A dissertation on the properties and effects of the datura stramonium or common thorn-apple; and on its use in medicine / By Samuel Cooper.

A

DISSERTATION

ON THE

PROPERTIES AND EFFECTS

OF THE

DATURA STRAMONIUM,

OR

COMMON THORN-APPLE;

AND

ON ITS USE

IN MEDICINE.

By SAMUEL COOPER,
Member of the Chemical and Medical Societies of Philadelphia.

PHILADELPHIA:

PRINTED BY *SAMUEL H. SMITH.*

M, DCC, XCVII.

TO THE

MANAGERS AND PHYSICIANS

OF THE

PENNSYLVANIA HOSPITAL,

WHOSE BENEVOLENT LABORS GREATLY CONTRIBUTE TO THE

BENEFIT OF MANKIND,

AND TO THE PROMOTION OF

MEDICAL SCIENCE;

THIS

DISSERTATION IS INSCRIBED,

AS A MARK,

OF GRATITUDE, AND RESPECT,

BY THEIR OBLIGED FRIEND,

AND PUPIL,

THE AUTHOR.

PREFACE.

IN the following pages we have ventured to bring into view ſome experiments and obſervations, relative to the properties and effects of the Datura Stramonium, or common Thorn-apple. It was thought that, as this active plant has not received much attention from the medical experimenter, it was worthy of further inveſtigation. It furniſhes a ſubject extenſive, and important. He, who would do juſtice to ſuch a ſubject, ſhould poſſeſs talents, leiſure, and induſtry. To a deficiency in the two *former* points many of the imperfections of the preſent work may be juſtly

aſcribed. Inſtead of ſome months, or rather weeks, could a few years have been devoted to its execution, it might have been leſs imperfect, and conſequently leſs unworthy of the acceptance of the reader. With great diffidence it is ſubmitted to his inſpection.

A

DISSERTATION, &c.

THE vegetable world is highly tributary to the exiſtence and happineſs of man. From hence he derives many articles of food, and many remedies for diſeaſe; and it is probable that his happineſs will increaſe in proportion, as ingenuity or accident ſhall give riſe to uſeful diſcoveries in this department of nature. Many unknown plants doubtleſs inhabit our globe; ſome of which may poſſeſs valuable alimentary properties; and others again may be imbued with energies capable of obviating ſome of the *preſent* incurable diſeaſes, which invade the animal ſyſtem. Theſe plants and their uſes, will, ſooner or later, be diſcovered. In the mean while, any effort to extend our knowledge of ſuch, as are imperfectly known, may be attended with advantage. Influenced by this belief, we have been led to devote ſome time to the conſideration of the Datura Stramonium. We ſhall premiſe ſome

remarks on its natural hiſtory, and afterwards attempt an experimental inveſtigation of its component parts, of its effects on the animal body, and of its uſe in medicine. The Genus Datura is arranged by the celebrated Linnæus, in the claſs Pentandria, and order Monogynia; and is thus deſcribed, "Datura. Cor. funnel-form. Cal. tubular; angled, deciduous. Caps. 4—valved." * This genus includes ſeven ſpecies; that of which we are about to treat, is the ſecond, with "Pericarps thorny erect egged, leaves egged ſmooth." * In reſpect to the leaves, this deſcription is erroneous, if we may be guided by obſervation, and by the authority of Dr. Haller and Dr. Woodville. The leaves are not egged; but the plant when it is very young, has for the moſt part egged, or ovate leaves; and Linnæus might have drawn its ſpecific character from an imperfect ſpecimen. According to Dr. Haller they are angled; and according to Dr. Woodville, they are pointed at the extremity, indented, and formed into ſeveral obtuſe angles.

This ſpecies of thorn-apple very generally grows throughout the United States. Whether it be a native of theſe ſtates, or an exotic, is a queſtion, which has not been yet determined by botaniſts. It is an annual plant. It grows upon the borders of roads, around houſes, in gardens, and upon vacant lots. It delights in a nitrous ſoil, and ſeems to love the abodes of man. It not only flouriſhes in the neighbourhood of Philadelphia, but by the ſides of ſome of the ſtreets, in ſome yards, and in great abundance, particularly in the vacant Northern grounds of the city. Its general

* Syſtem of Vegetables of Linnæus tranſlated by a Botanical Society at Lichfield. London, 1783.

height is from two to four, but it ſometimes reaches to the height of ten feet. It ſprings from the earth about the latter end of May, from which time it continues to ſpring, till vegetation be checked by the cold of autumn. Its flowers are produced in the two laſt ſummer and the firſt autumnal months. They appear in ſucceſſion, and may be ſeen on the extreme branches when the lower ones poſſeſs thorny ſeed-veſſels. Theſe obſervations, relative to the firſt appearance, duration, and flowering of the plant, will chiefly apply to the neighborhood of Philadelphia.

In its progreſs to maturity the face of the Stramonium conſiderably alters. The ſtalk at firſt acquires two oppoſite lanced, and afterwards ſeveral ovate leaves, arranged in an alternate order. After ſome time theſe oppoſite and alternate leaves decay; the ſtalk divides into branches; theſe branches divide into others, and leaves of a different form are produced. The leaves are now irregularly ſet, and are angled and indented.* The flowers are moſt frequently white: they are placed on ſhort peduncles at the junction of the branches and leaves. Some plants poſſeſs purple flowers, and purple ſtalks, while others again have theſe parts tinged of a blue color. Hence it appears, that three varieties belong to the Datura Stramonium. The ſtamina are generally five, at times ſix, and at other times, one of them is cleft ſupporting two anthers. The thorny capſules are replete with kidney-form ſeeds, of a dark brown color. A capſule of the common ſize contain-

* Dr. Woodville, in his elegant work entitled Medical Botany, makes the leaves of this plant alternate. This I think, is an inaccuracy.

ed ſeven hundred and fifty ſeeds. The root is white and fibrous.

Many catepillars feed upon the leaves, and eſpecially one, which is a ſpecies of ſphinx, and is that which feeds upon the tobacco. A ſmall beetle eats the leaves into numerous perforations. The leaves are ſometimes infeſted by the puceron or louſe of plants. Profeſſor Barton has been well informed, that the goat eats both the leaf, and the ſeed veſſel. A ſimilar occurrence fell beneath my own obſervation about the commencement of laſt fall. A female goat daily devoured large quantities of the leaves, and at the ſame time gave milk, which was uſed by a man, and his wife, and their two children. At this time three of the family were diſeaſed; the man and his wife labored under intermittents, and one of the children under an affection of the bowels. This milk was probably imbued with noxious properties; and if it did not cauſe, might have increaſed, or diſpoſed to, their complaints.

The odor of the leaves does not appear to be offenſive to the bat, or the mouſe, as I found by expoſing them to it in veſſels which had proper air-holes. Upon bringing a large quantity of the boughs of the plant into a room, a dog ſeemingly in health, ran to them, laid down among them, and ſlept without appearing to experience any inconvenience from their exhalation. Notwithſtanding what has been ſaid, the exhalation of this plant may be offenſive to ſome inſects, and to ſome animals. It is frequently offenſive to man, as will appear in the ſubſequent pages.

EXPERIMENTS ON STRAMONIUM.

EXPERIMENT I.

A POUND and an half of the pounded leaves of ſtramonium, and a gallon of water were put into an alembic, to which a conſtant fire was applied. After ſome time a colorleſs fluid collected in the receiver; this was taſted and ſeemed ſlightly to poſſeſs the properties of the plant. Nothing reſembling eſſential oil appeared on the ſurface of the diſtilled fluid. Upon continuing the diſtillation an empyreumatic liquid was obtained.

EXPERIMENT II.

AN ounce of the colorleſs fluid juſt mentioned was taken by a healthy perſon; and its effects were very inconſiderable; it ſeemed only to induce a ſlight nauſea. This experiment was repeated with a ſimilar reſult.

EXPERIMENT III.

BY ſubjecting the dried leaves in a ſtone retort to a violent heat, a dark oil of a diſagreable odor was obtained. This oil poſſibly aroſe from a decompoſition of the reſin of the leaves; the reſin loſing its oxigene; and hence becoming an oil.

EXPERIMENT IV.

A QUART of the expreſſed juice of the leaves was ſuffered to ſtand many days in an atmoſphere moderately warm. A degree of fermentation ſeemed to take place in the liquid, and a white oleaginous matter gradually aroſe to its ſurface. My ingenious friend Dr. Woodhouſe informed me, that, he once procured a conſiderable quantity of a ſubſtance which reſembled oil, by infuſing this vegetable in water for ſome weeks.

EXPERIMENT V.

A LARGE handful of the leaves were burnt to aſhes, upon which water was poured, and ſuffered to ſtand a conſiderable time. The water was then filtered and evaporated. By this proceſs a ſmall quantity of potaſh was procured.

EXPERIMENT VI.

SOME ſpirit of wine, and half an ounce of the powdered leaves of Stramonium, were rubbed together in a marble mortar. The ſpirit aſſumed a deep green color. After decanting this portion of ſpirit, other portions were added, as long as they appeared by their color

to extract any thing from the powder. The clear decanted liquid was evaporated, and afforded twelve grains of reſin. I am induced to believe that four drachms of the above ſubſtance contain a larger portion than twelve grains. Does not a portion of the reſin riſe into the air with the alcohol? This I think was the caſe in one of my experiments. Highly rectified ſpirit of wine was poured, quantity after quantity, on an ounce of the powdered leaves; was frequently ſhaken with the material, and afterwards decanted. The ſpirit uſed in this way amounted to eight pounds. The whole of the decanted liquid, upon evaporation, only yielded eight grains of reſin.

EXPERIMENT VII.

The four drachms, which had been ſubjected to the action of alcohol, were triturated with repeated quantities of rain water, till the water ceaſed to be colored. Upon filtering and evaporating theſe quantities of colored water, one ſcruple of gummy matter was obtained, among which many very minute ſaline cryſtals were viſible. The matter which the ſpirit and water did not diſſolve was inſipid, grey, and earthy. Being dried, it was found to weigh two drachms, eighteen grains.

EXPERIMENT VIII.

A CONSIDERABLE quantity of the dried leaves were infuſed in ſnow water for two or three days. The infuſion was expoſed to an intenſe cold; the whole of it became a congealed maſs, except a ſmall quantity, which was dark, and which remained beneath the ice. This dark fluid cryſtalized upon removing it into another veſſel. The cryſtals reſembled nitre, in their form, and in their taſte. The powdered leaves thrown upon live coals ſparkle like ſmall particles of nitre.

EXPERIMENT IX.

THE watery infuſion of the leaves is yellow, bitter, and ſomewhat nauſeous. The ſpirituous tincture of them is green, and aſtringent; and upon adding ſome of it to a ſolution of ſulphate of iron, a brown thick fluid was formed.

EXPERIMENT X.

I PUT a quantity of the pounded ſeed with ſome water into a veſſel, which was expoſed to a boiling heat. Globules of oil roſe to the ſurface of the fluid, which reſembled ſweet-oil in color, and in taſte. When

the pounded ſeeds are wrapped in paper they ſtain it like oil; when they are thrown into the fire they flame; and when they are ſet in a diſh, and expoſed to heat, an exhalation ariſes ſimilar to that, which emanates from roaſting coffee.

EXPERIMENT XI.

HALF an ounce of the ſliced root was infuſed in a pint of water for three days. About four ounces of the ſtrained infuſion were ſwallowed. They produced ſome fever, which was accompanied by a ſlight intoxication, and head-ache. This infuſion is not diſagreeable to the taſte.

EXPERIMENT XII.

I PLACED a grain of the powdered leaves upon my tongue, and ſuffered it gradually to mix with the ſaliva of my mouth. A highly bitter and nauſeous taſte and an increaſed flow of ſaliva enſued. The diſagreeable taſte remained many minutes after ejecting the material from my mouth.

EXPERIMENT XIII.

ABOUT two grains of the powder was ſnuffed up the noſe; ſome irritation was immediately felt in the membrane; ſneezing occurred, and the mucus of the part was increaſed in quantity.

EXPERIMENT XIV.

Two ſcruples of the powder were put into a phial, and an ounce and an half of warm water were poured upon them. The phial was frequently ſhaken; and the contents of it in about half an hour were filtered. The filtrated liquor poſſeſſed a yellowiſh color, and a taſte more bitter than nauſeous. Of this an ounce was injected into the urethra. A ſlight heat and pain were the conſequence.

EXPERIMENT XV.

A DROP of the above filtrated liquor was let fall into the left eye. An uneaſy ſenſation of the part was immediately experienced. In five minutes the uneaſineſs ſeemed to be ſomewhat increaſed; in ten it was leſs; in fifteen a ſlight pain occurred in the other eye. In half an hour the pupil of the eye on which the fluid was ſuffered to fall began to enlarge. The pupil previouſly to its dilation appeared to be more contracted than that of the right eye. It was largeſt about twelve hours after the experiment; at which time it was viewed in a conſiderable light, and ſeemed thrice as large as the other. It continued dilated during two days. In a ſtrong light, objects were ſeen more diſtinctly with the right eye, but in a weak light, or in the dark, with the dilated one. This experiment was made upon myſelf, It was repeated on a boy

about fourteen years old; in this caſe the liquid uſed, was the expreſſed juice of the leaves diluted with water. He ſat in a pretty ſtrong light, and in about ten minutes after the application, he was of opinion that the viſion of the affected eye was increaſed in energy. The other phenomena were ſimilar to thoſe related in the former experiment. In this inſtance the dilitation of the pupil continued three days. But my friends Dr. Bache and Thomas Horsfield to whoſe eyes the infuſion was applied, experienced afterwards no increaſe of ſight in the dark. To experience this effect their pupils perhaps were not ſufficiently dilated.

Dr. Rush, when treating of viſion, informs his claſs, that a certain philoſopher, who lectured in Philadelphia, was accuſtomed to give the following advice to his pupils. For ſome time previouſly to appearing in the company of ladies you ſhould view a piece of black cloath, which will render your eyes ſoft and languiſhing. If any of his audience had been diſpoſed to follow this advice, they might have accompliſhed the deſired end, with greater eaſe, and effect, by letting fall into the eye a drop of the infuſion of ſtramonium.

EXPERIMENT XVI.

A drop of the expreſſed juice was let fall into the eye of a cat. An itching or pain of the part appeared to be induced; the animal making great exertions with her feet as if ſhe wiſhed to rub off the material. The

whole of the colored part of the eye ſeemed in a ſhort time to be converted into pupil. Inflammation and a puriform diſcharge, of many days continuance, ſucceeded.

EXPERIMENT XVII.

I SCRAPED away a portion of the cuticle from my wriſt. Upon applying the freſh leaves pounded into a ſoft poultice to the part; it ſwelled, and became ſo painful, that after ſome time, I was induced to change the application for that of a mild cerate.

EXPERIMENT XVIII.

A QUANTITY of the pounded leaves was bound on the inner ſurface, and about midway of the thigh, and ſuffered to remain unremoved during twelve hours. No other effect than a moiſture on the ſkin was apparently produced by the application.

EXPERIMENT XIX.

ABOUT four o'clock in the afternoon ſix ounces of a warm decoction of the leaves were rubbed on each arm of a boy till the whole diſappeared. In a very ſhort time he was affected with febrile ſymptoms, his head

becoming light, his ſkin warm and ſweaty, and his mouth dry. He was troubled with a ſlight head-ache during the whole of the next day.

EXPERIMENT XX.

A RAT, ſo young that it was nearly devoid of hair, was treated in the following manner. A decoction of the leaves, the ſame in ſtrength as in the former experiment, was liberally applied to the ſurface of its body. It was quickly rouſed out of its quiet ſtate, and made violent, but irregular, exertions to move away. Theſe exertions ſeemed to be of the convulſive kind. They would ſuddenly ceaſe, and the animal would fall on its ſide, and lie as if aſleep; and their return would be equally ſudden. This alternate activity and torpor of the animal frequently occurred, but gradually diminiſhed, and entirely diſappeared in a few hours. To another equally young, water ſimilar in quantity and temperature to the decoction, was in like manner applied. The water excited it into conſiderable exertion, but its motions were more natural than thoſe of the former.

EXPERIMENT XXI.

AT night I ſtrewed freſh branches of the plant on my bed, on each ſide of the pillow, and about the room. I afterwards went to bed, ſlept, and awoke in the morning with a ſlight fever and head-ache.

EXPERIMENT XXII.

To I. L. twenty-six years old, healthy, his pulse beating seventy-two strokes in a minute, I gave one grain of the powdered leaves of stramonium diffused in about an ounce of temperate water.

In	2	5	10	15	20	25	30	35	40	45	55	65	Minutes.
The pulse beat	72	72	72	74	73	73	73	71	71	70	69	89	Strokes.

In about ten minutes his pulse seemed to be somewhat increased in force. In twenty minutes he became dull; and in thirty began to doze. In thirty-four minutes the pulse was full and unequal, and in forty-seven somewhat tense, and less unequal. He continued to doze till about the fifty-fifth minute; at this time some tea was handed him, which he drank, and which raised his pulse to eighty-nine quick strokes. This experiment was made in the evening; and next day he informed me, that he had experienced during the night much heat in his hands and feet.

EXPERIMENT XXIII.

To P. M. healthy, thirty-two years old, his pulse soft and full, and beating seventy-four strokes in a minute, I gave two grains of the leaves diffused in water.

In	5	10	15	20	45	0	45	40	45	50	55	00	05	Minutes.
Pulse beat	80	76	78	78	79	82	83	82	84	79	80	84	71	Strokes.

When ten minutes had elapſed he found his head ſomewhat giddy: in twenty he was drowſy, and his pulſe was quick. In thirty minutes his hands ſweated: in forty his tongue acquired ſome whiteneſs, and the eye a pupil ſomewhat more dilated. In forty-five minutes his pulſe beat fuller and quicker ſtrokes; his hands were warm, and covered with ſweat; his cheeks redder, and his drowſineſs had increaſed. In fifty minutes he complained of pain in his head; and his whole body was unuſually warm:—in ſixty his eyes became miſty; his ſtomach ſick. Deſirous of ſleeping he laid his body in a horizontal poſition. In ſixty-five minutes his pulſe evidenced great tenſion and was ſtill fuller. I was now obliged to leave him, but returned to him, about the eightieth minute, and found him aſleep; his eye-lids were not completely cloſed; his face was red, and moiſt; he reſembled a perſon laboring under the effects of too much ſpirituous potation.

EXPERIMENT XXIV.

M. F. aged forty, healthy, but having an ulcer on the leg, and his pulſe beating ſeventy-eight ſtrokes in a minute, took in the evening two grains of the powdered leaves ſuſpended in about an ounce of temperate water.

In	5	10	15	20	25	30	40	45	50	55	60	65	70	80	Minutes.
Pulſe beat	81	83	83	81	79	78	78	76	74	73	72	70	72	68	Strokes.

In five minutes his pulſe was quicker, and between the tenth and fifteenth minute, he was affected with a ſlight pain of the head. In ſixteen minutes he experienced a heavineſs in his eyes; in twenty his hands and feet were warm and ſweaty; and his pulſe was full and tenſe. In ſeventy, his face was fluſhed; and in eighty, nauſea ſupervened. He now drank ſome cold water, which relieved the nauſea, and the other ſymptoms. On the ſucceeding morning he informed me, that he felt unuſually cheerful, and that his appetite was increaſed.

EXPERIMENT XXV.

P. M. on whom experiment 23d. was inſtituted, his pulſe beating eighty times in a minute, took four grains of the powdered leaves.

In	2	5	10	15	20	25	35	45	50	60	75	Minutes.
Pulſe beat	81	76	80	78	76	74	74	68	66	66	66	Strokes.

In twelve minutes the pulſe was more full and tenſe, and the heat of his face and hands was increaſed. In twenty-eight minutes his head became giddy, and his ſtomach ſick. This ſickneſs at ſtomach was of ſhort duration. In about forty-eight minutes the fullneſs and tenſion of his pulſe had rather increaſed. In about ſeventy minutes evident intoxication was induced, reſembling that which ariſes from drinking alcohol. His cheeks and his eyes were reddened; his pupils were dilated; his voice faultered; and he was

hardly capable of ſitting erect. About the eightieth minute he took ſome tea, which obviated in ſome meaſure the preceding ſymptoms. In a ſhort time his pulſe was felt, and it beat eighty-four ſtrokes in a minute. This experiment was made in the evening. During the night he experienced much head-ache and thirſt. On the ſucceeding morning his tongue was covered with a white pellicle. He was troubled with head-ache and with pain in his limbs for many ſubſequent days. Theſe latter ſymptoms regularly ſupervened upon the approach of evening, and continued till morning.

EXPERIMENT XXVI.

I GAVE to I. C. about fifty years old, and laboring under mania of diminiſhed violence, five grains of the powdered leaves. Previouſly to exhibiting the medicine, his pulſe beat eighty-three times in a minute.

In	5	10	15	20	26	30	40	45	50	55	70	80	Minutes.
Pulſe beat	75	72	74	63	61	60	64	66	70	77	75	80	Strokes.

In about eight minutes ſome nauſea occurred: his pulſe was more tenſe. In twenty minutes he had an urinary diſcharge; in thirty his pulſe had become full. The Peruvian bark, he ſaid, that he had taken, had made him thirſty. He drank ſome water. In forty-two minutes the heat of his body was manifeſtly increaſed; and in fifty his cheeks were reddened. About the fifty-eighth minute he had an alvine, and urinary

diſcharge. In ſeventy minutes he was thirſty again, and drank; in ninety he had another evacuation of urine.

EXPERIMENT XXVII.

I GAVE to M. F. on whom experiment 24 was made, ſix grains of the powdered leaves diffuſed in water. Previouſly to taking the medicine, his pulſe was ſomewhat full and tenſe, and beat eighty ſtrokes in a minute.

I[n]	3	6	10	15	20	25	30	35	40	45	50	60	65	70	75	80	88	90	95	100
P.b	80	84	78	77	75	74	74	74	77	79	80	80	86	87	87	87	100	99	102	105

In five minutes his pulſe had undergone ſome increaſe in tenſion, and he thought that his eyes had become ſlightly dim. Before ten minutes had elapſed his hands were warmer, and he had experienced a ſlight pain in the back part of his head, which was ſucceeded by dullneſs of mind. In thirty minutes this dullneſs was diminiſhed. About the thirty ſixth minute he took four grains more of the powder. On the forty-ſecond minute his pulſe had increaſed in tenſion, and in ſixty in quickneſs. In ſeventy minutes he was thirſty, dull, and ſleepy; in ſeventy-five he experienced ſome head-ache. About the eightieth minute he was bled to ten ounces. His pulſe immediately afterwards was leſs tenſe, and quick, and his head-ache, and diſpoſition to ſleepineſs, though not his thirſt, were removed. In ninety-five minutes his

body was warmer, and his thirſt greater. I was now obliged to leave him. In three hours I ſaw him again. During my abſence he had taken ſome drink, ſlept, and diſcharged a conſiderable quantity of urine. He had continued free from any pain in his head; the heat of his body had greatly diminiſhed, and his pulſe was full and ſoft, and only beat ſeventy-two ſtrokes in a minute. It may be proper to obſerve that in the beginning of this experiment my patient was ſitting, and that when his pulſe was laſt felt he was in a recumbent poſture. The blood which was drawn evidenced a degree of ſizineſs.

EXPERIMENT XXVIII.

After bringing the heart of a frog into view, a few drops of the expreſſed juice of the leaves were applied to it. It ceaſed to move in a few minutes; and it could not be rouſed into freſh motion by pricking it with the point of a ſcalpel. The ſcalpel was applied afterwards to ſome of its muſcles, and they contracted.

EXPERIMENT XXIX.

Upon bringing into view the heart of a young dog, and the ventricles ceaſing to beat, I injected into the vena cava ſome of the expreſſed juice. The motion of the heart was renewed; and the heart pulſated many times.

EXPERIMENT XXX.

Upon bringing into view the heart of a frog, about three drachms of the expreſſed juice was injected into the inteſtines. Previouſly to the injection, the heart beat nineteen ſtrong ſtrokes in a minute. In five minutes it beat nineteen quick and ſtronger ſtrokes. In ten minutes it beat eighteen ſtrokes; in fifteen, ſeventeen; in twenty, ſixteen; in twenty-five, twelve; and in thirty, eight. After the twentieth minute its motions gradually leſſened in ſtrength till they entirely ceaſed. This frog lived about an hour and an half. Another one treated in the ſame manner, but without the injection, lived for ſeveral hours.

EXPERIMENT XXXI.

After removing a portion of the cranium in ſuch a manner as to bring the brain into view, ſome of the expreſſed juice was applied to the part. Convulſions were the immediate conſequence, the frog dying in three minutes.

EXPERIMENT XXXII.

About two drachms of the juice were injected into the cavity of the abdomen of a dog. Upon killing the ani-

mal about two hours afterwards and inſpecting the abdomen, a portion of the ſurface of the inteſtines, and a part of the omentum and peritonæum were preternaturally reddened.

EXPERIMENT XXXIII.

About half an ounce of the expreſſed juice of the leaves, was injected into the jugular vein of a bitch. She made one violent ſtruggle and died. She lived about half a minute after injecting the juice: Upon diſſection, her blood was found fluid; and a white coagulum had extenſively formed in the right auricle and ventricle of the heart. The brain was more watery than natural.

EXPERIMENT XXXIV.

More than an ounce of the expreſſed juice was injected into the rectum of a ſmall dog. In a few minutes the pulſe became more frequent and quick. In about ten minutes he endeavoured to vomit, but his endeavours were ineffectual. His ſtomach was oppreſſed, and ſomething regurgitated into his mouth which was ſwallowed as often as it regurgitated. In fifteen minutes he had ſeveral ſtools, which conſiſted of fæces and of the expreſſed juice. After theſe diſcharges, freſh efforts to vomit enſued, but they were as vain as the former. He tottered as he walked. In half an

hour he became dull and ſlept. During his ſleep his whole frame was affected with frequent tremulous motions or ſtartings. He did not ſleep long, made again efforts to vomit; attempted to walk, but was unable; laid down. He now fell into a ſleep, of greater compoſure, and of longer continuance. On the enſuing day he was languid, but able to walk, and took ſome nouriſhment, and gradually recovered.

EXPERIMENT XXXV.

To another dog whoſe pulſe was at one hundred and eleven in a minute, I gave about an ounce and an half of a ſpirituous tincture of the leaves. The pulſe gradually increaſed in quickneſs, and in frequency; and in thirty minutes it beat one hundred and forty ſtrokes. In twenty-three minutes derangement of mind came on; the animal running in circles, into the fire, againſt the furniture of the room, tumbling on her ſide, rolling on her back, and agitating her feet in the air. She was now bled from one of the jugular veins. Her blood, as it flowed, was florid; upon ſtanding ſome time the craſſamentum floated in the ſerum, was ſomewhat looſe in its texture, and numerous red particles were depoſited at the bottom of the bowl. Upon killing and diſſecting the animal, neither her fleſh, nor her ſecretions appeared to be imbued with the odor of the tincture of the leaves. In this experiment I was induced to pay attention to the odor of the fleſh and ſecretions, as I had once made a ſimilar experiment with the tincture of opium, and

found that the whole animal upon diſſection ſeemed to be impregnated with its ſmell. The portion of the tincture of opium uſed, was about three ounces.

EXPERIMENT XXXVI.

I POURED an ounce and an half of the expreſſed juice down the throat of a dog uſed in the laſt experiment except one. His heart afterwards beat ſlow and ſtrong ſtrokes. His reſpiration became more and more laborious, and at length the thorax moved with ſuch force, and irregularity, that the pulſations of the heart could not be felt. His ſl ep, when he ſlept, was reſtleſs and imperfect. During the two following days he drank, but eat little, ſlept much, and was found dead on the morning of the fourth day. Upon removing a portion of the cranium the brain was found to be watery. About two drachms of limpid fluid were found in the ventricles of the brain. The lungs appeared to be ſurcharged with blood. The valve of the pylorus was greatly contracted. The contents of the ſtomach were yellowiſh, and conſiſted partly of the medicine which had been taken. The gall-bladder was highly diſtended with a dark colored bile; and much bile of the ſame color was found in the inteſtines.

EXPERIMENT XXXVII.

I OBTAINED a dog that labored under periodical twitchings or convulſions, which occurred every three or four minutes. He appeared to be old, his frame was emaciated, his countenance dull, and when he walked, his ſteps were ſlow and irregular. To this dog I gave a ſcruple of the extract of the leaves, which was repeated ſeveral times. The effects of the medicine were frequent black ſtools, a frequent flow of darkiſh urine, thirſt, languor, and emaciation of the body. But this treatment did not diminiſh his convulſions. I now remitted the medicine for ſeveral weeks. During this period he became fatter, and more lively than I had hitherto ſeen him. Upon repeating the medicine in larger doſes, ſimilar effects as before, but of a more violent nature, were produced. His reſpiration became laborious and ſlow; and his death ſoon occured. Upon opening his abdomen a large worm lay naked to the view, except its extreme parts, which were concealed by the inteſtines. I was much aſtoniſhed, and much delighted, at a diſcovery ſo unexpected; and at once concluded, that the worm had been the cauſe of convulſion in the dog. It was of a vermilion color, above a yard in length, and nearly an inch in circumference. Profeſſor Barton, ſo juſtly celebrated for his profound knowledge of the objects of nature, is of opinion, that this worm is a new ſpecies of Aſcaris. He probably will be induced to deſcribe and arrange it among the vermes.

No perforation through the inteſtines was obvious; they were full of a yellowiſh fluid; but not any fluid was found in the cavity of the abdomen. May we not conjecture, that the worm perforated the inteſtines upon the firſt exhibition of the ſtramonium, which according to Dr. Ruſh and Dr. Fowler is offenſive to worms. The external ſurface of the inteſtines and ſtomach were redder than natural. Some parts of the inteſtines, and much of the meſentery appeared to be in a gangrenous ſtate. A ſmall quantity of water was found in the ventricles of the brain. Theſe laſt effects, I think, may in great meaſure be attributed to the violent operation of the medicine.

Obſervations on the preceding Experiments.

It appears, that the leaves of ſtramonium poſſeſs no eſſential oil, as they afford none when diſtilled with water. The diſtilled water, taken into the ſtomach, produces little or no effect. Experiments 1, 2.

The oily matter, which riſes to the ſurface of the expreſſed juice, cannot with ſtrict propriety be called an eſſential oil, as it does not riſe till a degree of fermentation occurs in the juice. This oily matter probably originates from a decompoſition of the reſin of the fluid.

The dry leaves, when expoſed in a retort to a violent heat, yield empyreumatic oil, and when burnt yield potaſh; products which are afforded by numerous vegetable ſubſtances. Exper. 3. 5.

From four drachms of the powdered leaves, which had been expoſed to repeated quantities of alcohol, twelve grains of reſin were obtained. The ſame leaves ſubjected to a pure water yielded one ſcruple of gummy matter, among which many very minute cryſtals exiſted. Had theſe cryſtals been ſeparated from the gum, they would perhaps have amounted to three or four grains. Exper. 6. 7. Three grains of the reſin, given to a healthy perſon, produced much exhiliration of mind, fever, and head-ache, and ſeveral alvine diſcharges. Three grains of the gummy matter given to a healthy perſon, produced a ſlight exhilira-

tion of mind, fever and head-ache, and a copious flow of urine. Might not this gummy matter be exhibited with effect in ſome dropſies? The grey, earthy, inſipid ſubſtance, which, neither the alcohol, nor the water diſſolved, weighed two drachms and eighteen grains.

Hence it ſeems that the conſtituent parts of the powdered leaves of ſtramonium are a reſin, a gum, an eſſential ſalt, and an earthy matter. The reſin appears to be the moſt active part. The gum poſſeſſes a bitter, the reſin, an aſtringent principle. Exper. 9.

With regard to the other parts of the plant; the honey of the flowers, the ſeed and the root; my experiments are extremely deficient. However I may obſerve that the honey is bitter, the ſeed and the root ſweet, and that they all in a greater or leſs degree poſſeſs the properties of the leaves. An ingenious botaniſt, William Bartram informs me, that he eats this honey with pleaſure, and avidity, and without experiencing any thing morbid from its uſe. But my fellow ſtudent Joſeph Johnſon aſſures me, that he once was attacked with head-ache, and with ſickneſs at ſtomach, after ſucking many of the flowers: and profeſſor Barton ſuppoſes that this is one of the plants from which the bee, in this country, ſometimes extract a pernicious honey. The ſweet taſte of the ſeed has betrayed many a child into great danger. The ſeed and the root are pulverized with much difficulty. When it is neceſſary to reſort to them, it will perhaps be beſt to roaſt, grind, and make the former into coffee; and beſt to ſlice, and boil the latter for a decoction. In the following experiments, and caſes, I have uſed the leaves in preference to the other parts

of the plant. They may be gathered, dried, and powdered with eaſe. They may be plucked during the flowering ſtate of the branches, put in an airy and ſhaded apartment, and pulverized as ſoon as they become dry. The uſe of a fine ſeive will be proper to obtain the powder free from the fibres of the leaves. It may now be kept in cloſe veſſels; and if good, it will poſſeſs a beautiful green color.

When this powder is applied to the tender membrane of the noſe it produces ſneezing, and an increaſed flow of mucus. When taken into the mouth, it ſtimulates the ſalivary glands into great action. Exper. 12, 13. It diſagreeably affects the ſenſes of taſte and ſmelling; and if the leaves be chewed for ſome time they induce a degree of intoxication. In theſe circumſtances ſtramonium reſembles nicotiana, or tobacco. And they are ſimilar in other reſpects; for the ſame inſect, in the catapillar, and in the fly ſtate, and the ſame animal feed alike on both plants. Should man not alter the current of his preſent propenſities, ſhould he continue to indulge a reliſh for unnatural luxuries, and delight in being the ingenious tormentor of himſelf; it may be predicted that ſtramonium, like tobacco and alcohol, will become the bane of ſociety. But a hope is entertained that future generations, taught by the experience and misfortunes of their anceſtors, will relinquiſh the general uſe, and prevent the introduction, of ſuch injurious articles.

A drop of an infuſion of the powder applied to the eye, dilates the pupil. Exper. 15, 16. It is difficult to account for this curious effect produced on the eye. Upon the application of the infuſion does an unuſual action occur in the external coat of that organ,

which is communicated by ſympathy to the retina; an action or affection, which to a certain degree deprives the retina of the power of receiving the impreſſions of objects? Or does the diffuſive vapor of ſtramonium, like heat or electricity, penetrate to the retina, and excite in it a peculiar diſeaſe? That fluids or vapors are capable of thus acting, is rendered ſomewhat probable by the following experiment. About three drachms of the powdered leaves were mixed with a pint of tepid water, and poured into a ſound bladder; the neck of the bladder was then tightly tied; and as ſoon as the bladder became well moiſt, the odor of the ſtramonium was perceptible on its ſurface. And the great Doctor Darwin, in the ſecond volume of his work entitled Zoonomia, ſays, "There appear to be three different modes by which extraneous bodies may be introduced into the ſyſtem, beſides that of abſorption. 1ſt. By ethereal tranſition, as heat and electricity; 2d. by chemical attraction, as oxigene; and 3d. by *expanſive vapor*, as ether, and eſſential oils." That the infuſion applied to the eye is abſorbed, and produces its effect through the medium of the circulating fluids, is an opinion, which is highly improbable. If the infuſion acted through this medium, both eyes would be alike affected. The following inſtance of the action of ſtramonium on the eye is a curious one, and it favors what we ſaid in a former experiment. "The late Dr. Bond had under his care a patient, a young girl, who had put the ſeeds of this plant into her eye, which dilated the pupil to ſuch a degree, that ſhe could ſee in the dark, but in the light was almoſt blind." Appendix to Notes on Virginia, written by Thomas Jefferſon. Since this vegetable

is capable of acting with ſuch energy on the eye, we may expect, that it will ſooner or later be applied with ſucceſs, in ſome diſeaſes of that exquiſite organ.

If the leaves be pounded into a ſoft poultice, and applied to a part from which the cuticle is removed, they excite heat and pain; if applied to a part, which is ſhielded by the cuticle, no effect ſeems to be produced. Exper. 18. But if a decoction of the leaves be rubbed for ſome time on the ſurface of the body, febrile ſymptoms will be excited. Exper. 19. The decoction externally applied to a very young rat, ſeemed to induce convulſions. Exper. 20.

The exhalation of ſtramonium excites head-ache and fever in the human ſyſtem. Exper. 21. This exhalation, I endeavoured to collect, by putting many branches of the plant under a large glaſs veſſel full of water, and afterwards expoſing it to the ſun. But in this I did not ſucceed; the water imbibed the exhalation. That the vapor emanating from this plant is capable of producing febrile action, is an opinion, which is ſupported by many facts. The following communications countenance this opinion. "Below the falls of Ohio (ſays a very intelligent gentleman*) I lay ſome days *in camp*, with General Putnam, and ſeveral others. Here the earth was extenſively covered with ſtramonium in full bloſſom, whoſe ſtrong odor produced a pain in my head, which continued after leaving that place and till we arrived in the Wabaſh river. I was now ſeized with a fever, which had nearly proved fatal, and which was ſucceeded by a

* John Heckewelder of Bethlehem in Pennſylvania, in a letter.

giddineſs of the head of many weeks continuance. General Putnam was alſo attacked with this fever; he recovered, though his recovery was not expected. Although my illneſs, and General Putnam's might have ariſen from breathing the fogs of the river, yet as I had been accuſtomed to theſe fogs before without being affected by them, I have ever been of opinion, that my fever originated from the ſcent of theſe plants." And Profeſſor Barton has been informed, that juſt before the peace of 1783, it was ſuppoſed by the phyſicians of New York, that the great abundance of ſtramonium in the vicinity of that city had produced fevers; and that on this account the plant was cut down. For a ſimilar reaſon (according to the ſame excellent Profeſſor) a law has been lately paſſed at St. Vincennes on the river Wabaſh, for deſtroying this plant. The inhabitants of the place aſſert, that previouſly to its introduction* among them, they knew

* Colonel Winthrop Sargent informed Dr. Barton, that the Datura Stramonium has been known to exiſt on the grounds near the river Wabaſh above 12 or 14 years. To theſe parts it was probably conveyed by accident or curioſity. Some perſons much admire its flowers. In a letter already quoted, that I received from I. Heckewelder of Bethlehem, there is the following information worthy of note. He ſays, "I met with this plant about the year 1769, for the firſt time on the road from from this place (Bethlehem) to Philadelphia. Its flower pleaſed me ſo well, that after its ſeeds were ripe, I took ſome of them home with me, and planted them on a farm near Nazareth. I found the plant at ſome places on the river Ohio: particularly at Fort Waſhington. This plant does not grow about Bethlehem, and does not appear in ſeveral parts of Pennſylvania." Profeſſor Kalm, who travelled about fifty years ago through this country, from Wilmington in Delaware ſtate, to Quebec in Canada, only ſpeaks of the Datura Stramonium, as growing between Wilmington and Philadelphia. From theſe and other circumſtances it is doubtful whether the thorn-apple is a native of all of the United States. Perhaps it is not a native of any one of them.

In a former part of this work I might have obſerved that the plant is frequently called *James Town, or Jameſon Weed*, becauſe a number of ſailors were once violently diſeaſed by ignorantly eating the boiled plant at *James Town* in Virginia. In like manner I might have obſerved that it is called French Cheſnut in New-Jerſey.

not what a remitting fever was. It may be ſaid, that the preceding opinions relative to the production of fever by its exhalation, are founded on deception; and that fever in theſe inſtances might have ariſen from the common cauſe, vegetable and animal putrefaction. It cannot perhaps be declared, that no putrid animals and vegetables exiſted at Fort Vincennes, and the other places; where the vapor of the thorn-apple ſeemed to produce ſuch morbid effects. Vegetable and animal putrefaction might have exiſted in theſe places, and co-operate with the ſcent of the plant in producing diſeaſe. As alcohol gives origin to a febrile diſpoſition in the ſyſtem, in like manner, the ſcent of theſe plants might have diſpoſed to the production of fever. But their vapor or ſcent, I ſhould imagine, would be highly equivalent, without the aid of any other cauſe, to give riſe to fevers of a remitting type; eſpecially when we recollect that the leaf can excite head-ache, convulſion, and mania. Alcohol and opium alone have excited the moſt violent diſeaſes. I ſaw, I think, towards the cloſe of laſt autumn, a caſe of true yellow fever which was induced in a perſon ſomewhat depreſſed in his mind, who for ſeveral days had taken nothing except repeated quantities of wine and brandy. And it is well known that a kind of apoplexy originates from an exceſſive doſe of opium. Thus we ſee that many morbid ſtimuli act with equal violence, and in a way ſomewhat ſimilar on the human ſyſtem; hence may we not be led to conjecture that their conſtituent principles may be the ſame, at leaſt in ſome degree, though differently combined?

Might not this active vegetable exhalation * be breathed with advantage in ſome weak habits, and in ſome caſes in which the inteſtines and ſtomach are not able to retain medicine? Would it not make a good addition to the pneumatic Materia Medica, a ſcience which has been cultivated with conſiderable ſucceſs by Dr. Beddoes? Thus, former phyſicians were in the habit of placing the poppy in the chambers of perſons laboring under certain diſeaſes; a practice which might perhaps be revived, and extended with advantage, to many plants.

One grain of the powdered leaves taken in a ſmall quantity of temperate water, in the ſpace of fifteen minutes, increaſed the frequency, and force of the pulſe; and finally produced thirſt and ſleepineſs. Exper. 22.

In five minutes two grains of the ſame medicine increaſed the frequency of the pulſe. In a longer ſpace of time, they rendered it full and quick, as well as more frequent; and produced the following ſymptoms, giddineſs, warm ſkin, moiſt hands and face, intoxication, ſleepineſs. Exper. 23.

The ſame quantity of medicine, given to an older perſon than either of the two former, rendered the pulſe full and tenſe; produced cheerfulneſs, and increaſed the appetite for food. Exper. 24.

The medicine given in larger doſes produced fullneſs, quickneſs, and tenſion, rather than frequency,

* The other ſpecies of Datura probably exhale a ſtrong odor. In a garden, which Dr. Smith viſited on the continent, he ſays, that the Datura arborea covered with its magnificent and fragrant flowers was at this time the fineſt thing, and had crowds of viſitors every evening. Few people could ſupport its perfume any length of time.

Sketch of a Tour on the Continent in the years 1786 and 1787, Vol. I. p. 118.

in the pulſe; produced intoxication, difficulty of ſpeech, and great thirſt; dilated the pupils of the eyes; rendered the blood ſizy and the ſtomach ſick; opened the bowels; increaſed the flow of urine; and gave origin to febrile ſymptoms of ſome days continuance. Exper. 25, 26, 27.

From the preceding ſymptoms produced by ſtramonium, we may infer that this ſubſtance is a ſtimulant. The experiments on frogs and dogs tend to confirm this opinion. They moreover ſerve to point out its higher degrees of action.

Like other ſtimulants ſtramonium exhauſts the irritability of the animal body. The expreſſed juice of the leaves applied to the heart of a dog deſtroyed its motion in a few minutes. Exper. 28. But the ſame fluid injected into the vena cava of a dog, after the heart had ceaſed to beat, ſtimulated it into freſh motion. Exper. 29.

The juice when injected into the rectum of a frog, a part of whoſe thorax had been previouſly removed that the heart might be viewed. ſeemed to accelerate its death. And death is accelerated in frogs that are treated in this way, with opium, ſpirit of hartſhorn, and ſpirit of wine; if we may truſt the experiments of the ingenious Dr. Crumpe.

The juice applied to the brain produced convulſions; injected into the abdomen, redneſs, or inflamation, of ſome of its contents; injected into the blood, immediate death. Inſtead of the juice, if water had been injected into the blood, a leſs ſudden death I ſuſpect, would have been the conſequence. Exper. 31, 32, 33.

The juice injected into the rectum of a dog induced ſickneſs at ſtomach, and ſeemed to diſorder the whole alimentary canal; induced intoxication, ſleep, and convulſive motions. Exper. 34.

The juice injected into the rectum of a cat produced a violent cough of many days continuance; and in another, it produced a partial loſs of hair, and a ſlight ſcurfineſs of the ſkin.

The blood drawn from an animal laboring under the effects of a ſpirituous tincture of the leaves, was found to be looſe in its texture; red particles were depoſited at the bottom of the bowl; ſigns according to Dr. Ruſh of high inflammatory action in the ſyſtem.

In an animal deſtroyed by ſtramonium, two drachms of water were found in the ventricles of the brain; and diſſolved blood appeared in the blood-veſſels, and dark colored bile in the inteſtines, and ♄ gall-bladder. In another, the ſame cauſe gave origin to a gangrenous ſtate of the meſentery and inteſtines. Ex. 37.

Drs. Whytt and Woodhouſe have found, that the fluid occaſionally effuſed in the ventricles of the brain reſembles water rather than ſerum, as it does not coagulate upon being expoſed to the action of heat. This fluid perhaps conſiſts of water, and a very ſmall portion of marine ſalt. It is doubtleſs effuſed by veſſels of very fine organization. I have found that it neither coagulates with heat, with ſpirit of wine, or with vitriolic acid; but a ſlight precipitation ſeemed to take place upon mixing it with a ſolution of cauſtic vegetable alkali. The effuſed fluid that I employed was taken from a perſon who died of mania laſt year, in the Pennſylvania Hoſpital, and whose body was submitted to inspection with the consent of his friends.

Hence, ſtramonium inflames the eye, dilates the pupil of that organ, increaſes the action of the arteries, and the heat of the body. It gives origin to intoxication, or mania, to cunvulſion in the muſcles, and to inflammation in the bowels, and diſpoſes the liver to ſecrete an altered bile. It gives origin to gangrene in the inteſtines and meſentery, to effuſion in the brain, renders the blood ſizy, looſens and diſſolves its texture.

Neither opium, hyoſciamus, or cicuta, I believe, affect the eyes ſo much as ſtramonium. The fever, the intoxication, and the convulſions, which this laſt article excites, are probably ſympathetic affections depending on its local application to the ſtomach or inteſtines. We cannot with propriety attribute ſuch affections to its abſorption, and conſequent diffuſion through the body. Some abſorption may take place; yet that they are produced in this way, is oppoſed by their ſudden exiſtence upon the application of the article, and their ſudden diſappearance upon its removal. Stramonium taken into the ſtomach, in a very few minutes affects the head and the arteries. In the firſt volume of the American Philoſophical Tranſactions, Dr. Ruſh has related the caſe of a child who was much affected in conſequence of ſwallowing the ſeeds. In this caſe the ſymptoms were fever, tremors, blindneſs, and an eruption on the ſkin, which immediately diſappeared upon the final evacuation of the ſeeds from the ſtomach and inteſtines, by the repeated uſe of vomits and purges.

The intoxication or mania, which ſtramonium induces, ſeems to be analogous to that which ariſes from the action of opium, alcohol and ſome other ſtimu-

lants. Like alcohol it ſometimes induces mania of many days continuance. In Beverley's Hiſtory of Virginia, a remarkable account is related of its effects on ſeveral perſons, who gathered, boiled, and ate it for greens. In each of theſe perſons it ſeems, that a mania came on, which laſted about eleven days.* According to ſome it has induced mania which has continued during life. Do not ſuch facts throw a blaze of light on the nature of the mind? Should we not be induced to attempt the diſcovery of other articles which affect the mind? May not articles exiſt which are capable of affecting all its different faculties? May not poſterity gain a dominion over it, nearly as complete as that, which we poſſeſs over the ſoil of our gardens?

In two perſons† who boiled the leaves for vegetable food in New Jerſey, violent diſeaſes ſupervened; mania in one, and tetanus in the other. Two children who had eaten of the ſeeds, ſeemed to labor under hydrophobia according to Dr. Lobſtein.‡ They rejected every kind of liquid, and on offering a cup-

* The James-Town weed being an early plant was gathered very young for a boiled ſalad, by ſome of the ſoldiers ſent thither; and ſome of them eat plentifully of it, the effect of which was a very pleaſant comedy; for they turned natural fools upon it for ſeveral days: one would blow up a feather in the air; another would dart ſtraws at it with much fury; and another ſtark naked was ſitting up in a corner, like a monkey, grinning and making mouths at them; a fourth would fondly kiſs and paw his companions, and ſneer in their faces, with a countenance more antic than any in a *Dutch* Droll. In this frantic condition they were confined, leſt they ſhould in their folly deſtroy themſelves; though it was obſerved, that all their actions were full of innocence and good nature. Indeed they were not very cleanly; for they would have wallowed in their own excrements, if they had not been prevented. A thouſand ſuch ſimple tricks they played, and after eleven days returned to themſelves again, not remembering any thing that had paſſed. Beverley's Hiſtory of the preſent ſtate of Virginia. Book 2, page 24. London, 1705.

† Dr. Barton's Lectures on the Materia Medica.

‡ Medical Tranſactions, Vol. V. page 83.

full of drink to them, the moment it touched their lips violent ſpaſms invaded the throat. Thus it ſeems that one cauſe acting on different conſtitutions may be capable of giving origin to three ſeemingly different diſeaſes, or morbid ſtates of the ſyſtem, mania, tetanus, and hydrophobia. May we not hence conjecture, that whenever theſe diſeaſes exiſt, they are owing to cauſes which are the ſame, or which act in a ſimilar manner. Theſe cauſes muſt be of a ſtimulating nature, and excite exceſſive and irregular action in the ſyſtem. If we would obviate this action, we muſt have recourſe to remedies, which eradicate the original cauſe of it, or which by their ſedative operation diminiſh the commotion, or oppreſſion of the ſyſtem. Dr. Ruſh, who may be juſtly ſtiled the father of medicine in this country, has attributed diſeaſes in general, to ſtimulus, as their remote, and to exceſſive and irregular action, as their proximate cauſe. Do not th facts juſt mentioned in ſome meaſure confirm the juſtneſs of his theory of diſeaſe. But the juſtneſs of his theory is better confirmed by the ſucceſs which attends its application to medicine.

Stramonium diſpoſes the liver to morbid ſecretion. In thus acting it reſembles opium, alcohol, and the miaſma, which produces intermitting and yellow fevers. But it does not conſtipate the bowels like opium. On this account it may prove more uſeful than opium in certain diſeaſes. In not conſtipating the bowels it reſembles hyoſciamus niger, or henbane, which keeps the inteſtines lax, according to Dr. Barton's ingenious experiments on this plant. The inflammation and gangrene in the inteſtines, the effuſion of water in the brain, the ſizy, looſe, and diſſolved blood, pro-

duced by the action of ſtramonium on animals, poſſeſs a great ſimilitude to the effects of malignant fevers on man.

There are many inſtances of death being the conſequence of taking ſtramonium. Some years ago, in the county of Burlington in New Jerſey, two children were deſtroyed by eating its ſeeds.*

In caſes in which our plant is taken into the ſtomach, the ſeeds, the leaves, or the root, the beſt remedies will be vomits and purges often repeated to evacuate the offending ſubſtance; and copious bleedings to diminiſh, or obviate the violence of its action. Dr. Ruſh has evinced the utility of vomits and purges, for obviating the effects of this plant; and that bleeding will alſo be proper, I infer from its ſucceſsful uſe, in caſes wherein the hyoſciamus niger or common henbane, and opium, have been taken into the ſtomach. Sir Hans Sloane cured four children, by bleeding, bliſters and purges, who were ſeized with great thirſt, vertigo, dimneſs of ſight, and profound ſleep, upon eating the ſeeds of the hyoſciamus niger. And Dr. Ruſh has lately applied copious bleedings with ſucceſs in the diſeaſe which ariſes from ſwallowing opium. But the following caſe in the beſt manner anſwers my purpoſe. In a child that had taken into her ſtomach ſome of the ſeeds of ſtramonium laſt fall, blood-letting and purges were uſed with the beſt effects. The blood which was drawn was cupped. This patient I ſaw. She was attended by my ingenious friend Dr. Caldwell. In

* This information I received from my reſpectable and intelligent friend, Samuel Coats, one of the Managers of the Pennſylvania Hoſpital.

ſlight caſes, or after the uſe of more powerful remedies the vegetable acid may prove ſerviceable. In affections produced by the plant, it has been uſed with advantage by the late Dr. Bond and others.

But a plant diffuſing ſuch a poiſonous exhalation ſhould not be ſuffered to grow upon farms, near roads and houſes, or upon vacant grounds in cities. The rich ſoil, which it inſeſts, and impoveriſhes, ſhould be ſurrendered to more ſalutary vegetables. Its abode ſhould be confined to the remoteſt corners of private medical or botanical gardens. Few or no accidents would then ariſe to children from ſwallowing its ſeeds; foreigners, or ignorant perſons would not be tempted to uſe it for food; its morbid exhalation would ſeldom or never be breathed; and when recourſe was had to its aid, as a remedy, it would more readily affect the human ſyſtem.

From what has been related relative to the effects of ſtramonium on the animal body, we may fairly conclude that it is a ſtimulant. In this opinion we are not alone. It is held and taught by two of the Profeſſors in the Univerſity of Pennſylvania; and in the ſecond volume of the Zoonomia it is enumerated among the inciting articles of the Materia Medica.

On the uſe of Stramonium in Medicine.

To that acute phyſician Dr. Storck, are we indebted for introducing the Datura Stramonium in the cure of diſeaſes. He exhibited an extract of the leaves of this plant with advantage, in ſome caſes of mania, in epilepſy, and ſome other convulſive affections. In ſimilar caſes this remedy was afterwards uſed by Dr. Wedenberg and Dr. Odhelius and with conſiderable ſucceſs. Dr. Greding was then induced to try the Stramonium; he gave it in a great number of epileptic caſes, and in caſes of epilepſy joined with mania, and only found the remedy to be effectual in a ſingle inſtance. And the late very reſpectable Dr. Cullen thinks, that it is ſeldom ſuited to the cure of ſuch diſeaſes. Yet, as if unwilling to decide on a ſubject concerning which ſuch different opinions were entertained; he ſays, "Nevertheleſs, I have no doubt that Narcotics may be a remedy in certain caſes of mania and epilepſy; but I have not, and I doubt if any other perſon has, learned to diſtinguiſh the caſes to which ſuch remedies are properly adapted."

Thus it ſeems that Drs. Storck, Wedenberg, and Odhelius, gave the medicine with ſucceſs, while Dr. Greding found it to be nearly uſeleſs. The former phyſicians might have given it in proper caſes, and doſes, while the latter one in theſe reſpects might have erred. On the occaſion Dr. Cullen deduces

nothing from his own experience. He conſiders ſtramonium as a narcotic, and therefore a ſedative. But the preceding experiments and obſervations I hope will evince, that it produces ſtimulating effects on the animal body. The following caſes may in ſome meaſure point out the conditions of the ſyſtem in which it may prove uſeful.

The preparation of the plant which has been chiefly given in theſe caſes is the powder of the leaves. The doſe is from half a grain to four grains, mixed with conſerve of roſes or water twice or thrice in the day.

IN EPILEPSY.

Dr. Rush has greatly ſimplified and elucidated the ſubject of Noſology, by conſidering pleuriſy, phrenitis, mania, apoplexy, and numerous other diſeaſes, as febrile ſtates of the ſyſtem. To the number of theſe febrile ſtates of the ſyſtem, I think epilepſy might be added. For it is induced by the ſame cauſes which induce other fevers. Theſe cauſes are alcohol, terror, obſtinate coſtiveneſs, a ceſſation of certain diſcharges, as in the caſes of piles, ulcers, &c. It appears to be a fever, ~~at leaſt a compound one~~, becauſe during the exiſtence of a paroxyſm the pulſe is uncommonly tenſe, and full, the face red, and the pupils of the eyes dilated; ſymptoms which frequently occur in fevers. Moreover in the intervals between the fits the patient is ſubject to vertigo, and his tongue is for

the moſt part white. Like other fevers, epilepſy generally attacks the young, and the plethoric, and occurs in the night, and ſometimes changes into mania. In a woman, who, during the exiſtence of a paroxiſm, died of epilepſy in the Pennſylvania Hoſpital, in the ſpring of 1796, the arteries of the brain ſeemed to be enlarged to twice their uſual ſize. Other diſſections have diſcovered water, and hydatids in the brain; effects which probably reſulted from morbid action in the arteries of that viſcus.* Dr. Ruſh has effectually cured it once or twice by mercury; but, has not, I believe, ſucceeded always upon uſing this remedy. In epilepſy Dr. Darwin has exhibited opium with great ſucceſs. I ſuſpect that ſtramonium is a remedy which is equal, if not ſuperior to either of theſe, in the preſent diſeaſe. It is a leſs diſagreeable remedy to the patient than mercury, as it does not confine him to his bed, by inducing a painful affection; and it ſeems to anſwer all the purpoſes of opium, without conſtipating the bowels. It was uſed with conſiderable ſucceſs in the caſe of a boy about twelve years old, in the Pennſylvania Hoſpital, in part of the autumn and winter of 1796. I will briefly relate his caſe. If the contagion of the yellow fever did not occaſion his epi-

* This diſeaſe has been cured, or ſuſpended by the ſmall-pox, by pulmonic, and by intermitting fever. I was informed by a black man, whom I could believe, that he had been once very ſubject to fits, which according to his deſcription muſt have been of the epileptic kind; and that his fits had never returned upon his violently having the natural ſmall-pox. There is at this time a patient in the Pennſylvania Hoſpital, who has been long ſubject to epileptic fits, yet upon his being lately attacked with pulmonic fever, they have entirely ceaſed to occur. A boy who was much harraſſed by fits remained free from them for ſeveral months; but during this time he labored under an intermitting fever, as preſently will appear. Hence is it not probable that epilepſy is a fever, as it ſeems at leaſt ſometimes to change into other fevers.

lepſy, the cauſe of it is unknown. I am informed by his friends, that he had the firſt epileptic fit during the prevalence of the yellow fever in Philadelphia in 1793; that he had another in about two months afterwards; and that the fits in 1794, and in the beginning of 1795 occurred ſomewhat more frequently, till he at length had one about every two weeks. But I am told that in the ſummer of 1795 he was ſent into the country, where he was attacked by an intermitting fever, under which he labored for four or five months. During this period, it ſeems that his fits entirely left him; but that they returned upon the diſappearance of the fever. In the winter of 1795, and in the ſpring and ſummer of 1796, he took the cuprum ammonaicum and ſome other remedies, which ſeemed in ſome meaſure to lengthen the intervals between the fits. But not being durably relieved by theſe remedies, they were diſcontinued; and he was admitted a patient into the Pennſylvania Hoſpital in the autumn of laſt year. He now had three or four fits every week. Dr. Shippen who was at that time the attending phyſician, preſcribed for him Fowler's mineral ſolution to be given in ſmall quantities. As the fits became more frequent upon uſing the ſolution, it was diſcontinued. Half a grain of the powdered leaves of ſtramonium was now preſcribed; it was to be taken in the morning and evening, and the doſe was gradually increaſed to three grains twice in the day. Upon taking this laſt medicine, his fits ſoon began to diminiſh in force and frequency; and at length he appeared to be cured of them. It is proper to obſerve that he was bled and purged before taking the ſtramonium, and was bled again a week or two afterwards. And that at a time

when he ſeemed to be threatened with a paroxiſm, Dr. Ruſh, who ſucceeded Dr. Shippen in the Hoſpital, had him bled with obvious advantages. Would not the application of preſſure to the carotid artery juſt before its commencement, prevent the fit? This boy was diſcharged from the Hoſpital as cured, but I am ſorry to add that after remaining about five months free from the fits, he has had a return of them. About the beginning of this ſpring after getting his feet wet by long expoſure on a rainy day, and coming in the evening into a cloſe warm room, and having to do ſome work which required ſtooping, he was ſeized with a fit. He has had ſeveral of them within the two laſt months; but he has lately been bled and purged, and reſumed the pills with much advantage. The laſt fit and the preceding one have been leſs violent, and more protracted in their acceſs. By bleeding and ſtramonium a perfect cure may yet be effected. If they ſhould fail the age of puberty may make a favorable change in his ſyſtem.

I gave two grains of the powdered leaves every evening to a woman about thirty years old, having imperfect ſpeech, and a kind of catalepſy, which returned every night, and laſted about an hour. Theſe affections, I believe, aroſe from frequent ſpirituous intoxication. Upon taking the medicine about three weeks, ſhe appeared to be cured of the catalepſy, and relieved of the imperfect ſpeech. Might not ſtramonium be taken as a ſubſtitute for alcohol in perſons, who wiſh to relinquiſh the uſe, or who ſuffer great inconvenience from the want, of this noxious article?

Two grains of the powdered leaves taken evening and morning, ſeemed to be of much ſervice to a woman, who had long been ſubject to tremors of the limbs, and occaſional epileptic fits; affections which ſeemed chiefly to ariſe from a contortion and ulcer in the foot.

Our remedy was given in ſome caſes of epilepſy in the Alms Houſe of this city with a ſucceſs not to be regretted. Dr. Hart, who attended to its effects, informed me, that it performed a cure in one of them; and that it relieved the others.

The following valuable obſervations on the effects of ſtramonium in epilepſy, I lately received in an obliging letter, from Dr. John Archer of Harford county, Maryland. This letter contains other obſervations reſpecting the uſe of ſtramonium, which I ſhall detail in their proper places. "I have adminiſtered the ſtramonium to ſeveral with various effects, to ſome with great advantage, and to others without any other advantage than prolonging the time of the return of the fit, or only leſſening its duration. I obſerved that thoſe, who had regular returns of the fits, or had them at ſhort intervals, received the greateſt benefit; becauſe they could take a ſufficient quantity of the medicine before the time of a return. By this means the return of the fit was prevented, then attending to the time another fit ſhould return, the medicine was again given, and in general a cure obtained; but thoſe, who had irregular returns of the fits, unleſs of ſhort duration, could not take the ſtramonium ſo as to act at the time of the fit, as it came on unexpectedly; theſe were not much benefited.

" In the epilepſy with regular periods of return, I order two grains of the powdered ſeeds made into a pill, to be given every four hours, until ſome ſenſible effects are produced; and then lengthen the time to ſix or eight hours, ſo as to keep up ſome ſenſible operation of the medicine, until the time of the fit. The medicine is now to be omitted till three or four days before the next return. It is then to be exhibited as before. To uſe the ſtramonium with effect in theſe caſes, and with any benefit in the preceding ones, low diet and occaſional blood-letting ſhould be enjoined.

" I need ſcarcely remark to you that thoſe patients, who have irregular returns of the fits with long intervals, muſt take the ſtramonium conſtantly, elſe they will miſs the proper time of taking it. In ſuch caſes though it may not prevent the return of the fits, it may mitigate their violence. I have alſo remarked that it is adminiſtered with little or no advantage to thoſe patients, who are become ſimple or fooliſh by the violence or long continuance of the diſeaſe.

" The ſeeds ſhould be gathered when fully ripe before the froſt and the rains injure them. The beſt ſeeds for uſe are of a blackiſh color. Take a ſcruple of the powdered ſeeds, half a ſcruple of flower, and a ſufficient quantity of water; mix them well, and divide them into ten pills. Theſe are to be given as already directed.

" I do believe the ſeeds of ſtramonium to be a valuable medicine in many diſeaſes; I have tried them in ſeveral others with great advantage, as mania, retention of urine, &c. but they muſt be given with re-

gularity and attention. In my opinion in a regular epilepſy, it is as powerful, as the peruvian bark in intermittents."

In the cure of epilepſy how does ſtramonium act. Does it act by giving origin to a new diſeaſe, or by waſting that general or partial accumulation of excitability, or ſenſorial power, which favors the production of a paroxyſm?

In Mania.

This diſeaſe, which Dr. Ruſh has proved to be a fever, may in ſome of its forms be obviated or relieved by ſtramonium. In J. B. this remedy appeared to effect a cure. Being deranged in his mind, and ſomewhat outrageous he was admitted into the Hoſpital during Dr. Parke's attendance laſt ſummer. He was bled and purged ſeveral times; in conſequence of this treatment he became ſomewhat more rational. After theſe remedies two grains of the powdered leaves of ſtramonium were preſcribed; theſe were to be taken every evening and morning. The medicine occaſioned whiteneſs of the tongue, fever, and a ſlight head ache. He took the ſtramonium about two weeks, rapidly grew better in his reaſon; and was diſcharged from the Hoſpital as cured. Dr. Ruſh conſiders the occurrence of head-ache in maniacal caſes as a favorable ſymptom, and I have ſeen it frequently occur in his patients at the Hoſpital as ſoon as their derangement had much diminiſhed or ceaſed. Might not this

ſalutary ſymptom in mania be accelerated, or induced in many caſes of this diſeaſe by the uſe of ſtramonium?

M. R. wild and melancholic having been deranged for ſome months, took one grain of the powdered leaves of ſtramonium morning and evening. Previouſly to taking the medicine he was bled and purged ſeveral times. The medicine ſeemed to make little or no impreſſion on him, but upon increaſing it gradually to four grains, he became affected with fever and pains in his limbs. He now became rational: But ſucceſſive ſuppurations occurred in the parts where the pains exiſted. Openings were occaſionally made into the collections of pus: and at this time he appears to be on the recovery, and continues to be rational.

To M. F. melancholic, a female patient, one grain of an extract of the leaves was given night and morning, which quantity was gradually increaſed to three grains. She was delighted with the medicine, ſeemed to get better, and would anxiouſly call for the pills when they were out. By ſome means ſhe at length diſcovered that they were made of what ſhe called Jemeſon weed, and refuſed to take any more of them. Upon taking the medicine in increaſed doſes ſhe informed me, that ſhe frequently ſaw ſmall dark ſpots in the air; and that ſparkles of light ſometimes ſeemed to proceed from her eyes. Dr. Archer within theſe few days informed Dr. Ruſh that in a certain caſe in which he gave ſtramonium double viſion was produced.

For J. B. laboring under melancholy madneſs, Dr. Wiſtar laſt ſummer preſcribed ſtramonium in doſes of half a grain, to be taken twice in the day; but the

medicine affected her ſtomach with ſo much ſickneſs that it was diſcontinued.

It was given to ſeveral perſons in the cells of the Hoſpital who had been deranged for many years; ſome of theſe it ſeemed to relieve by exciting violent diarrhœa; others again it ſeemed to injure. In theſe latter inſtances ſome advantages might perhaps have been derived from it, if its uſe had been premiſed by bleeding and purging.

IN TETANIC FEVER,

Dr. Archer's letter informs me that he once moderated the ſymptoms of tetanus by giving ſtramonium; and that Dr. Simmes formerly his ſtudent, now living in Georgia, had ſucceeded in the cure of a tetanus by uſing this medicine. Dr. Archer adds, that he attributes his own late ill ſucceſs in ſome caſes of tetanus wherein he adminiſtered ſtramonium to his not having preceded the remedy by evacuants.

IN HYDROPIC AND PARALYTIC FEVERS.

In one hydropic, and two paralytic caſes, in which our remedy was tried, it ſeemed to prove injurious.

IN FEVER WITH SWEATS.

In a ~~caſe of~~ person laboring under nocturnal fever attended with ſweats, two grains of the powder were given ſeveral hours be-

fore going to bed, for about a week. But it was neceſſary to diſcontinue the remedy, as the fever and ſweats were increaſed. He was afterwards cured by purges and elixir of vitriol.

IN INTERMITTING FEVER.

In a caſe of intermitting fever in which two grains of the powdered leaves were given about two hours before its expected attack, the paroxiſm was prevented.

IN AFFECTIONS OF THE EYES.

In a patient laboring under ~~caſe of~~ gutta ſerena where the pupil had not loſt the whole of its irritability, the ſeeds taken twice in a day, firſt half a grain of them, and afterwards three grains, ſeemed to produce ſome increaſe of viſion; but on account of the medicine diſagreeing with his ſtomach he relinquiſhed its uſe. In this caſe the local application of an infuſion of ſtramonium, might perhaps have anſwered a good purpoſe. Two old women with weak eyes ſeemed to derive ſome benefit from applying to the eye the juice of the leaves diluted with water. The ſtrength of the preparation was a drop of the juice to an ounce of water. A weak infuſion of the dry leaves would perhaps be equally ſerviceable as a preparation of the diluted juice.

IN RHEUMATIC FEVER.

Dr. Rush preſcribed laſt winter, a ſpirituous tincture of the leaves for a pain in the knee in the Hoſ-

pital. It ſeemed to relieve the affection by cauſing eruptions on the ſkin. An ointment made by boiling the green leaves of the plant in hog's lard, I once ſaw prove very ſerviceable in violent rheumatic pains. Dr. Bache informed me that an old lady in the country near the city, applies this ointment with great ſucceſs in caſes of club-feet. I lately ſaw it of great ſervice in one of theſe caſes. It is ſaid that this ointment is very uſeful in burns and in piles.

I muſt now conclude theſe pages. Time will not permit me to dwell any longer on this intereſting ſubject. The preceding experiments and obſervations have been accompliſhed at the expenſe of ſome eaſe, and ſome health. But if they ſhould in any way extend our knowledge of a powerful vegetable ſubſtance; if they ſhould collect into a point ſome of its different effects on the animal ſyſtem; and, if they ſhould have the leaſt tendency to obviate any portion of human miſery; my ends will be anſwered, and I ſhall conceive that my labors have been rewarded by an ample recompence.

FINIS.

In page 29 after the following ſentence near the bottom "The lungs appeared to be ſurcharged with blood." read. The blood in the venæ cavæ in the right auricle and ventricle of the heart, was in a diſſolved ſtate.