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NEW
EXPERIMENTS

AND
OBSERVATIONS,

Relating to the

Generation of PLANTS:

Occasion'd by

A LETTER lately publish'd in
the *Philosophical Transactions*, by
Patrick Blair, M. D. F. R. S.

TOGETHER

With an Account of the extraordinary
Vegetation of Peaches, Abricots, Nectarines,
Plums, Cherries, Figs, Vines, Goosberries,
Currans, &c. as they were artificially cultiva-
ted this Spring 1724.

By *R. BRADLEY*, R. S. S.

L O N D O N:

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New Improvements and Observations relating to the Generation of Plants, &c.



It is the Business of a Philosopher to contemplate the Works of Nature, and from due Observation and Experiments draw such Inferences as may tend to publick Benefit. A Philosopher ought by no means to be partial or re- tentive in the Discoveries he makes: let his Works be founded upon Facts, and his Mind generous and open in communicating his Useful Discoveries to Mankind; this, says a Learned Gentleman, should be always consider'd by the curious Naturalists, that they may avoid those Rocks which some of the antient, as well as modern Authors, have split upon: for without this Caution, many whose Genius leads them

to improve from the Learning of others, may become possess'd of Principles which are Erroneous ; and by prosecuting their Studies upon so unfound a Basis, produce nothing but Error, which will, as it falls more and more in the way of Novel Virtuosi, debauch their Understandings so far, as never to let them into the Path of found Knowledge, 'till they are incapable of enjoying the Benefits which will arise from it. The great Lord *Molesworth*, in some of his Writings, speaking of the Prejudice of Education, tells us as much ; and I am persuaded, that there is not one Man in the World that does not really find it to be so in some time or other of his Life, if he ever can attain the Liberty of thinking for himself, and has at the same time the Assistance of Reason and Experience.

'Twas Reasons of this kind which led me first to collect and put together my Observations in Gardening ; for as the State of Gardening was eight or ten Years ago, the Professors of that Art were so very Mechanical in their Performances, that every thing which was transacted in that way, was done without other reason than that their Fathers or Masters had done so before 'em ; and therefore it must be right, tho' the Consequence was so often fatal, that several
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Gentlemen who had good Inclinations towards it, were so much disappointed in their Undertakings, that they gave up their Gardens as expensive Trifles.

My ingenious Friend Mr. *Laurence* was the first that open'd the new Scene of joining Philosophy with the Practical Part, and by that means put it in the power of Men of Sense and Fortune to undertake something upon the foot of good Reason; and I have often wish'd the same curious Gentleman had had the same Opportunities of trying Experiments in the other Branches of Gardening, as he had in improving Fruit-Trees, I am persuaded he would have overcome as great Difficulties in them as he has done in the Culture of Fruits. However, as he did not take the trouble of going so far, I took the Opportunity of laying my Papers before the World relating to the Culture of Flowers, Forrest-Trees, Exotick-Plants, and Kitchen-Gardens, &c. as nearly following his Method as possible; and I am happy enough to find our *English* Gentry not displeas'd with the Scheme we have laid before 'em, infomuch, that even some Nursery Men confess they have had ten times the Business since we have open'd the Secrets of Gardening, than they ever had before; besides the Pleasure I have in meeting every where some kind of Garden

den or other which is in a flourishing State, from the delight most Gentlemen are now fallen into, of making Experiments themselves in a rational way.

As in the Business of Physick, no Man can be a good Physician unless he understands the Parts and Structure of an human Body ; so in the Affair of Gardening, no one can judiciously cultivate Health in Plants, unless he is acquainted with their several Parts, and their respective Uses : which was the Reason I chose to introduce my first Papers in that way, with some anatomical Descriptions of Plants, and some Observations I had made concerning their Method of generating, and bringing their Seed perfect into the World ; that thereby the principal Design of Nature in the Growth and Improvement of Plants might become intelligible to the Lovers of Gardening, and render them capable of increasing, amending, or altering of the Plants, which might happen to fall under their Care. As to the First, which concerns the Anatomy of Plants, it explains how the Sap circulates, and discovers how a Plant receives its Nourishment from the Earth. In the Second we observe the Design of Nature in continuing the several Species of Plants to us by Seeds or Eggs in such a manner, as is harmonious to the great Law, by which she governs all other Bodies

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dies under the Sway of her extensive Scepter. See *Chap. 1. 2.* in my *New Improvements of Gardening.*

My System of the Circulation of Sap in Vegetables has hitherto met with no Opposition, unless it were from some few Gardeners who do not know what Circulation means; and they, rather than lose the first Impression they receiv'd concerning the Sap of a Plant, of its rising and falling as they call it, seem to resolve that they will not be inform'd. But indeed the Circulation of Juices in Bodies, whether Vegetables or Animals, cannot very easily be conceiv'd, without first the Parts of which a Body is compos'd be well known, and then the very Motion of the Juices thro' those Parts be explain'd and made apparent; which, in Animals, is visible enough by help of the Microscope, and in all the milky Plants, is plainly discoverable to the naked Eye, when any of their Leaves are cut in the Summer. This I owe entirely to that learned and curious Gentleman *Charles Du Bois, Esq;* who first shew'd me the Experiment in his fine Gardens at *Mitcham*; but if yet this Doctrin might admit of a Query among the Gardeners, let 'em try my Method of transfusing of young vigorous Sap into old decay'd Trees so as to recover the Strength of the latter, which I did with great Success

cesses several Years ago, by planting some young Pear-Stocks about a Dwarf decaying Pear-Tree, and Inarching one into the other, by which means the vigorous Sap of the young Trees circulated through the Vessels of the old Tree, and by that means renew'd its Strength, and brought good Fruit. In this Experiment, I saw'd the old Tree off (within four Inches of the Ground) from the Root when it was joyn'd with the young Stock, and let it remain supported by the young Trees it was inarch'd into, and some Wedges to bear part of its weight; and yet the old Tree, tho' it had not the benefit of its own Root, brought good Fruit, which it could not have done if the Juices of the young Stocks had not supply'd it. An Instance of this kind is now at Mr. *Fairchild's* at *Hoxton*, done a year or two ago, as well as one of the revers'd Trees describ'd in my Monthly Writings for *Anno* 1721.

The Generation of Plants I have consider'd in a large Chapter in my *New Improvements of Planting and Gardening*, as well as in my Monthly Writings, and in my Philosophical Account of the Works of Nature; in each of which Books I have, in many Instances, given Proofs of that Doctrine and its Use, in bringing Varieties from coupling different degrees of
Plants

Plants one with the other; but to set aside what I have written upon that head, the late Mr. *Morland* F. R. S. in a Dissertation printed in the *Philosophical Transactions*, and Mr. *Geoffroy* of the Royal Academy of Sciences of *Paris*, has, in two or three Lectures before that Society, confirm'd my System beyond Contradiction. And even Dr. *Blair* F. R. S. allows, that Plants have a Mode of Generating, but does not agree with me about the manner in which it is perform'd, as may be observ'd in his *Botanick Essays*, p. 277. and in that Gentleman's Letter to Sir *Hans Sloan*, Bar^t. President of the College of Physicians, publish'd in the *Philosophical Transactions*, Numb. 369. For which Reason I think myself oblig'd to answer the Doctor's Objections, that none of those, whose Business it is to inform themselves in so essential a part of Gardening or Philosophy, may be led into Error.

I confess I am not at all displeas'd, since this System of the *Generation of Plants*, admits of a Dispute, that I have so curious a Gentleman as Dr. *Blair* to argue with; for from fair Argument, and just Observation, which we are to expect in Philosophical Controversy, it is not improbable but the Doubts and Objections which some might make against the System, may be clear'd up, and many Diffi-

culties in the Generation of Animals be explain'd : For as Nature is harmonious in all her Works, so Discoveries made in the Vegetable Kingdom may oftentimes explain Difficulties in the Animal Kingdom, as well as the Circulation of the Blood in Animals has indicated to us, that there is a Circulation of Sap in Plants; or that there being a Mode of Generating among all Animals, has inform'd us that there must be something analogous to it among Plants.

For the Reader's better understanding of this Argument, it will be necessary first to set down the most receiv'd Opinion concerning Generation in general, which is, That it is absolutely necessary that some of the Male Seed be receiv'd into the *Uterus* of the Female, in such a manner as to reach the *Ovum*, and even lodge itself in that Egg, before the Female can become pregnant ; and again, it is no less certain, that the Seed of all Animals in Health abound with living Animalcula, some one of which, when receiv'd into the Egg as its proper *Nidus*, becomes in due time a perfect Animal according to its Kind. These Animalcula are easily discover'd by good Microscopes ; and that some of the Semen which abounds with these Animalcules does pass into the Egg itself, is evident from the Observations one makes

makes every day of the Cock's Tread in the Eggs of Fowls and Birds, without which, it is known that the Egg will be unproductive; so it is plain, that if the Male Seed does not pass into the *Ovum* of the Female, the Female cannot become pregnant, nor be productive of its own Species.

The Opinion against this is, That the Seed of the Male need not enter into the *Ovum* or Egg to impregnate it, but by being lodg'd near it, or any where in the *Uterus*, the bare Effluvia which proceed from it, are sufficient to impregnate the Female; but this Opinion, as it depends upon no Principles of Nature, must consequently be Erroneous. And this in the Case of Plants is Dr. *Blair's* Opinion, as I shall explain by and by from his own Writings.

As I have set down the Case of Generation among Animals, it next follows that I give some account of it among Plants. In my Scheme is discover'd, that the Seat of Generation is in the Flower, that is to say, the Flowers of Plants are compos'd of such Parts, as are plainly design'd for this Use; for as the Eggs or Seeds of Plants are always found in the Flowers of Vegetables, so it is plain that they do the Office of the *Uterus* in Animals; and since it is plain, that those Seeds, before they are

impregnated, are as much without the *Punctum Vitæ*, as the Eggs laid by Female Birds that have not been with a Male, are without any lively part in them; then we may as reasonably infer, that to make them become prolifick, they must have the assistance of some Male part to render them Fecund, or make them Pregnant. That the Female part of the Flower is in the Pistillum, or Pistle, we all agree; and that the Chives or Stamina of a Flower, with their Apices, in their full ripeness, fling out their impregnating Dust as usual, for the perfecting the Seeds or Eggs in the Pistillum or Female part, we all allow likewise; and each of us has given Proofs enough of the Necessity of it to enliven and perfect the Seeds of a Plant: but the great Dispute now in question is, Whether the Dust which proceeds from those Parts which we allow to be Male, passes into those Pistles which we allow to be Female? or whether the Male Seed barely falling on the outside of the *Uterus*, will impregnate the Eggs within it?

In my first Essay upon this Subject in *my New Improvements of Planting, &c.* I was not so positive of the Manner how this Generation of Plants was perform'd; but that I left room enough for those who were contrary to my Opinion to please themselves, and even gave them an Handle

dle for reasoning against me: but upon more mature Consideration, in my *Philosophical Account of the Works of Nature*, I judg'd it necessary to leave out the supposititious Turn which Dr. *Blair* takes notice of in my *New Improvements*, page. 19. where I say, " We may easily
 " conceive that the glutenous Matter,
 " and Velvet Covering on the extremity
 " of the Pistils, may be capable of re-
 " ceiving and holding some of the Powder
 " as it falls ; and whether the Immission
 " of the *Farina Fœcundans* be requisite,
 " or not, its Lodgment on the Mouth of
 " the Pistillum may, by virtue of its at-
 " tractive Quality, *perhaps* fœcundate
 " the Seed contain'd in the Uterus."

Now that the Male Dust is always found upon these extreme Parts of the Pistils, is evident from Observations that may be made every day, and we may observe too with Dr. *Blair*, that some other Parts of the Flower are not without it: but in this, as in other Cases of Generation, it must be allow'd, that Nature bestows upon every Male much more Seed than what is sufficient to impregnate the Female, because of the Difficulty it has in reaching the *Ovum* of the Female; for according to the Doctrine of *Animalcula in Semine Masculino*, which is now generally receiv'd, a fifty thousandth part of
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the Seed expended in time of Coupling, were it rightly plac'd, would render the Female pregnant, that is, by being receiv'd into the *Ovum* or Egg of the Female, as its proper *Nidus*. I say then, that it seems much more probable, that this impregnating Dust comes nearer to the Point requir'd when it falls upon the Orifice of the Pistillum, than when it falls upon any other part of the Flower; for this Orifice of the Pistillum having an immediate Correspondence with the Ovaries, or Egg-nests, it's highly probable, that it may pass from thence into the Eggs, which it cannot do from the other Parts of the Flower that have no Pipes or Passages that lead to the Egg; then it appears that what of this Male-Dust does not fall upon or into the Orifice of the Pistillum, is lost.

But that we may the better conceive how this Male-Dust may enter into the Passage of the Uterus, and so impregnate the Seeds or Eggs; I would recommend to the Curious, who have the Advantage of good Microscopes, to examine with the same Glass, the Tube or Passage which leads to the Ovaries of the Flower, and some of the Male-Dust of the same Flower; and they will find, that what we take for a single Grain of that Dust with the naked Eye, is a Multitude of Grains, and that

that the Passage into the Seat of the Egg-nest, is capable of receiving many of them at one time. In my Dissection of the Female Parts of the Tulip and of the Anemony by the Microscope, in my *New Improvements of Planting*, &c. we may see this explain'd.

To carry on the Analogy between Plants and Animals yet a little farther, as far as it concerns the Generation of both, it may not be amiss to take notice in this Place, of an Objection which some have made against the Probability of the Passage of the Male-Seed into the Uterus of an Animal, so as to reach the Eggs ; because, say they, when we examine the Female Parts of Generation in Animals after their Death, when we can only have the Opportunity of discovering the Situation of all their Branches, we find so small a Passage into the Body of the Uterus, that a fine Horse-hair can hardly be admitted, and the Uterus itself seems to be only a Lump of solid Flesh : and then how is it possible that the Male-Seed can either be received into the Body of the Uterus, or can ever reach the Ovaries, so as to impregnate the Eggs in them ; but yet that the Seed of the Male, or the Animalcula in that Seed, does reach the Eggs, and even pass into them, is evident in those Eggs of Fowls and Birds which we examine

mine after Copulation that have the Cock's Tread in them, without which they are Barren and Unproductive ; and yet the Difficulty of the Male's Seed passing into those Eggs, when we view the Parts of the Female after Death, is as hard to be accounted for as the other before-mention'd. And we must likewise observe, that when Hen-Birds lay Eggs without coupling with a Cock, as often happens, there is not that lively part found in them which renders them productive ; from whence we find it is absolutely necessary that some of the Male-Seed, or its Animalcula, must enter into the Eggs of the Female, to impregnate them : Moreover, it is observable, that every Female of any kind whatever has Ovaries or Egg-nests, and that in every Branch of the Creation, every distinct Species has its Male and Female, and without coupling together, there can be no increase.

To what I observ'd above concerning the State of the Generative Parts of Animals after they are dead, when scarce any Passage into the Uterus can be discover'd, or any Passage for the Male-Seed into the Ovaries be accounted for ; I answer, that in living Bodies these Parts are vastly different from the State of those we have mentioned : for it is natural enough to judge, that when the Circulation of Juices is performing

forming its Duty in any common part of the Body, the Vessels are more or less subject to be restrained or relax'd as the Nourishment they receiv'd at different times from different Foods direct them to be; but in the dead State, where all Motion is ceased, we must expect them always fix'd and contracted. Again, the Generative Parts of Animals are not constantly destin'd to the Work they were principally ordain'd for, and therefore are not always in a proper State for Generation; every Bird, every Quadrupede, every Insect, and even every Plant too has its Season appointed for this Work, when they live in the Road of Nature; but indeed when they are forced out of that Road, it is not rare to see them couple, breed, and produce their Young at uncommon Seasons. Witness the Lambs brought forth in the Winter by invigorating Food given to the Ewes, Green Geese, Chickens, Pidgeons, and Plants too, to bring forth and bear Fruit in the Winter Season, by Art. If then there is a Season fix'd for Generation among those parts of Nature which adhere to her Laws, it is as evident that the Generative Parts of these Branches are then in as different a posture from what they were at other times, as there is a difference between the same parts living and dead in the

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same Bodies ; and it is as evident too, that *in Coitu* the Parts I speak of are more relaxed than at any other times : so that then there is no room to start the Difficulty above-mention'd, *viz.* that there is not Passage sufficient to admit the Male-Seed into the Uterus, or even into the Ovaries.

When I consider how every Flower, when it is prepared for this Act, is so much under the Influence of the Sun, that the Flower Leaves, or Petals, open at its Approach, and shut up at its Departure ; it explains to me, that the Pistillum or Female Parts of Generation are relaxed one time more than another, *i. e.* that the Female Parts are more relax'd at the opening of the Flower, than when the Flower is shut up ; for the Flower-Leaves or Petals adhering to the bottom of the Pistillum, must consequently, when they bend back, put every part of that Pistillum into a different Posture than it was in when the Flower-Leaves were shut ; and it is very certain, that 'tis the Presence of the Sun which ripens the Male-Dust in the Apices, and opens the little Cases in which it is contain'd, giving them a Springyness that flings forth that Dust as soon as 'tis ripe, so as to scatter it to a considerable Distance. The Female Parts, as I observe, are at this time
dilated

dilated by the opening of the Flower-Leaves, and the Apices or Chives concurring at the same time, in flinging forth their Male-Dust, answers the same End in the Generation of Plants that the Act of Copulation does among Animals. But I may add yet one thing more to explain the Possibility, besides the Necessity, of the Male-Seed's passing into the Uterus, which will I suppose put the Question in hand out of dispute; and that is, the Capacity of the Womb, as well to contain for a time, as to exclude at last a full-grown Fœtus, which is surely a sufficient Proof of the Necessity of the Male-Seed's entering that Part, as well as a Demonstration of its passing through that to the Ovaries, where, after impregnating the *Ovum*, or Egg, (or sometimes more) we find all those Passages become larger by degrees, as the Embrio encreases in Bigness; 'till at length the Burden they bear being too large for them to contain, is discharg'd to breathe the common Air: and yet after this vast Extension of the Parts we have been speaking of, a very short time contracts them so much, that there is no perceptible Alteration in them from what they were at first, and then are at liberty again of acting as Nature requires.

Now this is the Doctrine I maintain concerning the Generation of every thing that has Life over the Face of the whole Earth. Even in the Eggs of Insects it is visible enough, that the *Tread* of the Male, or Animalculum, must be lodged in the Egg before that Egg can be productive; and the imperfect Seed of a Plant, tho' it may grow as large as a prolifick Seed (as barren Eggs of other kinds will do) will be yet unprofitable as it is wanting of the Germe or Male Point of Life. As for the Animalcules in the Male-Seed of human Bodies, I have given a Figure of them in my *Philosophical Account of the Works of Nature*; and tho' they do not carry the strict Form with them of the Animal they are to produce, yet considering how Nature acts in other Cases of the same kind, and how many Changes of Figure are undergone by those Animals, where she gives us Opportunity of Observation, as in Frogs, and Insects; I think there will no Difficulty remain upon that account, since we find her Harmonious in all her Works. So that whether the Animalculum is of the same Figure 'tis to produce in the Animal, or a Grain of the Male-Dust be of the same Figure as the Plant that is to come from it, is out of the question; 'tis enough all Creatures that are Female have Eggs,
and

and that those Eggs must be impregnated by the enlivening Seed of the Male. So that by no means I can agree with Dr. *Blair*, when he supposes that the bare scattering of the Male-Dust upon parts of the Flowers remote from the Pistillum (or Female Part of Generation) where there can be no Immission of it into the Uterus, can have any Effect upon the Seeds or Eggs inclosed in the Ovaries, which are lodged within the Uterus or Pistil; nor can I be of his Opinion, when he says that the Effluvia from the Farina, can have such an Effect upon the Female Parts of a Plant, as to impregnate the Seeds within them: I should as soon suppose that a Block of Marble would bring forth a beautiful Statue upon the bare Approach of a good Statuary. But that I may do Dr. *Blair* all the Justice I can, I shall relate a few Lines of his own, wherein are his chief Reasonings against the System I support of the Animalcules entering into the Egg. *Botanick Essays, page 316.*

“ If in an Animalcule of the *Masculine*
 “ Seed of a *Man*, a whole Man is lock’d
 “ up, then the several Particles previ-
 “ ously in the *Ovum* are no more than
 “ the first Food to this Stranger; this new
 “ arriv’d Child (who after being fatigued
 “ by so long a Journey, and through so
 “ many difficult, and unaccessible Roads,
 “ when

“ when all those in Company with him
 “ have been so wearied, that they are
 “ left behind and kill’d) has need of such
 “ Refreshment to rouse up his Spirits,
 “ and to make him grow up so as to be-
 “ come a brisk and lively Boy. But if
 “ in the Female *Ovum*, there be such a
 “ Congeries of Particles of different Tex-
 “ tures heap’d up together, as to furnish
 “ the Materials for all those various Sub-
 “ stances of which the Animal Body is
 “ to be compos’d ; is it not more reason-
 “ able to suppose that this Substance only
 “ wants *somewhat* to actuate and enliven
 “ it, and to set all these Particles in such
 “ a Motion, that they may be regulated,
 “ ranged, and set together so as to form
 “ the Lineaments of a Fœtus, so soon as
 “ this Prolifick Virtue is communicated
 “ to them ? ” Thus far Dr. *Blair* ; but I
 believe the Reasons I have given above,
 for the Necessity of the Animalcules en-
 tering into the Egg, will be sufficient to
 change his Opinion, especially since in a
 Letter of the Doctor’s, publish’d in the
Philosophical Transactions, N^o 369. he
 tells us, that Mr. *Philip Miller* of the
 Physick Garden at *Chelsea* did by his
 Advice “ separate the Male Plants of the
 “ Spinage from the Female ; the Conse-
 “ quence was, that the Seeds did swell to
 “ the usual Bigness ; but when he sow’d
 “ it,

“ it, it did not grow afterwards. He
 “ search’d into the Seed, and found it
 “ wanted the *Punctum Vitæ*.

This, in my Opinion, is on my side the
 Question; it answers directly to what I
 have said of the Necessity of the Cock’s
 Tread in the Egg to render it prolifick.

The Doctor then adds, “ That the Female
 “ Embryones might have been impregna-
 “ ted another way, as (Mr. *Miller*) ex-
 “ perimented with twelve Tulips, which
 “ he set by themselves about six or seven
 “ Yards from any other; and as soon as
 “ they blew, he took out the Stamina so
 “ very carefully, that he scatter’d none of
 “ the Dust, and about two Days after-
 “ wards, he saw Bees working on Tulips
 “ in a Bed where he did not take out the
 “ Stamina, and when they came out,
 “ they were loaded with the Dust on
 “ their Bodies and Legs; he saw them fly
 “ into the Tulips where he had taken out
 “ the Stamina, and when they came out,
 “ he went and found they had left behind
 “ them sufficient to impregnate these
 “ Flowers, for they bore good ripe Seed.

This is an Instance of the Necessity of
 this Male-Dust to impregnate the *Uterus*
 of a Flower, and seems to favour my
 System, rather than overthrow it: for Bees
 do, by means of their Trump or Proboscis,
 penetrate into the Female part of Flowers
 when

when they have opportunity of working, as may be observ'd every day; and when this is done, is there any Difficulty to conceive that the Male-Dust can pass or be convey'd into those Parts ?

The Doctor then instances part of a Letter from the same Mr. *Miller*, concerning some Variations in Plants, which happens from the coupling of two different sorts of Plants, as the Cabbage with the Savoy, and the red Cabbage with the white Cabbage, so that the Seeds sav'd and gather'd from any one of them, will produce Varieties; some resembling in a great degree the Mother Plant, others partaking more of the Plant from whence the Male-Dust might come. He observes, that out of a parcel of Savoy Seed, which grew near white and red Cabbages, " He had half red
 " Cabbages, and some white Cabbages, and some Savoy with red Ribs,
 " and some neither one sort nor other,
 " but a mixture of all sorts together
 " in one Plant, which he supposes happen'd by the *Effluvia impregnating*
 " *the Uterus of one another.* This Experiment, (the Doctor observes) " is a most
 " convincing Argument for the *Effluvia*;
 " for did each Grain of the *Farina* enter
 " the Pistillum to its proper *Uterus*, this
 " mongrel Kind would never be produc'd.

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But here I beg leave to dissent from Dr. *Blair's* Opinion, for if the Impregnation of the Female was from the Effluvia of the Male-Seed, we may be sure those Effluvia must be all of one sort, as well as the Bodies those Effluvia proceed from are all of one sort, as the Doctor says, and I should readily come into, if in the whole Scene of Nature I could find *two Likes*; but as that has not yet been discover'd, it is reasonable enough to suppose there is no such thing: and I think this is a sufficient Answer to the Doctor's Objection to the Animalcules entering the *Ovum*, where he says, *That if it was so, the mungrel Kind could not be produced.* But let us suppose, that all the Animalcula in one Male were exactly alike in their State of Animalcula, it will not at all be surprising to find the one different from the other in Feature, in Bulk, &c. when they come to be perfected; for the Female Eggs which receive them, tho' those Eggs are in the same Female, have not all strictly the same proportion of Parts and Juices to nourish the Animalcula they receive; and therefore, the little Animals cannot be equally the same when they come to that Perfection we see them in, when they are excluded the *Matrix*. Besides, so great is the alteration of Parts in the same perfect Animal, from difference

rence of Diet, and change of Method in the way of Life, that a Year or two will sometimes make so great an alteration in the same Man, that he can scarce be known by those who have been so long absent from him.

As for what is mention'd concerning the Cabbage partaking of the Savoy, or the Savoy partaking of the Cabbage, it is no more than what is frequent in Animals of the same Tribe. A Greyhound, for Example, coupling with a Spaniel, will produce a cross Strain partaking of both; these are both of the Dog kind, as the Cabbage and Savoy are of one kind: so that 'tis no wonder they can couple as they do, and produce Varieties, since, I think, I have made it plain, that *no two* Animals, no more than any two of the Animalcula, are strictly alike; and besides that, the Difference of Nourishment given by each respective Egg, for the Support of that *Punctum Vitæ*, or Animalculum each Egg contains, will occasion difference in the Form or Manner of the young Plants or Animals to be produc'd: and this, I think, will be sufficient to support my System of the *Generation of Plants*, against Dr. Blair's Objections.

An Answer to some Objections that have been made against the Perfection in Taste and Flavour in Fruits forced out of their natural Seasons; wherein is set down some Observations relating to the extraordinary Vegetation of Peaches, Vines, Nectarines, Abricots, Plums, Figs, Cherries, and some others which I have rais'd this Spring, 1724. at Vaux-Hall, in Surry.

IN my Monthly Papers for the Improvement of Husbandry and Gardening, I have prescribed a Method for bringing Fruit of any sort to Perfection at any time of the Year; but however plain that Method is laid down, very few have yet attempted to put it in practice, either perhaps from a thought that it would be too Expensive, or that one must wait some Years before the Tree would bear, or else that the Whole was little better than Chimæra; or if it was to be done, yet such forced Fruits would be wanting of their Excellence in Taste and Flavour. For some of these Reasons I guess we find so little perform'd hitherto upon that account, and the Practice of this Art might have been buried still in

Oblivion, if a Gentleman of Worth and Fortune of the *Temple*, whose great Delight is in the discovery of curious and useful Things for the Service of his Country, had not given me an Opportunity of experimenting what I had affirm'd in my Writings; and altho' the Season was advanc'd as far as *Christmas*, he was not yet discouraged in the Undertaking, but resolv'd I should proceed as well as I could. The Air and Soil which we first approv'd of about Town, was at *Vaux-Hall*, where the Effluvia of the River concurring with the Lightness of the Earth, would both help in the Design. This being premis'd, I set to work in such Sort, that in a few days the Frames and Glasses were provided, and I began planting in the *Christmas* Holydays, the Weather then being very mild and open. In this Undertaking I was Fortunate enough to meet with Trees, which had been trained against Walls, and others that were in Pots, and had been brought to a bearing State by the Management of Mr. *Whitmil*, a curious Nursery-Man at *Hoxton*. I planted a whole Frame at once of a considerable Length, having this particular Regard, that none of the small Fibres of the Roots become dry before the Trees were fix'd in the Place where they now grow; and that the Ground
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they were planted in, should immediately be closed to the Roots. I planted every Tree in a Mud prepared with fine Earth and Water, so that the removal of these Trees gave them no Check, neither would I suffer the Heads of the Trees to be pruned at the time of planting, as is usually done by the Gardeners; for as I have mentioned seven or eight Years ago in my Works, when I wrote of the Sap Circulation, these Branches above Ground remaining entire, are the better able to support the Roots of the new planted Tree 'till it has got hold of the Ground, and the Buds begin to open; and then indeed it is necessary to prune the Parts above Ground equal to what has been lost in the Roots by the removal of the Tree; which will be something, however carefully it be taken up. My Plantation being thus order'd, and the Shoots of the Trees being nail'd as close as could be to the Pales, the Horse Dung was apply'd to the Back of the Frame, and the Glasses shut down over the Front; the Consequence was, that the Buds of the Cherries were green five days afterward, and in five days more, the white of the Flower Blossoms appear'd, and many of them were full blown in fifteen Days.

The Abricot, which were of a late sort, flower'd with the Cherries ; and the Anne-Peach, with the early Newington-Peach ; and Newington-Nectarine kept them company, as well as some of the Roses and Gooseberries : but what was most observable, a Plant of the Nutmeg-Peach, which is a very early Fruit, that the Gardener had prun'd in the head before I was aware, did not begin to swell in the Bud till the later Peaches were in full Bloom.

The Plums were in full Bloom in about twenty days after Planting, *i. e.* about the 23d of *January*, and particularly the imperial Plum, which is a large sort, and none of the earliest. The Figs follow'd the Plums in the swelling of their Fruit Buds, which grew to be about two Inches long the first Week in *February*, and the Vines had then shot an Inch, and the Currans about that time first began to shoot. At this time there were Cherries as big as large Pease ; but by an unlucky Blight, which got into the Frame, during my Absence, came to nothing: This I mention, that those Gentlemen who design to follow this Practice, must be very careful how they open any of the Glasses while the Air is unsettled, and be sure never to open them, when there is any Winds blowing from the *South-East*, or
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South-West; for the Tendernefs of the Leaves and Blossoms, whilst they are in the State I speak of, cannot bear the fluttering of the Winds, which bruise their Sap-Vessels. However, about the middle of *February*, there appeared several fine Branches of Grapes upon the Vines, which blossom'd at the end of the Month; the Plants having been brought to bear Fruit in Pots the Year before by Mr. *Benjamin Whitmill* above-mention'd. My Cherries were then (such as were recover'd of the Blight) as large as Pease, and ripen'd the first Week in *March*; and the Plums of the imperial sort, were then above an Inch in length. The Abricots were as big as small Walnuts, and the Peaches were as large as Hazlenuts: Goosberries had then Green Fruit of a good size, and the Currans were answering to them.

From these Observations, one may perceive how suddenly Fruits may be rais'd, and likewise take notice, that besides the Attendance they require in airing them at proper times, the Expence of warming the Back of the Frames with Dung cannot be great, because the Dung, after the Heat has left it, may be sold to the Farmers for very little loss. And, that the Fruit which is produc'd by this means, may be as well tasted as natural Fruit, is
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as evident, since the Trees have the whole Body of Earth to feed from, and there are proper Means to be us'd to give them Air; and again, none of the Steam of the Dung can come at them, and they have share of Heat and Sun enough to ripen them. I should not have written this, but I am willing to give Satisfaction to those Gentlemen who are now preparing to follow this Example the next Winter; and that they may not be impos'd upon, nor led into Error by those who know nothing of the Matter, and if yet they have any Difficulties about this Affair, I shall readily give my Opinion, if they direct to the Publisher of this Treatise.

F I N I S.

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