IX. *A Practical Essay on Raising Apple Trees, and Making Cider, by Mr.* A. CROCKER, *of Somerset, England.*

To the PRESIDENT *and* MEMBERS *of the* AMERICAN ACADEMY.

GENTLEMEN,

THE due cultivation of the arts and sciences tends much to the advantage and glory of every state. Institutions like that of the *American Academy* cannot fail of producing happy effects on the surrounding world.

Notwithstanding I hold all due respect for *mathematical* and *philosophical disquisitions* (two important objects of your institution) yet I conceive that the world, in general, derive a principal advantage from the *due application* of the sciences to *the common concerns of life.*

Horticulture, even when considered as a philosophical *science only,* is truly a pleasing study; but when applied to practice, it becomes an art *profitable as well as pleasurable.* It is not my intention, in the following essay, to treat in a scientifick way, the subject of horticulture at large; but only to explain in a plain yet comprehensive way, one branch thereof; namely, the propagation of apple trees: adding thereto, as a subject naturally appendant, the most successful mode of converting the fruit thereof into a grateful, vinous, and salubrious liquor.

If the result of twenty years' experience and observation on the subjects can merit your attention, I presume that the following pages have some small claim to that exalted privilege.

vilege. Should, however, my ideas thereof be too sanguine, I beg you will do me the justice to believe that I am, in the utmost purity of intention, and with best wishes for the prosperity of your Academy,

Gentlemen,

your most faithful,

and very humble servant,

A. CROCKER.

Frome School, Somerset, in England, July 23d, 1789.

A Practical ESSAY *on* Raising APPLE TREES, *and* Making CIDER.

THE value and virtues of cider are too well known, to need any encomium from the pen of a modern writer: it will therefore, be more suitable to the intention of an essay on the subject, to point out the best means of procuring this excellent liquor in its purest state.

To do which, we must not only shew the proper management of the cider itself; but we must consider the best kinds of fruit for making it; the necessary management of the trees from which the fruit is produced; and also, the soil best adapted to the raising of those trees. The several subjects of this anti-climax will, in this essay, be considered in their natural order.

The soil which, by experience, the writer hereof has found to be best adapted to the raising of apple trees, in the *seminary*, is a light, rich loam, that has a less proportion of clay

to

to sand, than that which by writers on agriculture is generally considered a *due proportion for good mould.* It must not be understood, that the writer hereof means to recommend a soil composed merely of clay and sand, without the auxiliary aid of putrid mucilages, or other subjects of manure; but that he would recommend such an enriched soil, as is not of too strong a tenacity to favour the germination of the kernels sown therein. On soil it may only be further necessary to remark, that for the *stocks*, when transplanted from the *seminary* to the *nursery*, a greater degree of tenacity is required, than what is before mentioned: so that if the due proportion of clay to sand, in *common mould*, be as *one* to *four*; in the *seminary* for *apple kernels*, it may be as *one* to *five*; and for the *stocks* in the *nursery*, it may be somewhat more than as *one* to *four*.

Having prepared a bed of such soil in the seminary, as is mentioned above, let there be taken, in the latter end of October, or early part of November, from the strainings or pumice,* of a cider or verjuice cheese† a quantity of kernels, which sow thereon, covering them with sifted mould about an inch over; where they will germinate, and spring up about April following.

In

* *Pumice.* A provincial term, signifying pounded, or ground apples: perhaps a corruption from the French *pomme maché*, chewed apples.

† A nurseryman who raises apple trees for sale, may find his advantage in raising his stocks from *apple kernels;* but though a handsome tree may be thence raised in less time, it cannot be doubted that a tree raised from the kernel of a *crab*, or other *wilding*, will stand much longer in the orchard.

In this seminary the young stocks are to remain two years from the time of sowing; during which time no attention to them is necessary, but that of preserving them from external injuries, and pulling up such noxious weeds as may arise among them. At the end of this time, they must be taken up, thrown into two parcels (of great and small) and trimmed root and branch. The lateral branches must be shortened to about six inches, and the leading branch taken off at two feet from the upper roots. The spill or tap-root must also be taken off below the fibres, and the other roots pruned or plashed, in such manner that the whole ramifications of fibres appendant thereto may be spread in a circular, or at least in the most commodious, manner for drawing nourishment from the greatest space of ground possible after transplantation.‡ Such of those stocks as are more than an inch in circumference, must be transplanted in a quincunx order, two feet and half apart each way. The smaller ones may be transplanted in rows of a foot distance, and three or four inches apart in the rows: whence they may be again transplanted, at the proper distance for grafting, a year or two afterwards.

The method to be recommended for transplanting, is this. Let trenches be made in the nurserybed (which is supposed to have been cleansed and well dug aforehand) about a foot broad,

‡ Here it may be noted, that such crabbles as have before shewn a broad, well formed leaf, and run tall and straight, may be trained as *wilding trees;* which possibly may produce good cider fruit without grafting: whereby the nurseryman will save two years in bringing a tree to perfection. But, should the tree deceive him, when it shews its fruit, he may graft it in the head; and but little time will be lost by such means.

broad, and six inches deep. In these trenches the stocks are to be planted, at the distances before mentioned, in the manner following. The nurseryman must take a stock in his left hand, and therewith keep it firmly down to the bottom of the trench; and with his right, display the large roots in the best manner, and fasten them firmly, by putting in and pressing hard down some of the side earth, which was thrown out of the trench. Thus must he fill up the trench by degrees, frequently pulling out and spreading abroad with his fingers the fibrous ramifications, and pressing the earth close about the roots and stem. The greatest part of this labour should be done kneeling on a wad of straw, and going backwards as he plants.

This operation must be performed the latter end of October, or beginning of November, as the season may best serve, after a fall of rain. Here the stocks will remain until the second spring following, without requiring any attention more than that of guarding them from external injuries, or pruning off such lateral branches, as may happen to break out within six inches from the surface of the earth. It is advisable to permit the natural grasses, which may arise among the stocks, to form an imperfect sward, that the soil may acquire a greater strength for holding the stocks from being shaken by winds; so that the fibres may the more securely perform an uninterrupted labour of extracting nutriment from the earth.

In the second April after this transplantation, the stocks (being about three inches in circumference) will become

fit

fit for grafting; which is a work that requires the utmost care and skill of the nurseryman.

Various are the methods of this art which have been used and recommended by different persons: but the mode of grafting which the writer of this essay has found best to succeed, and which is certainly well adapted to stocks of this size, is that which is termed *whip* or *splice grafting*; and is thus performed. Some fourteen or twenty days before the stocks are to be grafted, take from some healthy, fruitful trees, of such kinds of apples as are intended to be propagated, a sufficient number of shoots of the last year*; tie them in separate bundles; label them; and put the larger ends thereof about three inches deep in the earth, in some exposed part of a garden, there to remain till they are wanted for use.† The

* If it were of use to the respectable society I am writing to, I might give a list of the names of cider-fruit most in esteem amongst us: such as the Styre, Redstreak, Panson apple, Bennet apple, Captain Nurse's kernel, Hagley's crab, Elton's yellow, and Old Quining, of Herefordshire: the Cockagee, Golden pippin, Old Redstreak, Royal Jersey, Cadbury apple, Castle pippin, Lemon pippin, and Salisbury apple, of Somersetshire: the Staverton Redstreak, Lidbrook ditto, Zachary's apple, Josey, Bittersweet, Orchardton pippin, and Baccamore of Devonshire: to which may be added, the Marsy, Marbrè, Double Pigeon rouge, Panachè, Ecarlotte de le Precoce, Pomme de Neige, Pomme de Chatelet, Pommes des Normandy, and various others lately imported hither from the European continent; but as names are accidentally or capriciously applied, and the characteristicks of apples thereby but imperfectly denoted, it may be better to remark, generally, that such apples (especially sour ones) as are of a yellow colour, and have red streaks on the sun side, whatever their names may be, are indubitably the best cider fruits.

† The reason for taking the grafts from the tree, and thus exposing them before they are grafted to the stock, is, that the juices in their tubes may evaporate through the bark, or be extravasated into the ground. Their tubes being in some measure thus emptied, will the more freely admit the ascent of sap from the stock after their union.

The nurseryman having mixed and well tempered with water a sufficient quantity of strong clay, the new feces of a horse which feeds on hay, and some fresh cow-dung, he must betake himself to his nursery; where, standing on the north side of a stock, he must place his left foot firmly on the earth, close thereto, and with a strong pruning knife take off the stock about five or six inches above the ground in a sloping manner; and on the south side, where the bark is clean, and free from knots, with a very keen pen-knife, he must take off a thin slice of bark and wood, of two inches or more in length. He must then take his graft, and shorten it to three or four buds, and from the part opposite the lower bud but one, slope it down so as to match the thin slice taken from the stock; and so place his graft and stock together, that the inner bark of each may coalesce: inserting the bottom of the graft into a small plash-incision made at the bottom of the slope of the stock: In this order he must bind his graft and stock firmly together with a list of bass-matting wetted; and then, by himself or assistant, surround both with a ball of his tempered clay: taking care so to close it about the stock and graft, as totally to exclude the external air.* To prevent the clay being chapped by cold winds or sun, it may be proper to wrap a thin layer of tow round the ball of clay; smoothing the whole with the hand, dipped in water. Thus he will proceed until all his stocks are grafted.† In

* This operation of grafting should be performed, if possible, when the weather is moderate: not during the time of very cold winds or open sun shine.

† It is scarcely necessary to remark, that it may be prudent to graft each sort by itself. The labelling the grafts (before mentioned) was intended as an intimation of the propriety of so doing.

In this state the whole must remain until the latter end of June following;* at which time it will be necessary to cut through the ball of clay, displace it, and carefully take off the bass bandage; when, to his satisfaction (if the former operation was well performed) the nurseryman will perceive a perfect union of the graft and stock. If any extraneous shoots, around the stocks under the clay, should appear, they must be cut off with a keen knife, or slipped down with the fingers; and the whole clayed as before, but without any bass bandage.

The graft must now be left to make its advances towards a tree; which it will speedily do, with the few following helps. Early in the ensuing spring, the second clay must be taken off, and the stock cut slopingly away on the part opposite the graft. Should the graft not advance perpendicularly, it may be assisted by tying it to a small stake, fastened in the ground, near the stock. The lateral spurs or branches of the graft should not yet be taken off; as it is a known truth that trees acquire as much nourishment by the leaves, when in full verdure, as by the roots. But when the graft has arisen to the perpendicular height of somewhat more than six feet, let it be stopped (in the month of February) by cutting it off just above a bud of that height. The upper six buds will, in the course of the succeeding summer, form the ground-work of an apple tree head. This young head must, in the next spring, be shortened to four or five buds on each branch; always observing to leave the outer bud of each for the uppermost; thereby giving opportunity

* Frequently slipping off such buds as break out from the stocks below the clay.

portunity to the head to spread to a larger size. This operation of shortening the young shoots must be repeated in the ensuing spring, and perhaps in a third spring also; taking care in the preceding winters, to displace all such small branches, as cross or intercept the progress of others.

The second October following this period, those trees will become fit to plant out in an orchard; and the business of the nurseryman will nearly be ended.* Hence it appears, that in nine or ten years, an apple tree might be raised from the kernel to its plantation into the orchard; and of such kind of fruit as may be required or wished.†

It would amount to a tautology to repeat the necessary soil for an orchard, or the proper method of planting such trees, so much having been said on soil and transplantation, in the foregoing part of this essay: It remains therefore, to

* The site of an orchard has been so happily expressed by the English Pomonian Bard, that I shall take the liberty of speaking thereof in his own language.

"Whoe'er expects his lab'ring trees should bend
With fruitage, and a kindly harvest yield,
Be this his first concern; to find a tract
Impervious to the winds, begirt with hills
That intercept the *Hyperborean* blasts
Tempestuous, and cold *Eurus*' nipping force,
Noxious to feeble buds: But to the west
Let him free entrance grant."

† Were it not foreign to the intention of this essay, much might be said of the profits arising from a nursery properly managed; supposing the trees to be raised for sale. The writer will only remark that an acre of land will contain 6575 stocks, when planted at proper distances for grafting. Abate the 75 for accidents, there will remain 6500 trees; which, at the very low average price of *one shilling and six pence* a tree, will amount to £487 10*s*. A very handsome profit for an acre of land thus employed a few years only!

to remark only, that after the trees have been planted in the orchard, and properly staked to prevent their being moved by winds, &c. and have stood two winters and one summer, the heads must again be shortened, in the manner before directed.*

Thus (without further trouble, except a little pruning of such branches as intersect others) will new heads be formed, which will last for ages: and which will quickly repay all labour and cost, by successive crops of a golden fruit, highly estimable for its pleasing salubrious juice.

The business of the cider-maker comes next under consideration: and therein much labour and attention must be employed, or the nurseryman has been working in vain.

About the beginning of October, he will find his apples, in general, sufficiently ripe for gathering: this he will know by slightly shaking a loaded bough of an appletree; for if the apples fall freely, it is an indication of their being sufficiently matured for his purpose.

He must then progressively shake the boughs of his trees (but not pole any, leaving the unripe apples for further maturation) and gather into heaps this golden harvest of *Pomona*;

* Trees thus managed, will be subject to very few disorders. Should they however, contract much moss, it may easily be removed with a pail-brush, or a piece of hair cloth often dipped in water. This may best be performed after some showers of rain. If in four or five years after the trees are planted out, any of them should appear (by the cleaving of the bark) to be hide bound, an incision should be made in the bark, with the point of a sharp knife, from the head to the ground. Should they be unthrifty, from metallick salts, pyrites, or other peculiarity of the soil wherein they are planted, lay the roots partly open, in the month of November, and when the frost has well operated on the opened soil, cover the roots with some rich compost, and close the whole again.

na; keeping each kind of fruit by itself. These heaps of apples (which should not be more than a foot deep) must remain in the orchard, or some other open place, for a fortnight or more; in which time they will, in general, acquire a sufficient degree of melioration to be made into cider. Should severe frosts set in, these heaps of apples must be covered with straw.

His mill, press, and vessels being previously cleaned,* he must now grind his apples to a pretty fine pumice; and, without much delay, proceed to the expressing of the juice; putting the pumice for that purpose, into very clean horse-hair cloths, or making a cheese thereof with bandages of sweet, clean wheat reed; taking care not to mix the pumice of various kinds of apples in one cider cheese, especially of sweet and sour fruits.

The juice thus expressed, must be strained through a fine hair sieve, into an open vessel, and thence conveyed to the casks, which should previously be placed in an open cellar: the bungs of which must be left unstopped, that the gross feces of the first fermentation may be discharged thereat.

Very particular attention must now be paid to the cider, to catch (as it were) the very moment of the first fining thereof,† and immediately to rack it off into a clean, open vessel; where it must remain eighteen or twenty hours: after which, it must be tunned into another cask, properly cleaned,

* In none of which must any *lead* be used, lest a poison be thereby administered to those who drink the cider.

† This is best observed by drawing out a glass-full frequently, and holding it to the light: or it may pretty accurately be known by the discharged feces becoming brown, and beginning to crack.

cleaned, and if need be, matched.* This first fining of the cider, made at this season of the year, from sour fruit, will happen within thirty or perhaps twenty hours after making; that of sweet fruit, in not less than forty or fifty hours. Hence appears the necessity of keeping the different kinds of apples separate: for should a commixture of fruit be admitted, the juice of the sweet apple will not get fine until the second fermentation of that of the sour is begun; and a perpetual, unnatural fermentation will ensue, and continue perhaps for months; robbing the cider of its saccharine parts, and converting the whole into an acid liquor, unpleasant to the palate, and far less wholesome than it would have been, if duly managed.†

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* Matching a cask is intended either to suppress an improper fermentation in the cider; to give some particular flavour thereto; or to increase the spirit thereof; and is thus performed. Take a strip of canvas cloth, about eighteen inches long and two broad: one half of which must be dipped in brimstone (melted in an earthen pan) whereon some pounded oris root, grains of paradise, coriander seeds, winters bark, ginger, cloves, cinnamon, or other pungent aromaticks, have been strewed. When this match is dry, it must be lighted, and put into a cask (pendent from the bung) in which a few gallons of cider have been beforehand tunned; where it must remain until it be burnt out. The cask must remain close stopped for an hour or more, and then rolled to and fro, to incorporate the fumes of the match with the cider: after which it must be nearly filled with the remaining cider. If the matching be intended merely to suppress an improper fermentation, the brimstone alone will be sufficient; but if an additional flavour and spirit be required, take such of the other ingredients as may be liked best. For increasing the spirit, it seems unnecessary to be over curious in the choice of the ingredients; for "All the pungent aromaticks have a surprising property of increasing the quantity of spirit."

Shaw's Chemical Essays.

† Chemists inform us, and experience confirms the position, that vegetable juices undergo *various fermentations*, very different in their effects. The first is called *vinous*, and so changes the property of the *must*, that, by distillation, an inflammable spirit may be extracted; which before, could not be done: the second is called *acetous*, converting

In a very short time after the cider is become fine, if it be not racked as before directed, the acid fermentation begins. This may be perceived by a hissing noise, very distinctly heard, on applying the ear to the bung of the cask; and its effects can only be remedied (and that but in part) by drawing it off, as soon as perceived, into an open vessel, and suffering it there to remain for thirty or forty hours before it be again tunned into a fresh cask, and by mixing therewith some good French brandy, about the quantity of a quart to a hogshead of cider: or by matching the cask in manner spoken of in a preceding note.

But permit it to be supposed that the cider-maker has been cautious enough to catch the first fining above mentioned, and to have managed it according to the preceding directions, he will then have nothing more to do therewith until the February or March following; when it will be proper, in a mild season of fair weather, to give it another racking; and, if need be, to commix that which was made from sour fruit (which may be too pale) with that which was made from sweet fruit (which is generally dark coloured) thereby giving it as well a proper flavour, as that high amber colour, which, in the glass, is pleasing to the eye.* The vessels

verting the liquor into vinegar: all the succeeding fermentations are of the putrefactive kind, forming mucilage, volatile alcali, &c. Hence appears a philosophick reason for attending particularly to the cider in its early stages; that the acetous and future fermentations may be prevented, and the first only permitted. See Fordyce's Elements of Vegetation, Elliott's Elements of Chemistry, &c. &c.

* Should the colour be still too pale, some lump sugar, melted in an iron stew pan, and commixed with some cider whilst in a fluid state, will heighten it to any degree of colour required.

vessels should at this time of racking be placed in a close cellar. At the return of the season, when apple trees are again in bloom, the cider will be found in a slight fermentation: until this operation of nature is past, the vessels must remain unstopped; but as soon as this is perfected, the cork may be placed on the bung, and daily pressed more and more tight. Should the cider be intended for bottling, it will be best to do it in the beginning of April; leaving the bottles uncorked, for eighteen or twenty hours after their being filled.

Thus, by the month of June or July, the cider-maker will be possessed of a sparkling, vinous, animating liquor; fit for the best citizens of "the free and independent states of America" to regale themselves with.

X. *Meteorological Observations made at Montreal, Canada, North America.*

State of FAHRENHEIT'S *Thermometer insulated, and exposed to the North.*

OCTOBER. 1791.

Oct.	Remarks before Noon.	h. m.		h. m.		Remarks after Noon.
26		7. 30	37.00 / 0		—	
27		7.	26.30 / 0	11.30	30. 0 / 0	
28		7.	29.30 / 0	12.	31. 0 / 0	
29		7. 30	38.00 / 0	12.	31. / 0	
30	Snow.	7.	27.00 / 0	12.	31. / 0	sleet and rain.
31	Rain.	7. 30	32.39 / 0	11.	34. / 0	dry.