, will draw closer the bands which unite the different classes of society. Even the manner in which Her Majesty travelled and was received in Scotland deserves notice, as indicating a juster estimate of what constitutes the dignity of royalty. The queen was treated by her Scottish subjects like a rational being, instead of being worshipped like a goddess. How great the improvement since the days of Queen Elizabeth, who, when she visited the Earl of Leicester, at Kenilworth Castle, in July, 1575, was presented with gifts by persons representing the heathen gods, Sylvanus, Pomona, Bacchus, Neptune, Mars, and Apollo! She was amused with masks and other buffoonery, and with the barbarous sports of boxing and bear-baiting, and complimented by stopping the castle clock, that time might appear to stand still during Her Majesty's visit. The greatest honour, as we think, paid to the British queen of the 19th century was at Taymouth, where Her Majesty was asked to plant a tree in commemoration of her visit.

Public Gardens.—The Royal Gardens at Kew, since they have been put under the direction of Sir W. J. Hooker, have been very greatly improved; and, as they may now be considered to belong to the department of the Woods and Forests, a Report to that body of what has been done will doubtless soon be published. A new kitchen-garden is being formed at Windsor, which, we suppose, will also be reported on. The botanic garden in the Regent's Park is in an advanced state, and already forms a delightful and instructive promenade. The most interesting circumstance which has taken place in the public gardens about the metropolis, in the course of the present year, is, the naming of the trees and shrubs in Kensington Gardens and St. James's Park. The labels are of cast and

wrought iron. The name is painted in black letters on a white ground, on a cast-iron plate 14 in. by 7 in., nearly half an inch thick, with the corners rounded off, and the edges turned up. The plate is riveted to a wrought-iron shank 2 ft. in length; the upper part, for the length of 8 in., is round, and about 1 in. in diameter; and the lower part is about 1½ in. broad, and half an inch thick. When the label is stuck in the ground, the lower edge of the plate will be between 8 in. and 10 in. above the surface. There is a strap to the upper part of the shank, forming an angle with it of 15°, and to this strap the cast-iron plate with the name, &c., is riveted. The cost of the labels at the foundery is 17*l.* 10*s.* per hundred, and of painting and lettering 8*l.* 15*s.* per hundred. They are made by Gladwin, of 61. Watling Street, London. A disk 1 ft. in diameter, and two paving tiles for it to rest on, would have cost 50*s.* or 60*s.* per hundred more, but it would have kept the centre of gravity of the tally within its base, and, by greatly extending that base, would have kept the tally of the same height, as well as in the same position in which it was put down, for many years. With their present construction they are liable both to sink and fall back; and, though these changes will be slow, and perhaps scarcely perceptible for two or three years, yet they are as certain of taking place as the laws of gravity are of remaining unchanged. The labels are easily read at the distance of 50 ft. The scientific name and authority, English name, natural order, native country, and year of introduction, are placed on each plate thus:

LIRIODENDRON TULIPIFERA *LIN.*
THE TULIP TREE.
A MAGNOLIACEOUS TREE.
NATIVE OF NORTH AMERICA.
INTRODUCED IN 1663.

We need not enlarge on the entertainment and instruction that this enlightened and liberal act, on the part of the Commissioners of Woods and Forests, will afford to the public frequenting these gardens, or even to those who, living remote from the metropolis, can only visit them occasionally. Suffice it to say, that they will create a new sense in thousands of persons, and enable them to derive a degree of enjoyment from trees and shrubs which they had no idea of before. It will enable the citizen or extensive proprietor, intending to plant, to make choice of those trees and shrubs which he thinks most ornamental, or most likely to answer his purpose; and thus, by improving the appearance of individual estates, it will contribute to increase the beauty and variety of the woody scenery of the country. It will enable those who already possess collections of trees and shrubs, by comparing them with these named speci-

mens, to ascertain the correct names of those in their possession; and it will be particularly useful in this latter respect to nurserymen, whose collections at present, with one or two exceptions, are singularly deficient in respect of nomenclature.

These named trees and shrubs will also be of great use to nurserymen in a commercial point of view, by creating a taste for planting a far greater number of species and varieties in pleasure-grounds than what is done at present.

In short, at a mere trifle of expense, the Woods and Forests have done what will gratify everybody that visits Kensington Gardens and St. James's Park; and ultimately, and at no distant period, by the taste it will create in persons having gardens or country residences, contribute rapidly to the improvement of nursery commerce, and to the general ornament of the country.

Though the collection of trees and shrubs already planted in these gardens is not so complete as it might be, yet it will, we have no doubt, be increased by the addition of all the species and varieties that can be procured in the nurseries, either at home or abroad, so as in the end (perhaps of the present year) to render it a complete Arboretum et Fruticetum Britannicum.

It is no small gratification to us to reflect that we first suggested the idea of naming these plants, though no notice was taken of the suggestion till Lord Lincoln was placed at the head of this department of the government. It is also a source of satisfaction, and, we trust, one which will be considered laudable, that the names adopted are those of the *Arboretum et Fruticetum Britannicum.* The names have been selected and applied by Mr. George Don, F.L.S., than whom a more fit person could not have been employed for this purpose.

Let us hope that similar arboretums will be planted by the Woods and Forests on the crown lands at Edinburgh, Stirling, St. Andrew's, and perhaps at other towns where there is government property under the management of the Woods and Forests.

In the *Spectator* newspaper of Nov. 12., p. 1089., it is suggested that the label should also state the chief use or value of the article labeled [such, we suppose, as a timber tree, an evergreen, an ornamental shrub, &c.]. The *Athenæum*, noticing this improvement in Kensington Gardens, has the interesting passage which we quote below.*

* "Those who stroll around Kensington Gardens, the pleasantest of suburban walks, and St. James's Park, the latter perhaps the best work that Nash the architect accomplished, cannot fail to have been struck by the new source of interest which has been given to both these spots by the naming of the shrubs. To all the recent plantations very legible explanatory tickets have been attached. This little piece of benevolent attention will generate more

The Derby Arboretum continues to flourish, as appears by the Annual Report, published in the *Derby Reporter* of November 10. 1842. The total income for the support of this Arboretum, received from annual subscriptions and money taken at the gates, during the past year, was 398*l.*; a sum which exceeded the expenditure, even though some extraordinary charges were incurred. We are happy to see, by the same Journal, that another scene of recreation has been provided for the people of Derby by the town. It is a piece of meadow land, on which are being formed two walks, each 18 ft. wide, and together extending 3600 ft., and planted on both sides with standard trees. In order to do honour to Mr. Strutt, the founder of the Derby Arboretum, that gentleman was requested to plant one tree, to be called the Derby Oak, and Mr. Strutt accordingly planted it on the 10th of November, 1842. "It was an oak sapling, measuring 14 ft. 9 in. high, and 9 in. in circumference. The tree is planted at the point of junction of the two walks. A mound 30 ft. in diameter, and raised 2 ft.

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practical botanists among the numerous young persons who throng the gravel walks, than all the dry floras put together, and create a perception of the interest which may be taken in plants and shrubs among those who hitherto have passed them unheeded. Instead of grumbling at the loss of the old trees in Kensington Gardens, for which these plants have been substituted, and avoiding the walks, these parts of the Gardens will henceforth become the most frequented. What a pleasant task, and especially for those who take 'duty walks,' the dullest of walks, to wander along the paths, making at each walk one class of shrubs the subject of observation, taking first the elms, then the thorns, and so on. These tickets give all the information which can be desired; the scientific name, the English name, the class to which the plant belongs, its natural habitation, and when it was first introduced into this country. They might serve as models to other places which more especially demand proper tickets. Let us hope they may shame the National Gallery into the adoption of a competent and systematic mode of ticketing the pictures. Surely the executive officers might concoct tickets which should give all the requisite information, and save those the expense of a catalogue who are unable to afford to purchase one. The National Gallery is supported for the instruction of the public, and it is the duty of its officers to render it as efficient as possible in this object. In all humility let us ask why a ticket, giving information like the following, should not be appended to each frame:—

1.

RESURRECTION OF LAZARUS.
SEBASTIANO DEL PIOMBO.
BORN 1485: DIED 1547.
VENETIAN SCHOOL.

But our present notice is rather to speak of the good deeds of the Board of Works, than the neglect at the National Gallery. We cannot say much in praise of the new fountain in Kensington Gardens [see our Remarks, p. 381], but it was an excellent thought to grain the alcoves like dark oak, which has effectually stopped all the loose scribbling which formerly defiled them." (*Athenæum*, 1842, p. 992.)

in the centre, similar to those introduced by Mr. Loudon in the arboretum, had been prepared with about two thirds of fine marl, and one third of the rich alluvial meadow soil. The town council and several hundreds of the inhabitants were present to witness the ceremony, and to testify their undiminished respect for their benevolent townsman." An address delivered on the occasion by Mr. Strutt, and various other particulars, will be found in the *Derby Reporter* for November 17.

Of the notices which have been sent us of the state of the different botanic gardens, that of Belfast seems in the most thriving state; the number of visitors for the past year exceeding 70,000. An arrangement of herbaceous plants according to the Natural System was completed last spring, of which we expect soon to give a plan and description. The Caledonian Horticultural Society has completed its hall of exhibition, and the range of hothouses in the Glasgow Botanic Garden is also made complete. The majority, however, of provincial, botanical, horticultural, and zoological societies are, we regret to say, suffering from want of funds; which, we fear, will always be the case while these are private speculations. We would make them the properties of the towns, and support them by rates on the inhabitants generally, as other public municipal institutions are supported.

Cemeteries, we are glad to find, are increasing throughout the country; and, though many of these are not laid out in the manner which we think they ought to be, yet, as they multiply, they will excite the attention and criticism of thinking persons, which will in the end lead to the adoption of a better taste.

Commercial Gardens.—During our tour last summer we had an opportunity of inspecting the nurseries at Bristol, Taunton, Exeter, and Plymouth, most of which exceeded our expectation in point of extent and cultivation, and five of them had considerable collections of specimen trees and shrubs planted along the main walk or walks; and since our return we have been equally surprised and gratified at the number of new things in the Sawbridgeworth Nursery, and the extensive collections indicated in the nursery catalogues of Mr. Gregory of Cirencester, Mr. May of Leeming Lane, and various others. Market-gardens, we observed, were beginning to be formed adjoining the railways in different parts of the country, which will insure a supply of vegetables to the metropolis at less prices than they have been sold for during the past year.

Window and Drawingroom Gardening we only introduce for the sake of recommending attention to Mr. Ward's cases (see p. 376.), and to the large crystal bell-glasses that are now being manufactured for covering collections of miniature plants in drawingrooms.

On the *Progress of Gardening in Foreign Countries* we have this year little to record. We are gratified to find that though our hints repeatedly given in this Magazine, for planting trees along the railroads, have not been adopted here, yet at Vienna our idea has been entertained (see p. 476.). In the British dominions in India great progress appears to be making in the introduction of European fruits and culinary vegetables, and this is also the case in Southern Australia. (See *Gard. Chron. Index.*)

Garden Literature.—Few publications on gardening subjects have appeared in the course of the year. We have completed the *Suburban Horticulturist. Gardening for Ladies* and *The Companion to the Ladies' Flower-Garden* (of both which works, and *Botany for Ladies*, we are more proud than of any of our own) have come, the former to a fourth, and the latter to a second, edition. The two *Gardening Newspapers* continue to prosper; the *Chronicle* goes on with its accustomed vigour, and has deservedly attained a very extensive sale. The *Gardeners' Gazette* is now edited by our much esteemed friend Mr. Main (who, if any good and venerable gardening author deserves a pension from government, is the man), and we are happy to learn that it also has increased in sale. There is surely abundance of room for both papers. A rigidly analytical Table of Contents, in addition to the Alphabetical Index now given, would be a great improvement to both works. A Gardening and Agricultural Newspaper has been commenced in Dublin, under the editorship of our friend Mr. Murphy, who conducts it with the greatest ability (see p. 383.).

Obituary.—To the names of those enumerated in our Table of Contents is to be added that of the venerable *Mr. John Rogers*, who died Nov. 9. at his residence, Southampton, in the ninety-first year of his age. Throughout the course of a long life, he enjoyed uninterrupted health, and he retained unimpaired all his faculties to the last. He was one of the oldest and most experienced of gardeners and nurserymen, having commenced his career in the Royal Botanic Gardens at Kew, in the year 1768, under the patronage of the late John Aiton, Esq. He had the advantage of a personal acquaintance with the celebrated Philip Miller, and was probably the last individual living who had enjoyed the friendship of that eminent character. Mr. Rogers was the author of many treatises on gardening; and towards the decline of his life he published the result of his experience in two separate works, the *Fruit* and *Vegetable Cultivators*, which contain much practical and useful information. He was the father of Mr. William Rogers of the Southampton Nursery, and assisted in the forming and conducting of that extensive establishment.

GENERAL INDEX.

T.

V.

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END OF THE EIGHTEENTH VOLUME.

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