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AN INVESTIGATION

OF

THE PROPERTIES

OF THE

BIGNONIA CATALPA

OF

LINNÆUS.

BY ROBERT HOLMES,

OF VIRGINIA:

HONORARY MEMBER OF THE PHILADELPHIA MEDICAL SOCIETY.

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AN INAUGURAL

EXPERIMENTAL INQUIRY,

FOR

THE DEGREE

OF

DOCTOR OF MEDICINE;

SUBMITTED

TO THE EXAMINATION

OF THE

REVEREND JOHN ANDREWS, S. T. P. PROVOST,

(PRO TEMPORE;)

THE

TRUSTEES, AND MEDICAL PROFESSORS

OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE 8th DAY OF JUNE, 1803.

Dr. J. Woodhouse with the
kind compliments of his friend
The Author

TO CASPAR WISTAR, M. D.

ADJUNCT PROFESSOR OF ANATOMY, SURGERY, &c. IN THE UNIVERSITY OF PENNSYLVANIA.

DEAR SIR,

GRATITUDE and respect are due from every individual, to him who extends the bounds of that knowledge so useful to the community. Thousands are acquainted with your endeavours for that noble purpose. Permit me, with many, to express the high esteem which I entertain for them; and, be assured, sir, that a recollection of the many favours received from you will ever warm the breast of your affectionate friend.

That you may experience, in future, that plenitude of health and happiness which you have so ably contributed to confer upon others, and exercise those talents so happily calculated for the erection of the mind of youth, is the wish of your sincere friend

And grateful Pupil,

ROBERT HOLMES.

TO JAMES T. HUBARD, M. D.

OF PETERSBURG, VIRGINIA.

DEAR SIR,

IN dedicating to you, this imperfect Essay, I am impressed with a desire to express the high esteem which I entertain for your person and distinguished abilities; and to return my acknowledgments for the many valuable instructions which I received from you.

With sincere wishes for your prosperity and happiness in life,

I have the honour of being, Sir,

Your friend and

Former Pupil,

THE AUTHOR.

INTRODUCTION.

THE investigation of plants, in order to acquire an accurate knowledge of their properties, deserves the attention of every inquisitive mind. Not merely as a gratification to the curious, but as a source of knowledge which admits of application to many important purposes of life.

Although medical utility may be considered the most important object of such an investigation, yet the advantages do not cease here; for they are almost equally interesting to the cultivation of the useful arts.

In the present investigation, I have endeavoured to become acquainted with the properties of one of the most distinguished plants in the vegetable kingdom. It is to me somewhat singular, that a plant so noted for its beauty, so much admired as a domestic ornament, and, above all, one which has been considered as possessing powerful qualities, should so

long have escaped the attention of all the writers on Materia Medica.

As there is no diversity of sentiment upon this subject, it cannot be expected that I am swayed by any favourite hypothesis ; but on the contrary, those who do me the honour of perusing it, will grant at least that candour was kept in view.

Although these experiments were made with accuracy, and some of them frequently repeated, yet I view them as remaining in a crude and imperfect state ; and as such I present them, with all the diffidence natural to a youth in his first attempt to offer a production to the public eye.

But if I should merely clear the path for the man of experience, or the youth of abilities, with sufficient time to do justice according to the merit of the subject, my intentions will be satisfactorily fulfilled.

NATURAL HISTORY

OF

THE CATALPA.

I. ITS BOTANICAL ARRANGEMENT.

LINNÆUS places the genus Bignonia in the class Didynamia, and second order, Angiospermia, in his sexual system; and in his natural method, he ranks it under the fortieth order, *Personata.*

This excellent naturalist gives the following as a generical description. Bignonia. "Calix quinquified and cup form. The corolla bell shaped at the throat, five cleft, and bellied underneath. The siliqua is bilocular; and the seeds have membranous wings."

But Mr. De Jussieu, and other eminent botanists, have thought proper to divide the genus Bignonia into several different genera. According to the author just mentioned, the Bigonia Catalpa, and the Bignonia Longissima, constitute a distinct genus, by the name of Catalpa.

Walter in his Flora Caroliniana, denominates the first of these vegetables Catalpa Bignonioides, and refers it to the class Diandria, and the order Mono-

gynia of the sexual system, which is the proper place for this plant, as will appear from the fructification. The last mentioned of these plants is the subject of the present investigation.

OF THE TREE IN GENERAL.

The Catalpa is a native of Carolina and Virginia; and according to Linnæus, of Japan and the Bahama Islands. It is in general a small tree, and never arrives to a very large size. Catesby observes,* that it seldom rises higher than twenty-three feet; but I have frequently seen it much higher than this, and I believe it is generally the case, when it grows in a rich soil. The bark of the young trees is very smooth, and of an ash colour; but as they grow old, it becomes sulcated. These furrows, however, are not very deep. The epidermis, or external bark of the young shoots, has a large number of small excrescences, resembling very much the elder. The cortex differs from that of the large trees, in being of a green colour. The Catalpa contains a large portion of pith, which, in the young shoots is remarkable; and when broken, emits a disagreeable odour. The bark of the large trunk, when dry, breaks short and smooth.

The branches are not very numerous, but irregular and crooked. They are adorned with heart shaped leaves, of five or six inches in length, and almost as broad, placed by threes. Catesby

* Natural History of Carolina.

observes that they sometimes arrive to the size of ten inches in width. The superior surface is tolerably smooth, and of a beautiful green colour; the inferior is lighter and ribbed. They grow upon peduncles or foot-stalks, about three inches in length. They drop tolerable early in autumn.

About the 15th of June, in the middle states, it produces in pannicles, near the end of the branches, tubulous white flowers, resembling those of the common fox glove, only variegated with a few reddish purple spots, and yellow streaks on the inside. The Calix is of a copper colour.

The flowers are succeeded by roundish pods, about the thickness of a person's finger, and about fourteen inches in length. These pods, when ripe, open and display a great number of winged seeds, lying over each other somewhat like the scales of fish, attached to a stem within the pod. These likewise grow upon footstalks, about the length of a man's finger.

The Catalpa deserves a place in all curious shrubberies, as during the summer season, no tree makes a more beautiful appearance. Catesby, in his natural history of Carolina, gives a most excellent drawing of it, with the bird called the Bastard Baltimore, which he says is remarkably fond of perching on it.

OF THE FRUCTIFICATION.

The Calix has but one leaf, erect, cup formed, with five clefts.

The Corolla has one petal, belled. The tube very small, the length of the calix. The throat very long, bellied beneath, bell-oblong. The border is divided into five parts; the two divisions reflected; the inferior ones expanded.

There are five Filaments, awled, shorter than the corolla, of which two only are fertile, or furnished with anthers; the other three are infertile. The anthers are reflected, oblong as if doubled.

Pistil. Germ oblong. Style thread-formed with the situation and form of the stamens. Stigmata headed.

Perianthium. Two celled, two volved.

The seeds are numerous, imbricated, compressed membrane, winged on both sides.

ANALYSIS OF THE BARK OF THE CATALPA.

It may be necessary for me to observe, that the bark which was made use of in the following experiments, was obtained from different parts of the tree, and at different times. One parcel was taken from the body, adjudged to be twenty inches in diameter. A second was taken from the smaller stems and limbs, varying from one to three inches in diameter. They were treated in the following manner.

I. DISTILLATION.

Six ounces of the bark, of the first parcel, coarsely pulverised, were put into a glass vessel, upon which one pint of clear rain water was poured, and kept well stopped. After macerating twenty-four hours, they were subjected to the heat of Argand's lamp, in a glass retort with a receiver adapted.

Distillation being carried on for some time, a quantity of transparent fluid collected in the receiver. Its colour was an agreeable yellow; its taste bitter, with a peculiar aromatic odour.

It turned the blue vegetable colours to a red, and formed a black one with the solution of the oxy-sulphate of iron.

Result. Gallic acid.

II. DECOCTION.

Eight pints of rain water were poured upon two pounds of the recent bark, and boiled in a close ves-

sel, until it was reduced to half the quantity. The liquor was of a brown colour, intensely bitter, and somewhat astringent to the taste; possessing an unpleasant aromatic smell. It produced a black colour, with the solution of iron, and changed the tincture of litmus to a red.

Analysis. Four pints of this decoction afforded by evaporation, six drams and two scruples of a dark brown gummi-resinous extract. To four drams of this extract, four ounces of alcohol were added. It took up nearly three scruples; the spirit was bitter and of a brown colour. I then added to this spirituous solution nearly six times its quantity of distilled water, and in a short time a precipitation was gradually effected, with a flaky appearance, inclining rather to a brown colour. This being separated by the filter and dried, weighed eighteen grains.

A portion of this resin was re-dissolved, to which I added the nitrate of silver. A white colour was produced, succeeded by a precipitation, which was insoluble in water. From this circumstance I concluded that the solution contained muriatic acid.

The fluid which passed the filter was evaporated. During which process a curd-like substance was seen floating near the bottom of the vessel, but too small in quantity to induce me to filter a second time. The evaporation being accomplished, I obtained nine scruples of a gummi-mucus substance. Equal portions of which I put into four wine glasses, to which I added equal quantities of water, and as soon as a solution was effected, I treated them as follows:

To the first, the prussiate of lime was added, it produced a muddy green colour. Paper stained with the tincture of litmus, was dipped in the mixture; but no alteration in the colour took place.

To the second I added the nitrate of silver; the same occurrence took place as with the resin.

To the third the tincture of galls was added; a dark brown colour was formed. From this I concluded that iron was present.

The tincture of litmus was added to the fourth; the mixture was changed to a red.

The bark after being dried, was almost perfectly insipid.

Result.	Fecula, nearly	2 scruples.
	Resin,	1
	Gum,	2
	Gummi-mucus,	9
	Iron and muriatic acid.	

III. OF THE INFUSION WITH HOT WATER.

Four pints of boiling water were poured upon four ounces of the bark, well pulverised. In twenty-four hours it was decanted and filtered, and a second portion added. In this manner four infusions were made, with this difference, the third was suffered to remain thirty-six, and the fourth forty-eight hours, before decantation.

The first acquired a very bitter taste, an aromatic smell, and a light brown colour. It changed the tincture of litmus to a red, and formed a green colour with the solution of the oxy-sulphate of iron.

The properties of the second infusion were similar to those of the first, differing only in degree and quantity.

The bitter quality of the third was scarcely perceptible to the taste. It possessed no astringency, neither had it any effect upon the colour of litmus.

The water of the fourth was not altered.

Analysis. Two pints of each of these infusions were evaporated separately.

The first afforded three drams of a brown extract. The second gave out eighteen grains of a similar extract. From the third I obtained three grains of a feculent substance; and from the fourth I obtained nothing. When nearly half of the first portion had evaporated, it had deposited about thirty grains of a feculent substance.

To the extract obtained from the first portion, four ounces of alcohol were added, and it dissolved three scruples. The spirit acquired a bitter taste, and a beautiful yellow colour.

To a portion of this solution, the nitrate of silver was added; a milky colour was formed, but no precipitation ensued.

To another portion I added the gallic tincture, a brown colour was produced. Distilled water was then added to the remaining solution, as in experiment II. it was rendered very turbid, but no precipitation followed. I evaporated it until only half its quantity remained; when upon the addition of a little more water, a substance inclining to a brown colour, with a feculent appearance, was gradually precipitated. This

being separated by the filter, and dried, weighed nine grains. It was readily soluble in spirit and a large quantity of water.

The fluid which passed the filter was again exposed to evaporate. When completed, I obtained two scruples and a half of gummi-mucus matter.

This gummi-mucus matter was dissolved and tested by the following substances :

To a portion of it I added the nitrate of silver. A white colour was produced as before. Thus I concluded, that the extract obtained by infusion as well as that by decoction, contained muriatic acid.

The prussiate of lime produced no alteration ; it changed the tincture of litmus to a red. And by the addition of the gallic tincture, the colour of the mixture was but slightly altered.

The substance which remained after the action of the spirit, was bitter, and of a dark colour. It might be drawn into a number of filaments of considerable length.

Result.	Fecula,	1 1-2 scruples.
	Resin,	1-2
	Gum,	6
	Gummi-mucus,	2
	Iron and amuriate.	

IV. TINCTURE WITH ALCOHOL.

The Bark which had thus been repeatedly infused in boiling water, was dried, to which eight ounces of alcohol were added. After remaining eight days, with frequent agitation, it was examined. It had

contracted a considerable degree of bitterness, and a yellow colour. Paper, stained with the tincture of litmus, suffered to remain in it some time, was not altered in its colour; neither was it affected by the addition of the martial solution.

Some distilled water being added to this tincture, a flocculent precipitate gradually ensued. Its colour was yellow, but as it dried it turned to a light brown. Its weight was twelve grains.

The liquor was then exposed to evaporate. It exhibited rather a milky appearance, and in a short time fragments, resembling a stratum broken in pieces by stirring, were seen floating on it. These were likewise separated, and found to possess some share of the bitter quality of the plant. They were soluble in a large quantity of water.

The spiritous solution was again set apart to evaporate, which being accomplished, a gummi-mucus matter, of a light brown colour, remained in the vessel. Its taste was somewhat bitter.

This gummi-mucus being dissolved, to a portion of it I added the gallic tincture. But the presence of iron was not indicated.

To another portion of it the nitrate of silver was added. Its colour was rendered nearly white, succeeded by a precipitation. It was the muriate of silver.

The resin, separated by the first filter, was bitter to the taste, readily soluble in spirits, but not in water.

Results.—Resin		12 grains.
	Gummi-mucus matter	20
	Muriate	

V. IGNITION.

The Bark, which had thus been exposed, first to the action of water, then of spirit, was dried. It was perfectly insipid and inodorous. It was then burned in the open air. The ashes being collected, water was poured on them. Paper, stained with the tincture of a blue vegetable, immersed in this solution, indicated the presence of potash. The presence of iron was likewise detected by the alcohol of galls, and a calcareous earth was evinced by the oxalic acid.

Result.—Potash,
Iron, and
Calcareous earth.

VI. OF THE EXTRACT.

Eight drams of the extract, obtained from the decoction of the recent bark, were subjected to the heat of Argand's lamp, in a glass retort, with a receiver adapted. The heat was kept up steadily until the extract was burnt to a perfect coal.

Three drams, by measure, of a fluid possessing a bright yellow colour; an intensely bitter taste; and an empyrumatic smell, collected in the receiver.

It changed the tincture of litmus to a red, and formed a black colour with the solution of the oxy-sulphate of iron.

The acid which this liquor contained was much stronger than any obtained from the plant by a different process.

Its astringent quality was likewise in a much higher degree. By the properties which this liquor possessed, I suppose it to be the gallic acid.

The four drams of coaly substance, which remained in the retort, were burned in the open air. Water was poured upon the ashes, and the lixivium decanted.

It was found to contain, by the usual tests, Potash, Iron, and Calcareous earth.

VII. OF THE PITH.

Observing the Catalpa to be a tree containing a large portion of pith, a thought was suggested to me to examine its properties. Accordingly I obtained a quantity from the smaller stems and limbs, taking care to avoid a thin membrane which surrounds it, which is supposed to possess some of the properties of the wood. This membrane, in the Catalpa, is rather of a green colour.

Four ounces of the Pith, thus obtained, were put into a glass vessel, on which two pints of rain water were poured, and kept well stopped. After macerating twelve hours, it was subjected to heat. This being continued for some time, the water was poured off. It was of a medium consistence, between water and oil. Its taste was slightly bitter. Its colour was of a dusty hue, possessing an aromatic smell.

It changed the blue vegetable colours to a red, and formed a green with the oxy-sulphate of iron.

The fluid was then evaporated a little below the consistence of honey. I then added a quantity of

alcohol. A small part of it was taken up, which was insoluble in water.

To part of this spiritous solution, the nitrate of silver was added. But it scarcely produced any alteration in the colour.

To another portion, I added the gallic tincture. But no alteration ensued.

The substance which remained after the action of the spirit, was nearly insipid, and of a dark colour. It was slippery between the fingers. I added to a portion of this, dissolved in water, the gallic tincture. But the presence of iron could not be detected.

To another portion of it the prussiate of lime was added: but it produced no alteration.

Result—Resin,
Gum,
Mucilage.

The pith, after being thus treated, was burned in the open air. Water was poured upon the ashes, and after remaining sometime it was decanted. But no alkali nor iron could be detected.

Not satisfied with this experiment, I repeated it a second and a third time, with larger quantities of the recent pith, but always with the same result. As in the other cases of ignition, calcareous earth composed a part of this solution.

VIII. DECOCTION OF THE SEEDS.

This decoction was made by boiling half a pound of the seeds, together with the stem to which they are affixed, in four pints of water, until only half the

quantity remained. Its colour was nearly black; its taste slightly bitter; and its odour rather unpleasant, resembling that of the plant.

It possessed no astringency, neither was the tincture of litmus altered by it.

Analysis. A pint of this decoction afforded, by evaporation, a dram of a shining black extract.

To which I added three ounces of the spirit of wine. After remaining about two days its colour was scarcely altered.

The resin, obtained from this solution, was very small in quantity.

No iron could be detected; neither was a white colour produced by the addition of nitrate of silver.

I think it proper to observe, that the seeds, made use of in the above experiment, had been exposed, during the past winter, hanging on the trees from which they were obtained. I regret very much that it is not in my power to examine the properties of the fresh seed; as it is probable that the more active quality of the plant resides in them.

I have been informed, by Dr. Barton, that the Pea fowls are remarkably fond of eating the seed of the Catalpa.

IX. DECOCTION OF THE LEAVES.

Four pounds of the fresh leaves of the Catalpa were put into six pints of water, into a close vessel, and boiled until about half only remained.

Its colour was brown, tinged with green, and its taste intensely bitter. It changed the tincture of litmus

to a red, and struck a black colour with the solution of the oxy-sulphate of iron.

Analysis. Two pints of this decoction afforded, by evaporation, four drams of a black extract.

To two drams of this extract, three ounces of alcohol were added. But after remaining thirty-six hours, it appeared nearly as transparent as before.

Finding that it contained no resin, I dissolved it in water, and tested by the following substances :

To a portion of it the nitrate of silver was added. A white colour was formed, succeeded by a precipitation, which was separated and put into water, where it remained unaffected.

To another portion of it I added the tincture of galls; but no alteration took place.

X. INFUSION OF THE LEAVES.

Upon two pounds of the leaves of the Catalpa, I poured four pints of boiling water, in a close vessel. At the expiration of twelve hours it was decanted. This was repeated three times. The leaves, when dried, were insipid and inodorous.

The first infusion was very bitter to the taste. It possessed a dark yellow colour, and a smell rather unpleasant. It changed the tincture of litmus to a red, and formed a black colour with the solutions of iron.

The second and third infusions gradually differed from the first.

Analysis. These infusions were mixed together; two pints of which afforded, by evaporation, two drams of a dark coloured extract.

This extract contained no resin.

It was afterwards dissolved in water, to which I added the nitrate of silver. The mixture was rendered of a milky colour.

In this, as well as in the preceding experiment, I was clearly of the opinion that it contained muriatic acid.

OF THE BARK OF THE ROOT.

The roots, from which the bark was taken, varied from one half to three inches in diameter. The external part was scraped off, and none but the internal made use of.

The preparations made with the bark of the trunk, were repeated with the bark of the root. And their properties were found to be so nearly allied, that I deem it unnecessary to give a mere repetition of them.

OF THE EFFECTS

OF THE

CATALPA UPON THE HUMAN SYSTEM.

IT has long been a received opinion, that this plant possesses poisonous qualities. Nay, it has been said that it has been made use of by the negroes in the Southern states, for that purpose. But how productive it was of the intended design, or what could first have given rise to such an opinion, I am not able to say; having never heard an instance of death, nor positively, any bad effect produced by it.

It has likewise been said, that butter brought to market wrapped in the leaves of the Catalpa, made those sick who ate of it. But that these observations, together with all others asserting the poisonous quality of this plant are fallacious, and without foundation, the following experiments will show, and I hope perfectly eradicate every such belief.

Being at first impressed with the above opinion, I thought it requisite, at least, that I should be cautious. But after repeated trials with the different preparations of it upon various animals, I commenced taking of it myself. And its effects were so far from corroborating that impression, that I found it to be a safe, and probably may become an useful medicine.

Out of a number of experiments which I have made upon my own system, as well as those of others, with the preparations of different parts of the plant; I shall only relate a few, presuming that they will be sufficient to confirm my observation. I cannot but regret that time will not admit of my taking a view of its effects upon the system in its morbid state.

As I just observed, these experiments were commenced upon dogs.

Upon giving a dog six ounces of a strong decoction of the bark, he in a short time appeared to be very sick, with an inclination to lie down; his looks were dull, and took no notice of any person, which before was not the case. About an hour after it was taken it was attended with vomiting, which, however did not continue long.

Whether this was the true effect of the medicine, or whether it was forced up by the animal, I cannot say positively; but am rather apt to embrace the latter opinion. Because it is well known that these animals, when they receive any substance into their stomachs, which does not agree with them, eject it; which, if it had been suffered to remain, would not have produced that effect. I was confirmed in this opinion after trying it upon other dogs, on which it produced a purgative effect. When tried upon myself it generally produced the same effect.

OF THE DECOCTION.

EXPERIMENT I.

Two hours after a light breakfast, I took three ounces of a strong decoction, made with the inner bark of the trunk. My pulse beating seventy strokes in a minute. Its natural standard.

In.....	5,	10,	15,	20,	25,	30,	35,	40,	45,	50,	55,	60,	Minutes.
Pulse beat	70.	70.	72.	74.	72.	68.	67.	67.	64.	66.	68.	68.	Strokes.

In ten minutes there was no perceptible alteration in my pulse; in twenty, it became rather fuller; in thirty its fulness increased; and continued so until forty-five minutes had elapsed, when it became smaller and irregular. About two hours after it was taken, it began to operate as a cathartic, and continued for some time pretty copiously, without inducing nausea or griping. Neither did my body become costive after its operation.

EXPERIMENT II.

Three hours after my usual dinner, my pulse beating seventy strokes in a minute, I took two scruples of the extract obtained from the decoction.

In.....	5,	10,	15,	20,	25,	30,	35,	40,	45,	50,	55,	60,	Minutes.
Pulse beat	70.	74.	74.	75.	80.	78.	76.	76.	76.	74.	74.	72.	Strokes.

In fifteen minutes my pulse had only increased in frequency; about the twentieth it was diminished in fulness; at which time I began to feel sick at my stomach; in thirtieth was still smaller, and continued so until the expiration of fifty minutes, when it became irregular and weak. Not long after, as in

Experiment the first, it commenced its purgative effects.

OF THE BARK IN POWDER.

EXPERIMENT I.

Three hours after dinner, I gave Mr. T. S....., a healthy young man, a dram of the powdered bark in a small quantity of milk. His pulse beating seventy-two strokes in a minute.

In..... 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, Minutes.
Pulse beat 72. 72 70. 66. 64. 63. 62. 60. 60. 62. 64. 66. Strokes.

About the twentieth minute his pulse was much fuller, with some tension; and continued so without much variation until forty-five minutes had elapsed; at which time it became small and irregular; and he complained of a slight degree of head-ach, which lasted some time. After which his pulse began to assume its natural pulsation.

EXPERIMENT II.

At eleven o'clock A. M. I took three scruples and an half of the powdered bark diffused in a little milk. My pulse beating seventy-two strokes in a minute.

In..... 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, Minutes.
Pulse beat 72. 74. 74. 76. 76. 77. 78. 76. 76. 74. 74. 72. Strokes.

In ten minutes my pulse became fuller; in fifteen, its fulness had increased, and continued so without much variation until the expiration of thirty minutes; when it began to grow weak and much smaller. At

this time I felt considerable nausea, which lasted for some time. It however went off, and my pulse gradually returned to its natural pulsation.

The same dose was repeated upon a healthy young man, Mr. M. C.....; but with a very different result. It produced no other effect than an alteration in his pulse.

When the bark is snuffed up the nose, it produces very little effect.

OF THE DECOCTION OF THE LEAVES.

EXPERIMENT I.

Three hours after my usual breakfast I took three ounces of a strong decoction of the leaves. My pulse beating seventy-two strokes in a minute.

In.....	5,	10,	15,	20,	25,	30,	35,	40,	45,	50,	55,	60,	Minutes.
Pulse beat	80.	84.	80.	80.	76.	76.	78.	76.	76.	76.	74.	74.	Strokes.

In five minutes my pulse increased in force and frequency, which continued until twenty; in twenty-five it was much diminished in fulness; at which time I began to feel sick, which lasted a considerable length of time. My pulse continued small and weak until the expiration of fifty minutes; when it became fuller and began to assume its ordinary stroke. Some time after the sickness went off succeeded by a copious purgative effect.

EXPERIMENT II.

Two hours and a half after dinner, I gave Mr. J. P..... two scruples of the extract obtained from

the decoction of the leaves. His pulse beating seventy-four strokes in a minute.

In..... 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, Minutes.
Pulse beat 74. 75. 74. 76. 72. 72. 67. 67. 67. 69. 70. 72. Strokes.

In fifteen minutes his pulse was much increased in fulness, and continued so until twenty-five; in thirty it became much smaller; in thirty-five it was small and weak; and he complained of a fulness of the head, and drowsiness, which were unusual symptoms to him. These continued for some time. His pulse continued weak until fifty minutes had elapsed, when it began to recover its natural stroke.

OF THE INFUSION OF THE LEAVES.

EXPERIMENT I.

Half past nine o'clock A. M. I gave Mr. M. C....., a young man in good health, three ounces of a strong infusion of the leaves. His pulse beating seventy strokes in a minute.

In..... 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, Minutes.
Pulse beat 72. 73, 73, 75. 75. 76. 76. 76. 76. 74. 74. 72. Strokes.

About the twentieth minute his pulse was much fuller; which, however, declined towards the thirty-fifth. It continued small until the expiration of fifty minutes, when it began to take on its ordinary stroke.

This experiment confirms me in opinion that the decoction takes not more of the active properties of the plant than the infusion; and that it is the best form in which it can be taken.

OF THE ROOT.

About two hours and a half after my usual dinner, I took three ounces of a strong decoction of the recent root. My pulse beating seventy-two strokes in a minute.

In.....	5,	10,	15,	20,	25,	30,	35,	40,	45,	50,	55,	60, Minutes.
Pulse beat	72.	74.	72.	66.	66.	65.	68.	68.	68.	70.	70.	72. Strokes.

In ten minutes my pulse was much fuller; in twenty it was increased; in thirty-five it was much smaller, and a little irregular; in fifty it began to assume its natural pulsation. In a short time after it operated as a purgative, without inducing any disagreeable sensation.

Whenever I took the decoction of the bark of the root, or bark of the trunk, in the above quantity, it invariably had a purgative effect, which was very mild.

The extract obtained by spirit had nearly the same effects upon the system with the decoction and the extract obtained by water. But as it is much stronger than the latter, it is of course much more powerful when they are taken in equal quantities.

The pith of the Catalpa possesses but a small portion of the active quality of the plant. For when taken, in the form of a decoction, to the quantity of three ounces, it had no sensible effect. And three scruples of the extract produced but little alteration in the pulse.

OF THE ANTISEPTIC POWER OF THE BARK OF THE CATALPA.

Two decoctions of equal strength were made, one with the pulverized bark of the Catalpa; and the other with the best red Peruvian Bark. Equal quantities of these decoctions were put into separate vessels. The one containing the decoction of the Catalpa was marked C. and the other containing the decoction of the Peruvian Bark was marked P. for the sake of distinction.

Two pieces of fresh beef were procured of the same weight; one was put into the vessel C. and the other into the vessel P.—These were set apart. On the eighth day that in the vessel P. began to smell sour; whilst that in the vessel C. retained its usual smell.

On the tenth that in the vessel P. emitted a very fœtid odour. On the contrary that in the vessel C. still retained its natural smell, or rather smelt sweeter. What induced it to take on this kind of smell I cannot explain satisfactorily to myself; but the decoction after standing several days in a bottle kept stopped, emits rather a sweet odour. And a number of white flakes are seen swimming on its surface.

2. Two pieces of beef of the same weight were covered with equal quantities, one with the powdered bark of the Catalpa, and the other with Peruvian Bark. These were set apart and covered to prevent the diffusion of the emanation in the atmosphere.

The result of this was like that of the preceding experiment.

EXPERIMENTS TENDING TO SHOW THE QUANTITY AND PURITY OF OXIGENOUS AIR OBTAINED BY EXPOSING THE LEAVES OF THE CATALPA TO THE ACTION OF THE SUN.

A handful of the leaves of the Catalpa, and the common Willow (Salix Alba) were put into separate vessels, holding, each, a quart, filled with pump water, containing a portion of Carbonic Acid; and exposed to the solar light four hours, during which time four cubic inches of oxigenous air, of a high degree of purity, had collected in the bottom of each inverted vessel.

One measure of the air obtained from the leaves of the Catalpa was thrown over lime water; but no absorption took place.

It destroyed $2\frac{2}{3}$ measures of nitrous air.

The air obtained from the leaves of the Willow destroyed nearly the same quantity of nitrous air.

AN EXPERIMENT TO SHOW THE EFFECT PRODUCED BY THE LEAVES OF THE CATALPA IN ATMOSPHERIC AIR, EXPOSED TO THE SUN.

A handful of the leaves was put into a glass vessel containing sixty ounce measures of atmospheric air of the purity of 100°, and exposed to the action of the sun. In four hours the air was examined by throwing one measure of it up over lime water in the eudiometer. The alteration in the colour was very slight.

Another measure of it being added to an equal one of nitrous air, produced an absorption of $\frac{70}{100}$.

At the expiration of forty-eight hours, one measure of it was again thrown over lime water, when it gave $\frac{5}{100}$ parts of carbonic acid gas.

A second measure with one of nitrous air occupied 1 $\frac{75}{100}$.

AN EXPERIMENT TO SHOW THE EFFECT PRODUCED BY THE LEAVES OF THE CATALPA IN ATMOSPHERIC AIR, IN THE SHADE.

A similar handful to the one used in the above experiment, was put into a vessel containing sixty ounce measures of atmospherical air of the purity of 100°, and suffered to remain in the shade.

At the end of four hours one measure of the air was thrown over lime water, and the effect produced was similar to that in the preceding experiment.

Another measure of it with one of nitrous air produced an absorption of $\frac{90}{100}$.

In forty-eight hours the air was again tested by throwing a measure of it up over lime water, and it gave $\frac{5}{100}$ parts of carbonic acid air.

One measure of it with one of nitrous air occupied 1 $\frac{65}{100}$.

EXPERIMENT IV.

A handful of the leaves of the Catalpa, and Populus dilatata, were put into separate vessels containing each a quart of lime water, and exposed to the light of the sun.

After remaining thus exposed for three days no air was given out.

The oxigenous gas, obtained by exposing the leaves of the Catalpa in pump water, to the influence of solar light, arose from the decomposition of the carbonic acid gas or fixed air of the water, for it has been ascertained, that no pure air can be procured from vegetables, unless this gas is present. Not a particle of oxigenous air can be obtained by exposing leaves to the action of the sun in distilled, river, rain, or lime water.

The diminished purity of the atmospheric air, in which the leaves were exposed, in the light and shade, was caused by the carbon of the decayed portion of the leaves, uniting to the oxigen, one of the component parts of this gas.

OF THE CATALPA AS A MEDICINE.

From the preceding experiments it will be readily observed, that the Catalpa possesses a stimulating quality. But in an inferior degree, not sufficient to entitle it to a rank among that class of medicines.

It is an astringent; which though within itself if not very valuable, yet, when we observe its union with a superior degree of bitterness, the combination of which constitute some of our most valuable medicines, we cannot but suppose that the Catalpa may likewise be possessed of this useful qualification.

Great merit has long been ascribed by Dr. Cullen and other writers long before his time, to plants endowed with this bitter quality in an eminent degree. If this was justly done, (and experience seems to confirm it) certain it is, that the Catalpa, as possessing

this quality, presents a claim for as great a share of the confered merit as almost any other plant.

From this view of the Catalpa I am of opinion, that it deserves to be placed under the head of Tonics.

It is cathartic. As I have already mentioned its purgative effect it is not requisite that I should say much in this place. And, therefore, shall only observe, that the mildness with which it operates is the principal inducement to my recommending of it as a cathartic.

It has been observed by a celebrated writer,* the only one who has ever mentioned any part of the Catalpa as a medicine, that "its leaves have been used in nervous cases; and its pods in asthmas." I was not acquainted with this observation until my experiments were nearly finished.

If the Catalpa should not come into general use; or if it should be tried, and not found useful; a knowledge of its properties, and the counteracting an erroneous report relative to it, are sufficient to content me.

But on the contrary, if it should be found beneficial in those, or any other states of disease; or any one of them; the time spent in examining its properties, will be deemed the happiest period heretofore spent by me.

* Kæmpfer on the authority of Thunburg.

THE END.