An inaugural dissertation, on the chemical and medical properties of the persimmon tree, and the analysis of astringent vegetables : submitted to the examination of the Revd. John Ewing, S.T.P. provost ; the trustees and medical professors, of the University of Pennsylvania ; for the degree of Doctor of Medicine / by James Woodhouse, A.M. ; honorary member of the American and Philadelphia medical societies.

AN

INAUGURAL DISSERTATION,

ON THE

CHEMICAL AND MEDICAL PROPERTIES

OF THE

PERSIMMON TREE,

AND THE

ANALYSIS of ASTRINGENT VEGETABLES;

SUBMITTED TO THE EXAMINATION

OF THE

REVD. JOHN EWING, S. T. P. PROVOST;

THE

TRUSTEES AND MEDICAL PROFESSORS,

OF THE

UNIVERSITY OF PENNSYLVANIA;

FOR THE DEGREE OF DOCTOR OF MEDICINE.

BY JAMES WOODHOUSE, A M.
Honorary member of the American and Philadelphia Medical Societies.

Full many a flower is born to bluſh unſeen,
And waſte its ſweetneſs on the deſert air.
GRAY.

PHILADELPHIA:
PRINTED BY WILLIAM WOODHOUSE.

TO

BENJAMIN RUSH, M.D.

PROFESSOR OF THE INSTITUTES,

AND OF

CLINICAL MEDICINE,

IN THE

UNIVERSITY OF PENNSYLVANIA, &c.

This DISSERTATION

Is DEDICATED,

AS A GRATEFUL TRIBUTE OF RESPECT,

FROM HIS

AFFECTIONATE PUPIL,

THE AUTHOR.

To Mr. JAMES WOODHOUSE.

My dear friend,

I beg you would permit me, to make use of a small part of a page, of your intended inaugural publication, on the PERSIMMON TREE, *and the* Analysis *of* astringent vegetables, *as the vehicle of my acknowledgements, of the great pleasure I derived, from witnessing the zeal and industry, with which you conducted the experiments and studies, that have led you to the valuable discoveries, contained in your dissertation.*

I hope your success, in those experiments, will animate you to direct your inquiries into other branches of Chemistry and Medicine, and that your eminence and usefulness in life, may be equal to the ability and integrity with which you have discharged your duty to your

affectionate Preceptor,

BENJAMIN RUSH.

May 3rd. 1792.

INTRODUCTION.

THERE are three things, ſays a celebrated writer, which are ſufficient to render the beſt diſcourſe, inſiped and unintereſting; the difficulty of the ſubject, the neceſſity of ſaying ſomething, and the anxiety of ſaying it well.

Called before the tribunal of the public, under theſe circumſtances, I feel the force of this obſervation in a peculiar manner.

I have choſen the Perſimmon tree for an inaugural diſſertation, on the one hand, merely to avoid a thread-bare worn out ſubject, and on the other, that I might have an opportunity of ſaying ſomething on a tree, of which, little more is known than the name.

The indulgent reader will make every poſſible allowance, eſpecially when he conſiders, that this theſis is the production of one, who is as yet, a Tyro in Chemiſtry.

HISTORY

OF THE

PERSIMMON TREE, &c.

LINNÆUS has placed the Perſimmon tree, among the Polygamia Dioecia, and deſcribes it in the following manner in his Genera Plantarum.

The *Hermaphrodite* female.

The *Calyx* is a *perianthium* of one leaf, four-cleft, large, obtuſe and permanent.

The *Corolla* is compoſed of one petal, pitcher-ſhape, larger and four-cleft; the diviſions acute and ſpreading.

The *Filaments* are eight, briſtly, ſhort and lightly inſerted in the receptacle. The *Antheræ* are oblong and effæte.

The *Germen* is roundiſh. The *Style* one, half four-cleft, permanent and longer than the ſtamina. The *Stigmas* are obtuſe and two-cleft.

The *Pericarpium* is a globous berry, large, eight-cell'd, and ſitting on the large ſpreading calyx.

The *Seeds* are ſolitary, roundiſh, compreſſed, and very hard.

The *Male* in diſtinct plants.

The *Calyx* is a *perianthium* of one leaf, four-cleft, acute, erect and ſmall.

The *Corolla* conſiſts of one petal, pitcher-ſhape, coriaceous, four cornered and four-cleft: the diviſions roundiſh and revolute.

The *Filaments* are eight, very ſhort and inſerted in the receptacle. The *Antheræ* are double, long and acute; the interior ſhorteſt.

The *Piſtillum* is the rudiment of a germen.

The *ſpecies* with us but one.

The DIOSPYROS VIRGINIANA, *American Prune, Date Plum* or *Perſimmon tree*, is of a rapid growth, riſes from fourteen to twenty five feet in height, and bears fruit in a few years after it is planted.

It grows in Pennſylvania, New-Jerſey, New-York, Maryland, Virginia, North Carolina, South Carolina and Georgia, in moiſt clayey ground, in ſwamps, and along the banks of rivers.

A number of ſhort branches are ſent out from the body of the tree, garniſhed with entire, oblong, pointed leaves; the bloſſoms are produced in April, growing along the ſides of the branches, on very ſhort foot-ſtalks, making but little appearance, and are ſucceeded by large globular or oblong fruit, of different ſizes on different trees *.

The wood of the tree has a firm, cloſe grain, burns well, and its aſhes yield a large proportion of ſalts. The bark of the tree poſſeſſes a conſiderable degree of aſtrin-

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* *Marſhall's Arbuſtum Americanum, and Cateſby's hiſtory of Carolina*, vol. 2*nd*.

gency, the leaves more than the bark, the bark more than the heart of the tree, and the unripe fruit is one of the moſt powerful aſtringents, in the vegetable kingdom.

The trunk of the tree does not exceed ten feet, the fruit contains four flat ſtones, which when ſplit in two, Mr. Cateſby ſays, exhibits the tree in embryo, with its ſtem or trunk, and two *folia ſeminalia* in a more conſpicuous manner, than in any other ſeed he has ever met with.

A fine tranſparent gum, of a light brown color, inſipid to the taſte, readily ſoluble in water, exudes from the body of the tree.

A premium of twenty pounds ſterling, was offered by a ſociety in London, for the promotion of arts and manufactures, for a quantity of this gum, not leſs than fifty pounds, and a premium of ten pounds, for the next greateſt quantity, not leſs than twenty five pounds.

The expreſſed juice of the unripe fruit, being a ſubſtance of a ſingular nature, was ſubjected to the following experiments.

EXPERIMENT I.

Diſtilled in a retort with a gentle heat, a quantity of water, of a diſagreeable ſmell, came over into the receiver, which did not precipitate the liver of ſulphur, had no effect on the ſolutions of iron, and did not change the blue color of vegetable ſubſtances. The fire being raiſed, I obtained an acid of a light yellow color, which precipitated corroſive ſublimate of an orange color, green vitriol black, liver of ſulphur white, and changed the tincture of lit-

mus to a bright red. A black friable matter remained in the retort, which poſſeſſed the properties of the acid in a ſmall degree, and when burned to aſhes in the open air, gave the earth of alum.

EXPERIMENT II.

One drop of the unripe juice, dropped in a gallon of rain water, in which one grain of green vitriol was diſſolved, produced a purple color in the liquor.

EXPERIMENT III.

Iron filings digeſted in the unripe juice, were changed to the conſiſtence of a paſte, upon approaching a candle to the mouth of the matraſs, in which the experiment was made, a loud exploſion took place.

EXPERIMENT IV.

Mixt with common ſpirit, it forms a jelly, with the ſpirit of ſal ammoniac, it forms a coagulum of the conſiſtence of ſoft ſoap.

EXPERIMENT V.

Inſpiſſated in the ſun, it yields a large quantity of a brown, tranſparent, aſtringent gummy ſubſtance, of which common ſpirit diſſolves a larger quantity, than ſpirit of wine, or the vegetable oils. Pure Æther has no action upon it. Spirit of wine extracts the virtues of that part, which is inſoluble in water.

EXPERIMENT VI.

The inſoluble part of this ſubſtance, ſuſpended in water, appears like a jelly, collected, dried and diſtilled, it yields water, acid, oil and fixed air.

EXPERIMENT VII.

The ſoluble and inſoluble parts, ſeparately boiled in the nitrous acid, yields long priſmatic chryſtals, which poſſeſs the ſame properties, as the acid obtained from ſaccharine ſubſtances, and which has improperly been named the acid of ſugar.

EXPERIMENT VIII.

A quantity of the black fæculant matter, precipitated from green vitriol, by the aſtringent juice, was collected, dried, and found to poſſeſs the following properties.

It undergoes no alteration from being expoſed to the action of the air, for twelve months. Expoſed to a bright red heat, it does not inflame, but burns like the calces of metals, and is reduced to its metallic form. Digeſted in a ſolution, of the mild or cauſtic vegetable alkali, or the mild and cauſtic volatile alkali, it tinges the liquor of a dirty brown color, which mixed with a ſolution of green vitriol, precipitates the iron, of a brown or purple color.

EXPERIMENT IX.

The unripe juice, ſpread with a feather, over an ancient decayed writing, reſtored the legibility of the letters, which inſtantly appeared of a deep black color.

EXPERIMENT X.

The vegetable and volatile alkalies, added to the unripe juice, formed a coagulum, which being ſeveral times waſhed in warm water, did not taſte aſtringent; was inſoluble in water and ſpirit of wine, but readily diſſolved, in weak vitriolic acid.

EXPERIMENT XI.

The vegetable and volatile alkalies, were added to the unripe juice, diluted with water, and the mixture filtered: upon adding the vitriolic acid, in ſmall quantities, to the filtered liquor, a precipitate took place, which remained ſuſpended in the liquor; upon increaſing the quantity of acid, the precipitate was rediſſolved with effervescence. The precipitate collected and dried, was not liquefiable by heat, was inſoluble in water, but diſſolved in ſpirit of wine.

EXPERIMENT XII.

The vegetable and volatile alkalies, added to the unripe juice, diluted with water, and the mixture filtered, and added to a ſolution of corroſive ſublimate, green vitriol, and muriated barytes, precipitated the iron, the ponderous earth, and the mercury, entangled in the reſin, which could be ſeen in the fluid in large tranſparent globules.

EXPERIMENT XIII.

An aqueous ſolution of Perſimmon gum, and an acid ſolution of green vitriol, being mixed together, were tranſparent, upon adding the vegetable alkali, a black precipitate took place, which was inſtantly rediſſolved, by adding a greater quantity of the alkali, the precipitate remained ſuſpended in the liquor; ſtill continuing to increaſe the quantity of alkali, the black color of the precipitate was changed to a dirty brown.

The ſame effect was produced, when volatile alkali, magneſia, lime, or the earth of alum, were uſed inſtead of the vegetable alkali.

EXPERIMENT XIV.

The precipitate of muriated barytes, in the twelfth experiment, was collected by filtering the mother water, when added to a ſolution of green vitriol, the iron was precipitated black. Upon adding the vitriolic acid, to the filtered liquor, no precipitate took place.

EXPERIMENT XV.

The coagulum formed by the vegetable alkali, and unripe juice, being ſeveral times waſhed in water, was diſſolved in the vitriolic acid, to which a ſmall quantity of the vegetable alkali was added, to favour the chryſtallization. The ſolution, by ſpontaneous evaporation in the open air, gave chryſtals of alum, acid of ſugar, and vitriolated tartar.

EXPERIMENT XVI.

The chryſtals of alum were collected, and diſſolved in water, the vegetable and volatile alkalies, lime water, magneſia, ponderous earth, and a ſolution of borax precipitated its baſe.

EXPERIMENT XVII.

The earth obtained from alum, by the vegetable alkali, was diſſolved in the acid diſtilled from the Perſimmon, and being evaporated, afforded a powerful aſtringent gummy maſs.

The five laſt of theſe experiments, have been repeated with galls and other aſtringents, with nearly the ſame reſult. In ſome, as in ſumach, the acid is contained in a much larger proportion, than the reſin, or earth of alum. The ſon of Profeſſor Tromſdorf, it is ſaid, has extracted,

a true tartar from the berries of this vegetable, * I think he has been miſtaken, for a precipitate takes place, upon the addition of an alkali, and the berries always blacken a ſolution of vitriol.

To ſucceed in precipitating the alum, formed by adding the vitriolic acid, to the earth precipitated from vegetable aſtringents, with a ſolution of borax, great accuracy is neceſſary. It muſt contain a *certain* proportion of acid, or the precipitate will not take place. This obſervation, I thought neceſſary, for the failure of the experiment, tho' fallacious, might be offered as an objection to the theory I have laid down.

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REMARKS ON THE EXPERIMENTS.

From the firſt of theſe experiments, it appears, that the juice of the Perſimmon, contains the ſame acid, as all aſtringent vegetables; and from the ſecond, we find it may be employed, as a nice teſt, for detecting the preſence of iron, in mineral waters. In the third, it decompoſed the iron, ſeparating its principle of inflammability. In the fifth, we find a large quantity, of a tranſparent, brown, aſtringent gummy ſubſtance produced, which from ſome of the ſucceeding experiments, appears to be a gum-reſin, with a proportion of excrementitious matter. The reſin is a mild ſubſtance, generally containing a ſmall proportion of the acid, and may be ſeparated from the gum, by precipitating the baſis of the aſtringent, by the vegeta-

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* *Keir's Chemical Dictionary, article, vegetable acids.*

ble or volatile alkali, filtering the ſolution, and adding the marine or vitriolic acids. The gum is compoſed of the gallic acid, and the aſtringent baſis, which is earth of alum.

The property of forming a ſaline gum, with the earth of alum, is not peculiar to the gallic acid. The diſtilled acid of ſugar, according to Schrickel, and the acid of tartar, have the ſame effect on that earth. * A gum reſin appears to exiſt in almoſt every vegetable, which has the property of ſtriking black, with the ſolutions of iron, differing in the degree of ſolubility, in different menſtrua, and in the proportion of gum and reſin. It conſtitutes the aſtringent and bitter quality in peruvian bark, it may be extracted from the leaves and bark of the Perſimmon, galls yield it to a watery menſtruum, in the proportion of four drachms to the ounce, and it may be obtained, in conſiderable quantities, from the common pig-nut.

Morveau ſuppoſes the acid in aſtringents, is formed of this reſin and pure air. The twelfth experiment clearly confutes this opinion, for the reſin is there ſeen, in large tranſparent globules, when the iron, the ponderous earth, and the mercury were precipitated by the acid.

To ſucceed in this experiment, with galls, and other aſtringents, it is neceſſary to have a ſtrong infuſion of them, for it does not take place, after the reſin has been

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* *Keir's Chemical Dictionary, article, acid of tartar and ſugar.* The acid of sorrel and the phosphoric acid likewise form astringent gums with the earth of alum. ibid author.

extracted by one or two infuſions, altho' the aſtringency remains.

The precipitate formed, by adding the alkalies, to vegetable aſtringents, has been miſtaken by ſome authors for the aſtringent principle. In Keir's chemical Dictionary, and in the laſt edition of the Encyclopædia Britannica, a number of obſervations may be ſeen, relating to this principle. It is there ſaid, when rediſſolved in water, it blackened a ſolution of vitriol but faintly, and in no other manner, that what aroſe, from a ſmall quantity of acid remaining, which is proved it contains by diſtilling it. The author of theſe obſervations has been miſtaken, and it is not a difficult matter, to point out in what manner he has been deceived. The aſtringent taſte aroſe from a quantity of acid, which he acknowledges it contains; its ſolubility in water, aroſe from the ſame cauſe, for after it is ſeveral times waſhed, and the water filtered, it does not blacken a ſolution of vitriol, but when diffuſed in water, and added to a ſolution of that ſalt, the color is immediately changed, for its ſolubility in water, like alum and the calcareous phoſphat of urine, is owing to a ſuperabundant acid.

When ſpread with a feather, over an ancient, decayed writing, it reſtored the legibility of the letters. Various methods have been recommended, by different authors, for this purpoſe; among others, the diſtilled liquor of galls, in Canepariuſ's collection de atramentis, and the phlogiſticated alkali, by Dr. Blagden, in the Philoſophical tranſactions, for the year 1787. The unripe juice of the Perſim-

mon, poſſeſſes two advantages over theſe fluids; it is a more powerful teſt for detecting the preſence of iron, and forms a gummy reſinous coat over the letters, defending them for ever, againſt the action of air and moiſture.

The matter formed by the junction of the aſtringent juice and ſteel filings, and the precipitated fæcula of green vitriol, poſſeſs the ſame properties.

The twelfth, and following experiments, naturally lead us to ſay a few words, on the changes which take place, in the precipitates of iron, by the vegetable aſtringents.

On this ſubject, Meſſieurs Macquer, Monnet, Gianotti and the academicians of Dijon, have been particularly engaged. The two former, and the greater part of chemiſts, conſider the precipitate of ink, to be united with a principle in the gall-nut, in an oily ſtate. Mr. Gianotti thought, that the iron was united with the aſtringent principle; and that it was in the ſtate of a neutral ſalt. The gentlemen of the academy of Dijon, ſuppoſe the aſtringents direct their action to the vitriolic acid, and precipitate the iron pure.

My experiments have induced me, to draw a different concluſion, from thoſe gentlemen. I have clearly proved, that a neutral ſalt exiſts readily formed in aſtringent vegetables, compoſed of a peculiar acid and the earth of alum, independent of a reſin, which moſt of them contain.

In the making of ink then, a double elective attraction takes place; the gallic acid unites with the iron of the green vitriol, while the vitriolic acid unites with the earth

of alum. In an acid ſolution of green vitriol, no precipitate happens, becauſe the vitriolic acid diſſolves the iron, as faſt as it is precipitated; but, if a ſufficient quantity of an alkali is added, to ſaturate the vitriolic acid, the precipitate remains ſuſpended in the liquor; ſtill continue to add the alkali, and you ſaturate both the gallic and vitriolic acid, and the iron is precipitated, of a dirty brown color.

This theory points out the neceſſity of having a vitriol, exactly ſaturated with acid, in the making of ink; the propriety of adding a ſmall quantity of the vegetable alkali or ſteel filings, to the common ink powder of the ſhops, and the improper practice which ſome people have, of uſing vinegar as a menſtruum, to extract its virtues.

It ſhows the propriety of Mr. Clegg's propoſal, for employing the vegetable alkali, as a ſubſtitute for verdigriſe in the black dye, for which he received a ſilver medal and ten guineas, from a ſociety inſtituted in London, for the encouragement of arts and manufactures, in the year 1783.

It accounts for the phænomena, which happened in a number of experiments, made by Drs. Skeete and Irwin, in which magneſia, lime, chalk and the alkalies were triturated with peruvian bark, and added to a ſolution of green vitriol; and which Irwin accounted for, by ſuppoſing the preſence of fixed air.

The fallacy, of triturating aſtringent gum reſins, with different ſubſtances, and adding them to a ſolution of green vitriol, and making the intenſity of the color ſtruck, a proof of the ſtrength of the ſolvent power, is here pointed out.

It explains the reaſon, why in the precipitates of iron

by the nut-gall, the coalition of particles is ſucceſſive, and remains ſuſpended in the fluid, and why in the uva urſi, the pig-nut, and the Perſimmon, they concrete together, in large particles, and fall to the bottom of the veſſel. In the firſt caſe, the reſin being contained in a ſmall quantity, and united to a portion of the acid, is readily ſoluble in water; in the ſecond caſe, the reſin is contained in a large proportion, and is inſoluble in water.

It likewiſe explains to us the cauſe of the increaſed blackneſs of ink, in the common practice which ſchool boys have of adding chalk, lime, &c. to that fluid.

The doctrine of aſtringents, ſerves as a key to many of the experiments of Dr. Percival, and accounts for the manner in which acids neutralize aſtringents; by deſtroying the affinity between the gallic acid, and the earth of alum.

In ſhort, it ſimplifies the Materia Medica, it is an intereſting addition to chemiſtry, and in future it is probable, the whole catalogue of aſtringents will yield to one or two of the moſt powerful, and the author queries, whether even the peruvian bark, will not give place, to the more powerful combination, of galls and gentian, or the Perſimmon and centaury.

The acid of galls, forming an ink with green vitriol, may be offered as an objection to this theory, and it may be aſked, why does not the vitriolic acid, in this caſe, diſſolve the iron? The anſwer to this queſtion is eaſy, the vitriolic acid is too weak to act on the iron, and an ink made in this manner, though at firſt of a deep black color, yet is not durable.

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PHARMACEUTICAL TREATMENT OF THE PERSIMMON.

The unripe fruit is to be gathered, in the month of Auguſt or September, ſplit into pieces, dried in the ſun, and reduced to an impalpable powder. The juice may be obtained by preſſure, in an apparatus ſuited to the purpoſe, mixed with equal quantities of water, and kept in veſſels cloſely ſtopped. After the juice has been obtained, the part which remains may be dried, and uſed in the ſame manner, as the unripe fruit.

To obtain the gum reſin, we inſpiſſate the unripe juice in the ſun, in wooden, or earthen veſſels. The gum, if not thoroughly dried, cannot be pulverized, is malleable, and cannot be made into pills. When well dried, it is as brittle as glaſs, and may be uſed in powder, in pills, or in tincture. The beſt menſtruum, to extract its virtues, is common-ſpirit.

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OF THE USE OF THE PERSIMMON IN MEDICINE.

IN THE INTERMITTING FEVER.

Without entering into a diſquiſition, concerning the proximate cauſe, of an intermitting fever, ſuffice it to ſay, ſimple aſtringents, or aſtringents combined with bitters, are the remedies generally uſed, in the cure of the diſeaſe.

Galls, gum kinoe, oak bark, and the roots of caryophillata have all been employed with ſucceſs.

About the beginning of this century, ſays Dr. Cullen, the galls had got a reputation for the cure of intermittents; and it was pointed out as a proper object of attention to the Academy of Sciences, who accordingly appointed Mr. Poupart to inquire into the matter. His report amounts to this, that in many caſes the galls cured the intermittents; but that they failed alſo in many caſes, in which the peruvian bark proved ſucceſsful.

This, with due deference to ſuperior authority, cannot invalidate the efficacy of aſtringents, in intermitting fevers. How often does the bark ſucceed, when mixed with wine, or when joined with aromatics, or ſaline ſtimulants, when bark itſelf had no effect? How frequently does it ſucceed after bleeding, when pounds of it had been taken before to no purpoſe? How often do mild bitters ſucceed, when the whole catalogue of the more powerful, have been employed with no advantage? *

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* *Thoſe who doubt theſe facts, we would refer to Hoffman, Home, Webſter, Hunter, Langriſh, Ruſh and Gardiner.*

Dr. M'Cauſland, when ſtationed at Niagara, cured three hundred intermittents, by tartar emetic alone. Dr. Heberden informed Sir George Baker, that with two drachms of the powder of myrrh, he relieved a patient from an ague, which reſiſted the power of the bark, though taken in very large quantities†. Dr. Petrie in a letter to the ſame, ſays, that the powder of bay leaves, were efficacious in many caſes of an intermittent, in which the peruvian bark, produced not the leaſt effect‡. A very ſtriking inſtance of the efficacy of mild bitters, over the more powerful, happened in an obſtinate intermittent,*

* *Medical Commentaries vol.* 8.

† *Tranſactions of the College of Phyſicians of London, vol.* 3.

‡ *Ibid.*

The general effects of aſtringents, are to increaſe the force of coheſion of the human body, to diminiſh irritability, to diminiſh the capacity of the containing veſſels, and to increaſe the tonic powers of the ſyſtem*.

From this general view it is evident, in what manner they are adapted to the cure of intermittents. Their tonic power may be increaſed, by joining them with ſimple bitters, or with bitters and aromatics. In time of war, from principles of œconomy, or from neceſſity, we may be forced to diſpenſe with peruvian bark; in theſe circumſtances, the powder of the Perſimmon combined with centaury, or with calamus aromaticus, will anſwer every purpoſe of the above remedy.

The active principles of the bark, conſiſt in a gum and reſin, or in an aſtringent and bitter; in the combination above mentioned, theſe principles are united; thoſe who

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which broke out at the Illinois, in which pounds of the bark were adminiſtered with no good effect; when recourſe was had to the bark of the willow tree, which ſubdued the diſeaſe in every inſtance. Theſe medicines poſſeſs no ſpecific power, the bark or any other aſtringent and bitter, given in ſmall doſes, or after proper evacuations, would have been equally efficacious. The reaſon the bark failed—the reaſon it ſtill continues to fail in many caſes, is, that it is not accommodated to the ſtate of excitability of the ſyſtem. This GRAND PRINCIPLE, THIS SUBLIME *and* LUMINOUS TRUTH, *enables us not only to account for the failure of the bark, but for the contradictory reports, given of the ſame remedy by different practitioners. Diſeaſes may be cured in both ways, but the one is like ſailing by the tedious and uncertain direction of the ſtars; the other, by the unerring guide of the compaſs.*

* *Duncan's Therapeutics.*

object to it as being inferior in virtue, to that made in the laboratory of nature, might as well object to a combination of vitriolic acid and mineral alkali, being inferior as a purge to Glauber's ſalt.

The bark of the tree, has been uſed with ſucceſs in this diſeaſe; and it was once ſaid, the peruvian bark was obtained, from the Perſimmon tree of New Spain *.

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IN THE PILES.

When the hemorrhoidal flux verges to exceſs, or when it depends upon a prolapſus ani, aſtringents both internally and externally, may be properly and ſafely employed. †

There are three methods of uſing the Perſimmon in this diſeaſe; the ſimple juice may be applied to the part affected, or it may be mixed with eight times its quantity of hogs lard, or an ointment may be made of the juice, hogs lard, ſugar of lead and opium. The ſecond application is not only the moſt elegant, but the moſt uſeful, as it is free from all particles, which from their mechanical ſtimulus are apt to irritate. Experience has aſcertained this compoſition, to be as uſeful as any, in the cure of the diſeaſe.

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IN THE MENORRHAGIA, OR IMMODERATE FLOW OF THE MENSES.

When this diſeaſe depends upon a laxity of the uterine

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* *Lawſon's natural hiſtory of North Carolina.*
† *Cullen's firſt lines.*

veſſels, tonics and aſtringents, are the remedies particularly indicated. The pulvis chalybis and peruvian bark, are the preparations generally employed. Alum when given alone, or joined with the bark, has been frequently uſed with ſucceſs ; and if we may reaſon from analogy, the Perſimmon, as containing a ſalt of greater aſtringency, would be equally uſeful.

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IN THE LEUCORRHEA.

The Leucorrhea, Fluor Albus or Whites, as depending upon the ſame cauſe, as the Hemorrhagia Uteri, is to be cured in the ſame manner, with leſs reſerve however in the uſe of aſtringents.

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IN THE DYSENTERY.

In the latter end of the Dyſentery, or in the Diarrhæa, which ſucceeds this diſeaſe, the ripe fruit dried, or the powder of the unripe fruit, or the bark of the root of the tree, have been employed with ſucceſs, when other remedies failed.

The Indians make a paſte, of the ripe fruit, which they bake into loaves, of the thickneſs of a mans finger, and of the conſiſtence of a dried pear, which they uſe as a ſovereign remedy in this diſeaſe. *

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* *Charlevoix, page 223. vol. 2nd. He ſpeaks of the Perſimmon tree, by the name of* Piakimine, *which it is called in the Indian language.*

The revd. Dr. Wilſon, of Lewis-town in the ſtate of Delaware, ſays, the bark of the root of the tree, when given in wine is a ſpecific.

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IN THE DIARRHÆA.

When this diſeaſe depends upon an increaſed excitability of the inteſtines from debility, the Perſimmon is equally uſeful as in the Dyſentery.

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DIABETES.

We have the authority of Dr. Mead for uſing alum in this diſeaſe, altho' we are told by Dr. Cullen, the ſerum aluminoſum has been given without ſucceſs. Probably, by not being adminiſtered in ſufficient quantities, and not continued for a ſufficient length of time. We are guided by the light of analogy, when we would recommend a trial of one of the moſt powerful of the vegetable aſtringents in this diſeaſe.

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IN THE GONORRHÆA.

The Gonorrhæa conſiſts in an exceſs, or deficiency of action, in the ſecretory veſſels of the glands of the urethra. The increaſed ſecretion of mucus is the effect, not the cauſe of the diſeaſe.

This theory accounts for the various ſucceſs attending the uſe of different injections, ſince firſt introduced into practice.

In the aſthenic gonorrhæa, the Perſimmon juice diluted with water, makes a valuable injection.

Some practitioners have attempted to aboliſh the uſe of theſe applications, and the ſhortneſs of time they remain in the urethra, has been offered as an argument againſt their uſe. Would not a bougie, made by inſpiſſating the unripe juice on a compoſition of oil, wax and reſin, rolled to the ſize of the urethra, and wore as bougies generally are, obviate this objection?

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IN THE CYNANCHE TONSILLARIS.

Alum combined with oak bark, Dr. Cullen ſays, is a uſeful gargle in the Cynanche Tonſillaris, and may be uſed in caſes of ſpongy ſwelled gums and looſe teeth, from ſcurvy and other cauſes. The juice of the Perſimmon, being of equal efficacy with theſe remedies in other diſeaſes, muſt be equally ſo in this.

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IN THE GRAVEL.

The action of aſtringents, in relieving the ſymptoms which attend the preſence of a ſtone in the urinary paſſages, is a ſubject which has puzzled the ingenuity of antient, as well as modern phyſicians. Dr. Cullen ſuppoſes they act, by abſorbing the acid in the ſtomach, this great man, has the modeſty to offer this opinion, only as a conjecture; he is induced to think ſo, from the medicines which are the moſt powerful in relieving the ſymptoms of a calculus, being a variety of alkalines.

In oppoſition to this it may be ſaid, the urine always contains a ſuperabundant acid, which keeps the calcareous matter diſſolved; conſequently, whatever tends to rid the urine, of this exceſs of acid, favours the depoſition of the calcareous matter. It may likewiſe be ſaid, the aſtringent matter enters the courſe of circulation, and diſſolves the ſtone.

Another objection to the opinion of Dr. Cullen, is, that all ſtones taken from the bladder, are not compoſed of the ſame principles; ſome containing an acid, others being evaporable by heat, while others are converted into quick lime. *

To aſcertain whether the aſtringent matter, was taken into the courſe of circulation, or into the bladder unaltered, I ſwallowed ſix ounces of a ſtrong infuſion of the Perſimmon gum diluted with half a pint of water; and after frequent micturition at different intervals, could not diſcover it in the urine by the addition of green vitriol.

At the ſame time I opened a vein in the arm, and could not diſcover it in the ſerum, by the ſame teſt.

To ſee the effect of a concentrated aſtringent, on the calculus, I put one ſcruple of a ſtone taken from the bladder of a horſe, reduced into an impalpable powder, into Perſimmon juice, one ſcruple into water, and another into recent urine, and after the mixtures had ſtood twenty four hours, I filtered the water, and having dried the powder,

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* *Percival's Eſſays vol.* 1. *And Tranſactions of the Royal Society of Edinburgh vol.* 3.

of each mixture ſeparately, found it had loſt none of its weight.

In this diſeaſe the Perſimmon may be uſed in powder, in pills, or infuſion.

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IN CHRONIC ULCERS.

The ripe fruit applied to an old malignant ulcer, has been found to be an efficacious remedy, and is ſaid to cauſe exquiſite pain. *

The efficacy probably ariſes, from its antiſeptic quality, and from the inflammation which it excites.

To produce an action different from the morbid one, which prevails in ulcers, by the exhibition, or abſtraction of ſtimulants, appears from many ſtriking facts, to be the indication to be anſwered.

Boerhaave, before he began the ſtudy of Phyſic, cured an ulcer on his leg by the application of *ſalt* and *urine*, which reſiſted the remedies of the moſt celebrated Phyſicians, for five years. ‡

I have ſeen bleeding and a low diet cure, or at leaſt, put a venereal ulcer of the leg in a proper diſpoſition to heal, which baffled the power of mercury, bark, wine, wort, generous diet, and many other famous tonics and ſtimulants. Sir John Pringle, mentions a fact nearly ſimilar to this. §

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* *Lawſon's natural hiſtory of North Carolina.*
† *Johnſon's life of Boerhaave.*
‡ *Diſeaſes of the army.*

OF THE USE OF THE PERSIMMON IN THE ARTS.

IN THE TANNING OF LEATHER.

The greater the quantity of reſin contained in any vegetable aſtringent, the greater the eaſe with which leather may be impregnated with it, and its greater degree of inſolubility in water afterwards, ſo much the more valuable is it, in this important branch of manufactures.

The uſe of tanning, ſays Dr. Macbride, is to prevent the leather from rotting, and to render it impervious to water. Any aſtringent vegetable ſubſtance, is powerful enough to accompliſh the firſt purpoſe, but to render the leather impervious to water, requires one containing a large proportion of gummy reſinous matter.

The ſuperiority of oak bark over other aſtringents, is owing to this property. The famous eſſence of this ſubſtance, is no more than an extract made by infuſion, and was firſt propoſed as a ſubſtitute for oak bark, in a memoir delivered to the Bath Society, in the year 1773.

The unripe juice of the Perſimmon, provided it could be obtained in ſufficient quantities, and for a price which would not greatly enhance the value of leather, muſt be preferable to oak bark, for reaſons evident to every chemical mind.

Allowing every tree to produce four buſhels of fruit, though Mr. Bartram ſays, he has ſeen ſome which produce ſix, and ſuppoſe three hundred of theſe trees cultivated; the quantity of gum reſin which would be produced, would

be 1800 pounds, as I have aſcertained by experiment, computing ſix pounds to a tree. The quantity of juice would be ſeveral hundred gallons, which might be kept in barrels 'till wanted for uſe.

North Carolina is the only ſtate, in which the Perſimmon is cultivated; it is a common practice there to ingraft it on the apple, by which means the rapidity of its growth is greatly increaſed.

When we oppoſe the cleanlineſs of the proceſs, if the Perſimmon could be uſed, the ſtrength of the aſtringent, the ſmall number of hands required, the ſmall capital to begin and little labour requiſite to carry on the buſineſs, the trifling piece of ground which a tanyard would occupy, the value of the leather and ſhortneſs of time neceſſary to finiſh it: to the large capital at preſent required, the number of hands employed, the quantity of labour, the immenſe loads of bark, the annual expence of a horſe and price of inſtruments to grind it, and to the length of time neceſſary to finiſh the leather, we may conclude, the experiment is well worthy the attention of ſome philoſophical tanner.

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AS AN INGREDIENT IN THE BLACK DYE.

The black dye in common uſe, is no more than an ink, made by adding a vegetable aſtringent to a ſolution of green vitriol, altho' realgar, antimony, litharge, arſenic, orpiment and other ſubſtances have been added to the ingredients.

In the Swediſh tranſactions for the year 1753, a fine black is ſaid to be dyed, with the leaves of the uva urſi,

the black matter concretes together in large particles, which is ſuppoſed to be of great advantage to the black dye, as the largeneſs of the colouring particles, which concrete in the pores of the cloth, may render them more fixed, conſequently, leſs of the colouring matter is waſted in the liquor. To this cauſe, ſays Dr. Lewis, may be attributed a quality of the uva urſi dye, mentioned by the Swediſh author, that the cloth is cleaner, than after the other black dyes, or requires leſs waſhing to free it from the looſe color.

The juice of the Perſimmon, precipitates iron in the ſame manner as the uva urſi, in large particles, which fall to the bottom of the veſſel. I have dyed ſilk with an ink made of this ſubſtance, which was as black, and bore waſhing as well, as that dyed with galls, logwood, and fifty other ingredients.

It is aſtoniſhing to think, an exorbitant price is ſtill paid for galls and logwood, when buſhels of a ſubſtitute ſuperior to either, may be had for the trouble of carrying them away.

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IN THE MAKING OF INK.

The great defect in an ink, made from the juice of the Perſimmon, is, that the precipitated iron, concretes together in large particles, and falls to the bottom of the veſſel; this takes place in a greater or leſs degree, in every precipitate of iron, by a vegetable aſtringent. In ſome inks this circumſtance may be prevented by the addition of gum arabic, and the coloring matter kept ſuſpended in

the fluid; I have attempted it in vain, in ink made from the Perſimmon, the letters always appearing as if written with charcoal diffuſed in water. An ink has likewiſe been made from the precipitated iron mixed with water, and kept ſuſpended by the addition of gum arabic; when made in this manner, tho' it is durable, yet the letters may be waſhed off from the paper as eaſily as if written with any black powder diffuſed in water.

In the latter end of October, and in November, the aſtringent gum of the Perſimmon, is converted into a ſweet nutritious ſubſtance, which remains on the trees 'till January, and ſerves as food to ſquirrels, rabbits, racoons, and other animals.

The manner in which this change is produced, would lead to an inquiry, as curious as it would be uſeful. It appears to be a proceſs, analogous to a mortification in the extremities of the human body, and brought on by the ſame cauſe. An extinction of life, from a languid circulation, cauſed by the bebilitating power of cold. In what manner this quality acts, in producing a decompoſition, is difficult to determine: the conſtituent principles appear not to be changed, they are only modified; the gum reſin is principally compoſed of acid, oil, earth and water: the ripe fruit contains the ſame principles, and even when changed into a vinous liquor and diſtilled, the compoſition is ſtill acid, oil, and water*. Here we muſt reſt ſatisfi-

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* *The compoſition of ſpirit of wine, is a ſubject which has engaged the attention of many celebrated Chemiſts, among whom Cartheuſer, Macquer, Stahl, Boerhaave and Bucquet ſtand foremoſt. The two former, conſider it as a compound*

ed with the fact, for it is not the buſineſs of Chemiſtry, to wander in the boundleſs regions of conjecture. Perhaps ſome future experiments, may throw light on this myſterious proceſs, which at preſent only proves, that nature herſelf is a great Chemiſt.

TO MAKE SPIRIT OF THE PERSIMMON.

For this purpoſe, a certain quantity of water is to be added to the Perſimmon when ripe, and the whole put into a proper veſſel to which a certain quantity of yeaſt is to be added, to promote a fermentation. Every buſhel

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of phlogiſton and water, while the latter, think it is compoſed, of acid, water, and an attenuated oil. Perhaps a gleam of light may be thrown upon the ſubject, when we obſerve, that ſpirit of wine may be produced from animal, as well as vegetable ſubſtances. A fact not noticed in ſyſtems of Chemiſtry!

The Tartars prepare a wine, called Koumiſs, *from the milk of Mares, Camels, Ewes, and Reindeer, which is partly of an animal nature, and another called* Airn, *from the milk of Cows.* They likewiſe produce an inebriating liquor, from fiſh and water, putrefying in holes dug in the earth.† The Chineſe prepare a wine from Lamb, and produce a ſtrong ſpirit from the fleſh of Sheep.‡ The Swedes diſtil a low priced brandy, from rye and large black ants, found in ſmall round holes, at the bottom of the Fir-tree.* §

The ants yield to a chemical analyſis, acid, oil, and reſin. Theſe acts in my opinion, not only throw light on the compoſition of ſpirit of wine, but are an intereſting addition to our ſtock of knowledge, on putrefaction and fermentation.

* *Tooke's hiſtory of Ruſſia, and Tranſactions of the Royal Society of Edinburgh, vol.* 1.

† *Macbride's Eſſays.*

‡ *Encyclopædia Britannica, article China.*

§ *Conſett's tour through Sweden.*

of fruit treated in this manner, will yield one gallon of ſpirit, of an agreeable flavour. If beer is prefered to ſpirit, the fruit is boiled in water, which is afterwards ſtrained, and ſet to ferment; hops are then added to prevent the fermentation from proceeding too far, and it is bottled for uſe.

Thoſe who would wiſh to collect large quantities of the fruit for diſtillation, may conſult a memoir publiſhed by Mr. Bartram, in the firſt volume of the American Philoſophical Tranſactions.

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TO MAKE PERSIMMON BREAD.

When freed from the ſtones, they are to be mixed with flour as potatoes generally are and baked in the ſame manner. Bread when made in this way, is not only very nutritious, but has the advantage of œconomy to recommend it.

FINIS.