

delivered on Tuesday 2  
Thursday 4 - to Saturday Co of Mary  
1815. S. W. Con of Am. 15.

1840  
1841

*[Faint, illegible handwriting in cursive script, likely bleed-through from the reverse side of the page.]*

1<sup>st</sup>. Flowers.

2<sup>d</sup>. Joh<sup>n</sup> Conrad.

Having given a concise history of Botany by means of the biography of those who have distinguished themselves in the science. We shall now commence with examination of the anatomy & Physiology of Plants. The Science of Botany may be compared to a ~~circle~~ <sup>circle</sup>, begin where you will, and if pursued will bring you to the point from which you set out. Linnæus has commenced the subject with the delimitation of the P. supposing it to be already grown, but we propose investigating <sup>first</sup> the seed. We will unfold its structure & economy, plant it ~~in the ground~~ and watch its swelling, its protrusion from the ground and its gradual growth into a perfect plant, and then we will pull it up and describe its root, its branches and every part in succession, until we come to the seed again or the same point at which we set out.

In the first place what is that body we call a seed. It possesses all the qualities of matter but it is very different from a pebble, which if we break seems stony & alike, or throw it upon the ground and it there remain motionless, excepting when moved by external force, but break open the bean and you observe its coats its lobes filled with oil

*[Faint, illegible handwriting at the top of the page]*

*[A large section of very faint, illegible handwriting, possibly bleed-through from the reverse side]*

*[Faint handwriting at the bottom of the page, including a signature and date]*

filled with vessels, we find an internal adjustment  
of the particles so corresponding with each other as  
to become a little system, perfect in itself.

Throw this into the ground and by the aid of heat  
and moisture, it will swell and evolve itself  
into the perfect plants, capable of producing "seed"  
"after its kind". The organization, which  
gives it this power, must then be curious &  
it is this we would now attempt to unfold.



(April 30. 1815) 5  
Spencer 5<sup>th</sup>

## Of the Seed

Few know what a seed is: but reflect upon it and your reflection may rise to astonishment. 'Tis a living being. Throw it into the earth & it swells & from being a mere point by a power, inherent in a wonderful conformation, it will soon flourish a luxuriant plant, which will be capable of producing "seed after its kind"

I had rather become acquainted with the structure of a single seed, than all the barbarous terms of the whole host of Botanists. The one trammels the understanding & burdens to little purpose; The other brings home to the mind the pleasing & sublime idea that it did not make itself

We begin with the external parts of the Seed. and shall describe the Milium & the <sup>Apillus</sup> Inleguments or Tunicis. 1<sup>st</sup> Examine a Pea in its pericarpium or Pod and you find it connected to the sutures by a little stalk which is the medium of nutriment to the growing seed. Break off the Pea and you will see a scar of excretion which is called the Helum or eye. which is of great use to the perfected seed, altho' it has been ~~the~~ <sup>when</sup> growing - Forms - Colour

W  
9  
(April 20. 1815)  
7-25

of the law

You know what a case is. But what upon  
it and your reflection may see to the  
a living being. Then it cuts the earth & it comes  
being a man's point by a power, without in a number  
falling confessions, it will soon flourish a lux-  
uriant plant, which will be capable of producing  
"less often it rains"

But what becomes acquainted with the  
structure of a single case, then all the laborious terms  
of the whole best of the world. The one triumphs the  
understanding & another a better purpose; the other brings  
down to the mind the feeling of a business order. At  
it did not make itself

The paper with the extreme part of the law  
and there describe the William & the independence  
a James. It is necessary a law in all circumstances or  
But one year find it connected with the nature of  
a little that which is the nature of the instrument  
the primary work. That of the law and you will  
a sense of control which is called the William & you  
which is a paper use to the paper and see with other  
William & you



7

Near the Hilum is a part called Calyptra which in the bean is shaped like the heart on the playing card. In some seeds the C is opposite the H.

Near the Hilum is a foramen or hole called the Foramina Hili, not distinguishable in all seeds but perhaps present in all. Was first observed by Grew who supposed it to be the point where the moisture was absorbed, which opinion was received & entertained by his successors and confirmed by their experiments particularly Mr Curtis Botanist of London who took C beans & carefully weighed them and also C other beans and varnish the foramina Hili. He then placed them all in the same situation where they operated upon by the same causes, and he found that the C unvarnished beans had swelled most, but we do not think this conclusion because inasmuch as the end of the radicle, soon to be mentioned, is directly under the Foramina Hili, the varnish might have prevented the action of the air and consequently the period of the swelling of the seed. The action might only have been delayed longer in the varnished than in the unvarnished.

8  
 than the album is a part called album  
 which in the beam is shaped like the heart on the  
 flying end. In some seeds the P is opposite the  
 H.

than the album is a form on or has call  
 the album H. is not distinguishable in all seeds  
 but perhaps present in all. When first observed by Brown  
 the supposed is to the point where the  
 was observed which point was necessary data  
 taken by his microscope and compared with  
 experiment particularly the Centre of the  
 the took I mean & carefully compared them  
 I other beams and named the form H. H.  
 this place there all in the same direction  
 they operated upon by the same cause, and in  
 found that the I measured beam had travelled  
 most, but we do not think this conclusion beams  
 measured as the end of the scale, soon to the  
 thing is shortly under the microscope H. H.  
 weight have presented the action of the air and  
 consequently the power of the stretching of the  
 the other might only have been observed  
 paper in the microscope than in the microscope

It however clearly proves that the Foramen H.<sup>9</sup>  
is not the only medium of absorption of water,  
because these various swelled only in a less  
degree — Square the Bean after soaking.

### Of the Integuments.

The Arillus. Integuments or Tunics — The Testa  
of internal Membrane

Testa or shell is the membrane which contains  
the fluid matter of the seed before it was perfected, and  
is essential because never wanting or the only  
membrane which a seed receives that denomination

The Testa is mostly membranaceous — pellucid as  
in rice — opaque — chalcaceous like paper —  
Coriaceous — like L. — Fleehy — Spongy — bones  
or stone like — It may be one celled & two. —

The Internal membrane is never wanting  
and is membranaceous & subspongy — All the  
The Test. Inter. appear to be made up of cells  
of various sizes, various compacted.

It is not the only instance of such a nature  
because that which is called a life  
is not the only instance of such a nature  
It is not the only instance of such a nature

After Interments.

The Order. Interments or Burials  
of the Order

The Order is not a life  
The Order is not a life  
The Order is not a life  
The Order is not a life

The Order is not a life  
The Order is not a life  
The Order is not a life  
The Order is not a life

The Order is not a life  
The Order is not a life  
The Order is not a life  
The Order is not a life

The Epidermis of Scalp Skin or Cuticle invest  
the substance of the seed and is also never wanting.  
All animated beings from man to the humblest  
plant that bears a seed is covered by a cuticle,  
which is similar in its uses & perhaps its structure.  
In man it is composed of scales, like those of a  
fish, & is that which is raised by the water in a  
blister. The Cuticle of plants from whatever parts it  
may come appear before my glass to be made up  
of cells of continuity.

The Cuticle is membranaceous in most plants  
by gummy or mucilaginous in the quince (Pyrus  
Cydonia) and perhaps in the Linum tomentosum  
or Flax, but this may be only investment of the true  
cuticle.

Excuse from the imputation of pedantry because  
we think you cannot be too familiarized to the hard  
names refresh them in our memory for we forget  
them in a season.

The substance of the book is also very interesting  
 The number being four more to the number  
 than the book is named by a title  
 which is number on its cover & perhaps its title  
 is more or less compared to the title, like those of  
 fact, but that title is named by the cover and  
 title. The title of the book is not printed  
 very clear after the first page, to be made up  
 of cells of text.

The title is numbered in most places  
 by giving a number to each page in the space (from  
 the first page) and also in the same position  
 as that, but this may be only a number of the  
 title.

From the introduction of printing books  
 we think you cannot be the foundation of the book  
 names of the title in your country for the first  
 time in a book.

The Nut or Seed properly so called is composed of  
4 parts. 1<sup>st</sup> Albumen - 2<sup>d</sup> Vitellus. 3 Cotyledons  
& 4<sup>th</sup> Embryons.

1<sup>st</sup> Albumen - -

Here we may remark that the eggs of birds &  
the seed of vegetables are essentially the same in  
their structure & economy. After breaking the shell  
of an egg we find a strong membrane investing  
the other contents of the shell. Immediately within  
this membrane is the white, consisting of two in  
their own proper membranes. The Yolk is known  
to you all and it likewise has its membranes  
which uniting with the other membranes forms  
at the poles of the egg what are called Calyx -  
This union serves to steady all the parts and keep  
them in their relative position & to bring the punctum  
vitae or cicatriculae always uppermost. Upon the  
yolk is a small circular body, whitish, which is  
the Punctum vitae, point of life, the point, where by  
incubation, life is first perceived. In the blunt  
end of the egg is a cavity for air. By heat the  
punctum vitae begins to pulsate & the other parts.

The water being purified & called in comparison of  
 Affected. 11 Albumen. 2 Vitellus. 3 Vitellina  
 & 4th Vitellina.

11 Albumen  
 has an easy remnant that the eggs of birds &  
 a sort of vegetable are essentially the same in  
 their structure & economy. After meeting the  
 few of the former a strong resemblance existing  
 in the other contents of the shell. Fundamentally  
 the membrane is the white, containing 2 or 3 in  
 their own proper membranes. The white is  
 layers all and it likewise has its membranes  
 which meeting with the other membranes forms  
 the part of the egg which are called layers.  
 This human error to state see the part and  
 them in their relative position & to bring the  
 into a concentric arrangement. After the  
 yolk is a small circular body, which is  
 the membrane of the part first, which is  
 surrounded by the part first. In the  
 case of the egg is exactly for air. By this the  
 part of the egg is subject to the part.



other parts contained in the shell become in time arranged into a chicken. The vessels of the vitellula extend themselves thro' the other parts & go to the little sack of air in the large end of the egg. This sack contains oxygen & as the chick grows the sack enlarges, the shell being porous to the air. We shall soon see how well these parts agree with the seed of plants.

Under the integuments, of which we have spoken, in the lilies, Grasses Palms &c. (Corn Tea Maise) is a substance called Albumen, which is similar, in its sensible as well as chemical properties, to the white of an egg & so like is it that it is designated by the same name (Albumen). In many plants it is wanting & therefore cannot be so necessary as the white of the egg. The Vitellus or Yolk in the seed is placed between the Albumen & the Embryon and it is entirely exhausted, when the embryo grows, which proves its importance when it exists, but is often wanted than seen, & it is best observed in the imperfect seeds as the Maise. Some dispute has arisen whether the vitellus be distinct from the cotyledons. The Albumen & Vitellus never rise with the <sup>little plant</sup> ~~germinating~~ never become leaves, as we shall tell you another part does which will be confounded with it.

other parts contained in the tree become no more  
 changed into a chiton. The vessels of the  
 arteries themselves thro' the other parts of the  
 rest of an in the large end of the egg. The  
 from oxygen & on the other hand from the  
 the cells being furnished with air. The  
 to have more life parts appear with the  
 than the integuments, & finally in some  
 in the little paper below. (See the  
 a certain order albumen, which is  
 visible in some of the figures & the  
 egg & is the same as is described by  
 name albumen. In many parts it is  
 larger than in the rest of the egg  
 the albumen is with a fluid between  
 the albumen & the embryo, and it is  
 when the embryo grows which forms the  
 albumen is not, but is often wanted from  
 it that is shown in the figures & is the  
 from the parts that are under the  
 distinct from the albumen. The albumen  
 from the rest of the albumen, and  
 albumen, as we shall see from the  
 which will be compared with it.

## Cotyledons. -

The next part is the cotyledons, which is a farinaceous substance which constitutes the nutritive part of the seed. Many plants have but one. Most have two and Linnæus Gortner & Jussieu that there are many which really have none as the mosses, which is disputed by others who say, that the Vitellus of the mosses is a cotyledon, but the V. is always absorbed in germination & never becomes seminal leaves.

Jussieu has derived the primary divisions of his system from this circumstance.

Which are. 1<sup>st</sup> Acotyledonous. Plant

2. Monocotyledonous. —

3. Dicotyledonous —

and some say Polycotyledonous. but Jussieu refers all such plants to the Dicotyledonous —

Colour — white. yellow in siliques & legumes —  
Sarcocolla Scorzonera. livid or leaden — Purplish in  
Ridens — Amaranthus — blood red

Taste. almond — a. Opuntia — Peach Persea  
sweetish — aromatic. many —

*Stylidium*

The most part is the *stylidium*, which is a few  
necesses *stylidium* which consists the *stylidium* part  
of the *stylidium*. Many plants have but one. That have  
two and *stylidium* *stylidium* *stylidium* that there are  
many which really have more as the *stylidium*, which  
is *stylidium* by others who say the *stylidium*  
the *stylidium* is a *stylidium*, but the *stylidium* is always  
characterized in *stylidium* *stylidium* *stylidium* *stylidium*

*stylidium* *stylidium* *stylidium* *stylidium*  
of this *stylidium* from the *stylidium*.  
that *stylidium* are *stylidium* *stylidium* *stylidium* *stylidium*  
— *stylidium* *stylidium* *stylidium* *stylidium* —  
— *stylidium* *stylidium* *stylidium* *stylidium* —  
and some say *stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*  
— *stylidium* *stylidium* *stylidium* *stylidium* —

*stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*  
*stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*  
*stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*  
*stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*  
*stylidium* *stylidium* *stylidium* *stylidium* *stylidium* *stylidium*

## Vicia Faba.

As an example of the seed we shall take the English Bean or French Horse B. as one of the largest seeds which display clearly the different parts. On it we find the Testa which consists of three parts, as our glasses show. First the cuticle? 2<sup>d</sup> a membrane corresponding with the Cortex & 3<sup>d</sup> with the luteus or inner part of the brank hereafter to be mentioned.

Under these are the cotyledons or seed lobes cut thro' the funiculus and the bean will separate in to two part or two lobes, which are the cotyledons they are white in the Bean & most seeds, altho' there are some which are pale. I never saw any that were much coloured. The Col.<sup>s</sup> of the Bean are eaten by no insect. The lobes in different seeds are variously applied. In the Bean they are each concave & smooth & plain in; others waned irregular & after twisted.

Grew was probably much deceived by his glass when he says that the substance of the cotyledon was radiated, and that these radiated lines run from the centre to the circumference are were composed of cells. By looking at the seed lobes with my glass I can see the radiated lines but I can make the centre in any part, so I can with my fingers any<sup>thg</sup>.

Green Lake

Shaw & Cut transversely

(See the drawing.) That part of the Embryo or  
which is to become the leaves & stem. Plumula

Shave away part of the lobe carefully from  
the end of the Bean which contains the radicle and  
you may discover small lines & by shaving very  
carefully with reference to these lines you will be  
enabled to trace them thro' out the lobe & you  
will find about 4 or 5 main branches with  
numerous smaller ones. They arise from the  
point of the union of the cotyledons & ramify thro'  
them variously and frequently uniting. Cut  
the lobe transversely and you find the line of  
separation and the cut ends of the vessels in a  
curved line of dots. These vessels are called the  
Seminal vessels from existing in the Semen or seed.  
This seed correspond with the Bean, and what  
we have said applies in a great measure to all  
(Drawing. Almond & Bean.)

Between the Cotyledons is a small body  
called the Embryo, called by Linnaeus the Coraculum  
or little heart. It is composed most frequently  
of two parts, always of the radicle or little root  
and the Plumula which is wanting in the Tropaeol  
When there is a neck it is called Scapus.

(Drawings of the Plumule & Scapus) —

(See the following)

There are many parts of the body carefully examined  
to see if the brain which contains the vessels  
forming the nerves is not injured by any  
cause which might destroy the brain  
or the nerves themselves. It is not  
the purpose of this experiment to destroy  
the vessels of the brain but to destroy  
the vessels of the nerves. The vessels of the  
brain are called arteries and the vessels of the  
nerves are called nerves. The vessels of the  
brain are formed from arteries in the lower part  
of the neck and with the brain, the vessels  
of the nerves are formed in a great measure  
from the same source.

(See the following)

The vessels of the brain are formed from  
arteries which are called arteries. The  
vessels of the nerves are formed from  
arteries which are called nerves. The  
vessels of the brain are formed from  
arteries which are called arteries. The  
vessels of the nerves are formed from  
arteries which are called nerves.



The Plumula is that part of the Embryon or Cor<sup>m</sup> which is to become the leaves & stem. Plumula means a feather, is the diminutive of Plume. Gertner calls it the first bud of the new plant. Grew who called it plume was followed by Linnæus. (Plumula)

In some P. the Plume is so hidden that it can be scarcely seen: in other more or less flattened evident & usually much flattened or compressed. The P. of the Bean is composed of two leaves, of the Almond the (*Amigdalus communis*) of many.

(Show the drawing, & point out all the parts and name them)

This part of the Plant called the Plumula aspires after the air and in germinating pushes thro' the ground. When the seed germinates, moisture is introduced or imbibed by the little hole or foramen Hili which we said was directly over the end of the radicle.

The plume is most always wanting in the monocotyledonous seeds. - It may be simple linear. - Curved - spiral - compound. digitate. &c. -

The Scapus is very frequently absent from the coraculum. It is a mere neck, between the Plum and the Radicle. Linnæus says nothing about it. -

The Mountain is that part of the ...  
which is to be seen ...  
... of ...  
... is the ...  
... of ...  
... of ...

The Mountain is to be seen ...  
... of ...  
... of ...  
... of ...  
... of ...

The Mountain is to be seen ...  
... of ...  
... of ...  
... of ...  
... of ...

The Mountain is to be seen ...  
... of ...  
... of ...  
... of ...  
... of ...

The Mountain is to be seen ...  
... of ...  
... of ...  
... of ...  
... of ...

## The Radicle or Rootlet.

The Radicle or little root is found even on those plants where embryo is entirely wanting. Gartner found by examination of 1054 seeds I conclude that they all have a Radicle simplex (sim. R.) only one but in the seeds of (Lecale Cereale) Rye. Triticum wheat & Hordeum Barley, there are 3. 4. & 5 - C - It may be a mere point. tubercle - conic - tapering cylindrical. Fusiform - Capitate, straight & curved. — It is very long when longer than the cotyledons - aqualis - short or very in proportion to the Cotyl.!

By examining the Plumula & Radicle we find it covered by a cuticle & we find membranes corresponding with the coats - The Pads originate in the seed I and we shall see them perfect in the full grown seed

Thus you see how nearly the seed resembles the egg. The seeds according to Spallanzani exist in the pericarpium before the plant has flowered as he ascertained in the Spartium Junceum, Brown & it is sometimes after the flower has fallen that before the Pericarpium is distinct.



When the seed is perfected it falls to the ground  
& is hurried by the rains. It is now a perfect system  
or whole like the egg and not a dead substance  
like a pebble or a crystal, but a body regularly  
organized & harmoniously arranged into a system of vessels  
glands & membranes, and in a state of fitness to be acted  
upon by certain external agents. It is a little machine  
capable and liable to be set in motion. What then  
are the agents, which turn the wheel of life or raise  
the vegetable ens of being from its dormant state?  
See answer — These agents are Fine Air &  
Water.

Place a living seed or egg of a Plant in the  
ground, where there is a proper degree of moisture & not far  
from the air. By the influence of the Potent agent  
Fire or Heat upon the Coraculum, the punctum pitae  
or that point where life begins to show itself, will  
begin to swell. The vessels will permeate the co-  
tyledons (See drawing) will take on their proper  
functions, which are to nourish the little embryo.  
The cotyledons are a deposite or store house of farinaceous  
or mucilaginous matter, which the seminal vessels are  
enabled to absorb & carry to the coraculum, first converting  
it into a milky fluid, which contains much sugar. The  
first fermentation proceeds in the seed in this substance  
and it is this which is performed in the making of

When the case is perfect at all, a perfect  
is required by the case. It is now a perfect  
as well as the case and a clear  
like a bubble or a crystal, but a body regularly  
organized & harmoniously arranged in perfect  
form & substance, and in a state of perfect  
order by certain natural agents. It is a little  
capable and liable to be set in motion, but this  
is the agent, which from the order of its course  
is regular and of long duration. It is  
the common cause of these agents and their  
order.

There is a very great deal of  
ground, where there is a perfect degree of  
from the air. By the influence of the  
and a heat upon the substance the  
a heat and when the degree is  
higher to well. The effect is  
the substance will take on this  
function, which one to which the  
the substance are a deposit or the  
or substance and when the  
order to which a copy of the  
it is the case, which contains  
and substance in the  
order in the substance

making of malt. All animals are their first feed length  
milk. The Milk is carried <sup>in the seminal vessels</sup> directly to the Coraculum by  
~~the seminal vessels~~ which unites with the lobes by their extremity, and the  
Radicle pushes forward directly to the Coraculum until it  
beats the integuments. The Foramen Hilii is at the  
very end of the Radicle & the integuments of the Bean  
almost always first break there. The Foramen en-  
larges, in a manner analogous to the enlarging of  
the air sack in the blunter end of the egg. The radicle  
invariably pushes down into the ground in quest of its  
peculiar nutriment. The Root always will tend  
downwards and as in this case, if the bean is placed  
the wrong end up it will turn in a circle & push  
down. Linnæus proved that the <sup>branches</sup> roots of trees  
placed in the ground would become root & the  
roots in the air would bear leaves & flowers -  
we should have supposed that the root would  
in this case become the plume & the plume the  
root but here you see that they both have  
turned in order to assume their proper places.  
The Plume by the same power emerges from the ground  
in quest of its peculiar element, & we may say aliment, the  
air. Thus you see the use of the cotyledons, that of  
feeding the infantile plant with milk. But this is  
by no means to only one.

making friends. All animals are less free for light  
work. The milk is carried directly to the granary by  
the animal itself, and the labor of the animal is  
lessened by the fact that the animal is not  
burdened with the weight of the milk. The animal  
is not burdened with the weight of the milk, and  
the labor is lessened by the fact that the animal  
is not burdened with the weight of the milk. The  
animal is not burdened with the weight of the milk,  
and the labor is lessened by the fact that the  
animal is not burdened with the weight of the milk.  
The animal is not burdened with the weight of the  
milk, and the labor is lessened by the fact that  
the animal is not burdened with the weight of the  
milk. The animal is not burdened with the weight  
of the milk, and the labor is lessened by the fact  
that the animal is not burdened with the weight  
of the milk. The animal is not burdened with the  
weight of the milk, and the labor is lessened by  
the fact that the animal is not burdened with the  
weight of the milk. The animal is not burdened  
with the weight of the milk, and the labor is  
lessened by the fact that the animal is not  
burdened with the weight of the milk. The animal  
is not burdened with the weight of the milk, and  
the labor is lessened by the fact that the animal  
is not burdened with the weight of the milk.



They continue adherent to the infantile plant until all the Farina store of Farinaceous or nutritive matter is exhausted, when it falls off and rots affording a manure. In some plants the cotyledons <sup>rise</sup> with the embryo as in the bean & serve as protection and support. They grow and become green & serve the as lungs to the little plant, before it can use its own. The vegetable juices are brought up thro' the Root and are carried by the seminal vessels, which you have seen, & exposed upon the upper surface of the leaf, where they undergo a change by exposure to the atmosphere & then return by the lower side of the leaf to the Plumula for its growth and increase. When the cotyledons are thus grown they are called seminal leaves & they are various in different vegetables, but constant in the species of plants.

As soon as the proper leaves of the plant are suited to their office, the seminal leaves become exhausted, shrivel up and fall off. Then the little plant is weaned and can go alone.

The colour of the coraculum is nearly white in almost all plants, until it is exposed to the air when it takes the livery of the herbage of which covers the fields. The Name of the

They continue attached to the inflexible plant  
and all the former state of formation or structure  
matter is preserved, when it falls off and is  
renewed. In some plants the epidermis  
is proper on the stem of the former formation and  
supplies. They grow and become green & serve the  
as long as the little plant, when it can no longer  
the vegetable juices are brought up to the roots  
and are carried by the tumour vessels, which  
you have seen & appear upon the upper surface  
of the leaf, when they undergo a change by exposure  
to the atmosphere of their return by the lower side  
of the leaf to the plant for its growth and  
increase. When the epidermis on the former  
leaf is called tumour leaves they are common in  
different vegetables, but constant in the species of plants.  
As soon as the proper leaves of the plant  
appear in their office, the tumour leaves become ex-  
hausted, dried up and fall off. When the little plant  
is grown and can go alone.

The colour of the tumour is nearly white  
in almost all plants, and it is equal to the  
colour of the leaves of the vegetable of which  
it is the tumour. The tumour is the

Seed  
J. S. May 3<sup>d</sup>  
1815

The plumage of the *Nelumbium* is green; which a curious anomaly, as we find few exceptions to the general rule that part of animals & particularly plants are colourless excepting when exposed to the air & light.

(Recapitulate the parts again and take leave of them for this season).

Plumula is the embryon plant & it has been supposed that each embryon contains the flower & the seed and that these seeds, altho' scarcely distinguishable even with glass, contain also others rolled up in them and that the huge tree is sketched out in miniature in the minutest seed. Darwin alluding to it says.

Lo! in each seed within the tender rind,  
Life's golden thread in endless circles wind;  
None within more the lucid vesicles are rolled,  
And as they burst, the living flame unfold,  
The pulpy acorn ere it swells contains,  
The oak's part branched in its milky veins:  
Each ravel'd bud fine film & fibre line,  
Traced with nice pencil on the small design.  
Again he says  
Of grain within grain, successive harvest dwell,  
And bunched forests, shambles in a shell.

