

till they recovered their vivacity, although they lost much air in coming, up the specific gravity was therefore much less than at bottom, and this was probably owing to the distension of the sound. That fish rise and sink in the water, by this power of increasing and diminishing their bulk, and consequently their specific gravity, is well known to naturalists, but I was pleased to see the truth of that fact confirmed by these experiments.

JONA. WILLIAMS, JUN.

N^o. XI.

An account of the most effectual means of preventing the deleterious consequences of the bite of the CROTALUS HORRIDUS, or RATTLE-SNAKE. By BENJAMIN SMITH BARTON, M. D.*

Read Aug.
19, 1791.

DURING my passage through several of the western settlements of Pennsylvania, and the adjoining States, in the year 1785, I made it an object of attention to acquire every possible information respecting the effects of the poison of the RATTLE-SNAKE, and the methods of prevention, or of cure, which are commonly employed in those parts of our country. A very considerable number of vegetables were either mentioned, or shown, to me, all of which, I was assured, *were good for the bites of Snakes*. Without being much of the skeptic

* I think it proper to confine my remarks to this species of RATTLE-SNAKE, because it is that with which I am best acquainted; because it is the most common species in those parts of our country which are best known to me, and because I believe it is the most deleterious species that has yet been discovered within the limits of the United-States. I have little doubt, however, that the plan which I have recommended, and the remarks which I have made, will equally apply to the *Crotalus miliaris*, the *Crotalus Durissus* and the other species of this formidable family of serpents which are described by Linnæus, and by other writers.

tick in medical matters, I might have doubted either the veracity of my informers, or the accuracy with which their experiments and observations were made. It, certainly, did not require a very extensive acquaintance with botanical or with medical science to discover, that these reputed specificks were frequently possessed of properties the most opposite; and, consequently, that the effects of the poison of our venomous serpents, which are so uniform in their appearance, were capable of being obviated or removed, by a number of vegetables, perhaps no less different in their influence on animal bodies than they are in family, and in species. I might have doubted, for a moment, whether the activity of these poisons was so great, and the effects of their operation so dangerous and so fatal, as has been generally imagined. I was not ignorant that in the seasons of supervening languor and torpidity the RATTLE-SNAKE, in particular, bites with seeming reluctance, and without any, or with but little, ill consequence arising from the wound. I, likewise, well knew, that even in those seasons when the sun powerfully exerts its influence, at which times these animals are best qualified to strike and to injure, individuals of the species must often be found, the cavities of whose venomous fangs are entirely, or nearly, destitute of their active poison, from the introduction of which into the body, those alarming symptoms, which characterise the successful bite of this animal arise†. I could imagine that, in some instances, the
poison

† Several years since, a gentleman made the following experiments in Philadelphia. He had a large RATTLE-SNAKE brought to him alive, which he so managed by a string that he could easily lead it into, or out of, a close cage. On the first day, he suffered this Snake to bite a chicken, which had been allured to the mouth of the cage by crumbs of bread. In a few hours, the bird "mortified" and died. On the second day, another chicken was bitten in the same manner, and survived the injury much longer than the first. On the third day, the experiment was made upon a third chicken, which swelled much, but, nevertheless, recovered. On the fourth day, several chickens were suffered to be bitten, without receiving any injury. After this, it is said, the Snake grew larger and fatter. *M. S. by my father, penes me.* The truth of these experiments seems to be confirmed by the original and very well-written account of the second volume of the Count de la Cépède's *Histoire naturelle des Serpens*, &c. published

poison might be thrown into ligamentous or tendinous matter, from which there would be little probability of an absorption into the mass of blood. These last mentioned circumstances enabled me to understand how, in some instances at least, the internal use of the various vegetables which were employed, might have led my informers to suppose that those vegetables had accomplished a cure.

Upon examining the subject more minutely, I found that although the principal dependance seemed to be placed on the internal use of vegetables, yet the employment of external means was evidently the most important part, both of the prevention and of the cure. In general, the first thing that was attended to, after a person had been bitten by the RATTLE-SNAKE, was to throw a tight ligature above the part into which the poison had been introduced: at least, this was the practice whenever the situation of the wounded part admitted of such an application. The wound was next scarified, and a mixture of salt and gunpowder, sometimes either of these articles separately, was laid upon the part. Over the whole was applied a piece of the bark of the *White-Walnut**. At the same time, some one, frequently more than one, of the vegetables which were mentioned to me, were given internally, either in decoction, or infusion, along with large quantities of milk.

Such is the rude and simple practice of our western settlers for preventing, or for curing, the dangerous effects of the bite of the RATTLE-SNAKE. They likewise extend this practice to the bites of several other kinds of serpents, the history of which will form the subject of a memoir,

lished in the *Appendix to the second volume of the monthly review enlarged*: see page 511. The simple experiments which I have just related deserve to be attended to. They enable us to assign a reason why persons who have actually been bitten by the RATTLE-SNAKE have sometimes experienced very inconsiderable, or no bad, consequences from the wound: they enable us to discover in what manner many vegetables have acquired a reputation for curing the bites of serpents, without our recurring to the very disagreeable necessity of arraigning the veracity of those from whom our information is derived: and, lastly, they teach us a physiological fact that the poison of the RATTLE-SNAKE is secreted very slowly.

* The *Juglans alba* of Linnæus.

moir, which I hope to lay before the Society, some time in the course of the ensuing year. At present, I shall only remark that there is reason to believe, the practice which I have described has often been employed for the bites of serpents which do not belong to our *venemous* tribes. This I know to be the case with respect to our *Wampum-Snake*, the *Coluber fasciatus* of Linnæus: for, a careful examination of this serpent and a curious inquiry into its history, have convinced me that its bite, like that of many other species of the extensive genus of *Coluber*, is really harmless. It would be uncandid not to observe that Mr. Catesby, who has given a description and a good figure of the *Wampum-Snake*, in his *Natural History of Carolina, &c.** was of the same opinion long before me. I may also remark that Linnæus, in his *Systema Naturæ*†, has not annexed to the *Coluber fasciatus* that mark by which he designates the serpents which he supposed to be venemous. But the Swedish naturalist does not seem to have been certain that his *Coluber* is that described and figured by Catesby, under the name of the *Wampum-Snake*. From comparing, however, the animal itself with the descriptions of Catesby and Linnæus, I am confident that the *Wampum-Snake* of Pennsylvania, Carolina, &c. is no other than the *Coluber fasciatus* of the *System of Nature*.

But to return from what is rather a digression. In the simple practice which I have described, I am disposed to repose great confidence. Nor can I have any doubt that the beneficial effects which have been experienced under the employment of the multifarious means I have mentioned, are to be attributed principally to the use of the ligature, to the scarification of the wounded part, the application of the salt, the gunpowder and the blister. I shall not deny that some of the vegetables which were exhibit-
ed

* See Volume 2d, p. 58 and t. 58.

† See Volume 1st, p. 378. Vienna edition of 1767.

ed internally may be of use. Such, perhaps, are the various decoctions which are made of the more stimulating vegetables, the infusions and expressed juices of vegetables, accompanied with the use of large draughts of warm water, the steam-bath, &c. These, by exciting a most profuse perspiration, may contribute to the discharge of the poison from the mass of blood. Some of them act powerfully as diuretics, and in this way may also be of service. The Indians in the State of Jersey, I have been informed, formerly made use of the expressed juice of the leaves of the common *Garden-Rue* * as a remedy for the bite of the RATTLE-SNAKE. It is well known that this vegetable possesses very active powers, and in the large doses in which the Indians prescribed it, it excited a most violent sweat. They gave to an adult, about two table-spoons full of the juice every two hours, until this effect was produced. I think, there can be little doubt, that it has been of considerable service.

It deserves, however, to be mentioned, in this place, that during the use of the *Rue*, and even before this vegetable was administered, external means were employed, the principal of which was the application of the ligature.

We see, therefore, that without a knowledge of the name, much less of the structure and office, of the absorbent-system, the rude savages of our continent, from whom it is probable the white inhabitants derived their experience on the subject, had learned the propriety of applying a ligature, in order to prevent the farther introduction of the poison into the body. From the nature of the savage life, man in this state of his political existence is more liable to be injured by the bites of serpents than in the more polished stages of his improvement. It is fortunate, therefore, that even among some of the rudest nations of men, the mode of treating the bites of these animals is so rational.

If

* *Ruta graveolens*, Lin.

If, along with the ligature and the application of different stimulants to the wounded part, they make use of various internal means, many of which are probably impotent, and some of them, perhaps, pernicious, let us remember that even among the most polished nations, where medicine is cultivated as a science, physicians are accustomed to administer many articles whose effect on the system are known to be inconsiderable or useless.

The salt and gunpowder applied to the scarified part act powerfully by exciting a discharge of blood, and particularly of the ferous part, from the wound; whilst the bark of the *White-Walnut*, already mentioned, which possesses the evacuant power of cantharides, in no inconsiderable degree, contributes to the farther discharge of this serum, and along with it the poison thrown in by the animal.

I do not know that any vegetable substance besides the bark of the *White-Walnut* is ever employed in these cases as a blister. I know, indeed, that both the Indians and the white inhabitants of this country are acquainted with the blistering property of other indigenous vegetables: such are the *Common-Wintergreen* (*Pyrola rotundifolia*, Lin.), some species of the genus *Ranunculus*, or *Crow-foot*, &c. In some parts of Pennsylvania, the roots of the first of these plants are pounded, and then applied to parts where it is required to raise a blister. The roots of this *Pyrola* are, however, principally used in rheumatick affections, and I have never heard of their being employed in cases of the bites of venomous serpents. I have heard of one instance in which a blister of cantharides was applied to the wound occasioned by a RATTLE-SNAKE, and was attended with the best effect*.

If the method of treating the bite of the RATTLE-SNAKE which I have described, is ever of service, it
VOL. III. O is

* Since I wrote the above, I have read, with no small degree of pleasure, that the bark of the *Daphne Mezereum* of Linnaeus (the *Common-Mexereon*, or *Spurge-Olive*) has been applied to the wound

is obvious that no time should be lost in the employment of the means that have been mentioned, or of some means of a similar nature. In those cases where the poison is applied near to the orifice of an absorbing-vessel we have reason to suppose that it will be conveyed into the mass of blood with great celerity. The mildest fluids pass along the lymphatick-vessels with rapidity, but when these vessels are exposed to the influence of cold, or when they are stimulated by poisons of any kind, their propelling action is greatly encreased. Even, however, after we are convinced that a portion of the poison has been absorbed, we ought not, I think, to omit the use of the ligature, and of some of the other means which have been mentioned.

As poisons of various kinds in their passage through the lymphatick-vessels are liable to be detained, for some time, in the glandular appendages of this system, it would, perhaps, be of use to scarify these parts, and to apply a blister to them, in order to promote the discharge of the poison. Let us suppose, for instance, that the poison of the RATTLE-SNAKE is thrown into the sole, or end, of the foot close to the mouths of a number of lymphatick-vessels. In most cases, the stimulant effects of this singular fluid are observed to take place in a few minutes. The lymphaticks partake of the inflammation which is excited: the poison is quickly propelled along them, but its passage into the blood-vessels is somewhat retarded by the conglobate-glands

wound occasioned by the bite of a poisonous serpent, and that the application was attended with the happiest effects. See the *Flora Suecica* of Linnæus, p. 128. It has also been lately recommended, and its beneficial effects have been experienced, in the same case, and in the bite of the mad-dog. See what Acrel has said on the subject in the *Vet. Acad. Handl.* for the year 1778, p. 104. All the species of the genus *Daphne*, with which the botanists are acquainted, are indued with the same property. The bark when chewed strongly stimulates the mouth and fauces, exciting a considerable degree of heat: when applied externally to the skin, it produces a blister and a considerable discharge of serous matter. Its good effects in the instances just mentioned, are, therefore, I presume, to be referred to this stimulating property. The bark of the *White-Walnut*, as I have already observed, acts in the same way, though not so readily, or so powerfully. The *Mezerion* or the cantharides, perhaps more especially the *Daphne Gnidium*, would, I imagine, be very properly substituted for it.

glands, which form an essential part of the absorbent-system in man. In a short time, however, if the ligature has not been very early and very carefully applied, the glands of the groin are observed to swell, and inflame. In this state of the complaint, I would advise an extensive scarification of these glands, and the application of some powerful blister, the effects of which, at the same time, are very suddenly exerted. I know of no article of the materia medica so likely to answer both these intentions as the *Ecorce de Garou* of the French, the bark of the *Daphne Gnidium*, which I have already mentioned.

It often happens that the poison of the RATTLE-SNAKE, like that of the mad-dog, being merely thrown into muscular, tendinous, ligamentous or cellular parts, is deposited there some time without being absorbed into the mass of blood. In these cases the success of the plan which I have described will, probably, be very great. Whatever preference may be given to the use of the knife, or of the caustick over that of scarification, the application of the blister, &c. I think, there can be very little doubt of the propriety of employing the ligature. I am convinced, indeed, that on the use of this simple application, the success of our cure, or to speak more properly of our prevention will, in a great measure, depend.

Hitherto, I have proceeded on the supposition, that the poison of the RATTLE-SNAKE is conveyed into the blood-vessels through the medium of the absorbent-lymphatics. But, unfortunately, cases sometimes occur in which this active matter is thrown immediately into a vein or artery. When this happens, the effects of the poison will be the more readily propagated to the remotest parts of the system; and the powers of medicine will then be found to be less considerable. I have received an account of the case of a person who, whilst he was reposing himself under a tree in a wood, was bit in the neck by a RAT-

TLE-SNAKE: remedies were immediately applied; but to no purpose, for the unhappy sufferer expired in a few minutes. This very sudden operation of the poison will not excite much wonder, when we consider the proximity of the wound in this case to the source of circulation. For although experiments are wanted to demonstrate the *precise* action of the poison of the RATTLE-SNAKE on the human and other animal systems, we are already in possession of facts which warrant us to conclude, that it exerts its principal effects on the sanguiferous system, and, as I believe, immediately on the blood itself. In what manner it affects this important fluid I am unable to decide with certainty. That it induces a preternatural tenuity of it cannot, I think, be doubted.

But whatever may be the particular operation of the poison of which I am speaking, we are certain that the introduction of the smallest portion of it into a blood-vessel is generally attended with the most serious consequences. Mr. Catesby says that, "where a Rattle-Snake with full force penetrates with his deadly fangs, and pricks a vein or artery, inevitable death ensues; and that, as I have often seen, in less than two minutes. "The *Indians*," he continues, "know their destiny the minute they are bit; and, when they perceive it mortal, apply no remedy, concluding all efforts in vain*." Mr. Catesby is frequently very accurate in relating facts, and in making observations. What he has here said respecting the fatal consequences of the *immediate* introduction of the poison into the blood-vessels perfectly corresponds with the information which I have received from a variety of sources. I am unwilling, however, to believe that, in every case, such an introduction is necessarily mortal. I cannot but suppose that of the many cases of the bites of the

* The Natural History of Carolina, &c. vol. 2, p. 41.

the RATTLE-SNAKE which so frequently occur in the less inhabited parts of our country, the number of those in which the poison has been immediately applied to a blood-vessel cannot be inconsiderable. And yet, at present, how seldom does the bite of this animal prove mortal! Whatever may be the event of this opinion, I think we ought not to neglect the application of the ligature, &c. even after we are confident the poison has been thrown into a blood-vessel. Perhaps, in this case, the *Rue*, or some other powerful sudorifick, may be of service. How far the use of milk, &c. will tend to the recovery of our patient, I cannot decide with confidence. I confess, however, I should be unwilling to place much hopes in the administration of this fluid, although the practice is very generally adopted in most of our new settlements.

I have now described the modes of preventing the dangerous consequences of the bite of the RATTLE-SNAKE, as they are practised in various parts of our country. At the same time, I have ventured to throw out some conjectures of my own; which I thought would not be improper, nor altogether unacceptable. As my object in presenting this paper to the Philosophical Society is more utility than curiosity, I have avoided mentioning several other means which are daily employed for the same purpose, both in the countries to the East and in those to the West of our mountains. I cannot, however, help observing that sucking of the wounded part, is very generally practised by the Creeks, and some other native tribes in the southern parts of our States, &c. as I have been informed by my ingenious and worthy friend Mr. William Bartram, who received his information from the traders among these people. It appears from Mr. Catesby's elegant work, which I have already quoted, that some of these tribes have learned the importance of cutting out the wound-
ed

ed part, when, from the situation of the bite, this can be done*.

When the poison of the RATTLE-SNAKE has actually been introduced into the general mass of blood, it begins to exert its most alarming and characteristick effects. A considerable degree of nausea is a very early symptom †. We now discover an evident alteration in the pulse: it becomes full, strong, and greatly agitated. The whole body begins to swell: the eyes become so entirely suffused, that it is difficult to discover the smallest portion of the adnata that is not painted with blood. In many instances, there is an hemorrhagy of blood from the eyes, and likewise from the nose and ears: and so great is the change induced in the mass of blood, that large quantities of it are sometimes thrown out on the surface of the body, in the form of sweat. The teeth vacillate in their sockets, whilst the pains and groans of the unhappy sufferer too plainly inform us that the extinction of life is near at hand.

In this stage of its action, and even before it has induced the most alarming of the symptoms which I have mentioned, the powers of medicines can do little to check the rapid and violent progress of this poison. The employment of the ligature, the use of the blister, and of the other modes of treatment which I recommended in the local stage, it is obvious to remark, will be of very little, if any, benefit here. When there is no hemorrhagy, however,

* See vol. 2, p. 41. Mr. Catesby also makes mention of the practice of sucking the wound, which, he says, "in a slight bite, has sometimes a good effect; tho' the recovered person never fails of having annual pains at the time they were bit." Vol. 2. p. 41. The Abbé Clavigero says, the most effectual remedy for the bite of the RATTLE-SNAKE, "is thought to be the holding of the wounded part sometime in the earth." *The History of Mexico*, &c. vol. 1st, p. 59, English Translation.

† It is remarkable that a nausea, and sometimes a vomiting, is induced in many cases in a few minutes after the poison has been thrown into a muscular part, and long before it can possibly have entered the blood-vessels, through the medium of the absorbent-lymphatics; or, admitting that it has been introduced directly into a blood-vessel, before this active poison can have effected in the general mass any change whatever. Does not this very sudden appearance of the nausea and vomiting seem to render it probable that the poison of the RATTLE-SNAKE exerts considerable effects on the nervous matter of animals?

ever, and when the symptoms of a violent action of the heart and arteries take place, mercy may, perhaps, dictate to us the use of the lancet, with the view to moderate this action. I say nothing of the employment of the other parts of what is called by physicians the antiphlogistic treatment, as the condition of the unhappy sufferer will, in most cases, preclude the possibility of it.

I should have been glad to have annexed to this imperfect paper, a more accurate account of the effects of the poison of the RATTLE-SNAKE, on the system of man and other animals, and, likewise, an analysis of this singular fluid. The subject is, certainly, a curious one, and one the minute investigation of which would, probably, throw some lights on the physiology of animals, whilst it would, no doubt, ultimately tend to the establishment of a more certain mode of treating the bite of one of the most formidable serpents that has hitherto been discovered in North-America. But such an investigation would require much time and patience, and, perhaps, I may add, a portion of fortitude. Fully impressed with a sense of the richness of the field, I mean to undertake the inquiry. Meanwhile, I shall just observe that the poison of the RATTLE-SNAKE is generally of a yellowish, somewhat greenish, colour, and that it changes to a darker hue with the heat of our seasons. During the period of the animal's amours, the poison is observed to be of a much darker green than at any other time, and it is certain that it is now also of a much more active and deleterious nature. Whether this increase of activity depends on the procreative passion of the animal, or whether it is not merely a consequence of the heat of the season, I shall not decide, at present.

From the facts and observations which I have submitted to the Society, it appears that, in many cases, the prevention of the deleterious effects of the poison of the RATTLE-SNAKE, may be accomplished by means which
are

are simple, and within the reach of almost every person. To this subject I anxiously wish to turn the attention of physicians and of physiologists; because the analogies which subsist between the effects of this poison and those of some other animals, both of the same and of different families, are numerous and striking. It is highly probable, therefore, that our researches into this subject, would conduct us to the knowledge of means whereby we might sometimes, perhaps not unfrequently, be enabled to prevent the consequences of the bite of the mad-dog, &c. Our success in one case ought, at least, to stimulate us to make the experiment in another. Let us not, any longer, look for *absolute specificks*. Let us be content that, in the fulness of her benevolence, nature, ever attentive to our welfare, has enriched her series of animals, of vegetables, and of minerals, with beings, with objects, and with means, which man, in every stage of his improvement, is instructed to employ for preventing, for alleviating, or for curing at least some of those infirmities the whole of which constitute, as it were, a part of his essence, or nature. The rage for specificks is, indeed, nearly at an end. I exceedingly regret, however, that it is still, in some measure, supported by the botanists, who cultivate an useful and an amiable branch of natural knowledge. Thus, the *Flora* of almost every country, and even of a narrow district, or of the suburbs of a city, is too frequently crowded with the most unqualified recommendations of certain vegetables in different diseases. But the partiality of the botanists for remedies for the bites of poisonous serpents appears to be peculiarly striking. Perhaps, this partiality may be placed among those errors which disgrace even the *primordia* of medicine. It is certain, that we very easily trace it to a state of society of which credulity, superstition, and ignorance are the most prominent and distinctive features.

Of the many travellers who have visited the countries of North-America, there are very few, indeed, who have not recorded in their journals at least one or two specifics against the bites of serpents. M. le Page du Pratz, who, in some respects, is a judicious writer, seriously informs us that the RATTLE-SNAKE “shuns the habitations of men, and by a singular providence, wherever it retires to, there the herb which cures its bite, is likewise to be found*.” Had this gentleman observed that wherever the animal, of which we are speaking, retires, we find vegetables which the full credulity of the Americans has led them to imagine are antidotes to its bite, he would not have exposed himself to the imputation of credulity with those who are more intimately acquainted with the works of nature, or with the powers of medicines. But the truth is, that there is no branch of natural history in the investigation of which even men of science have more prominently discovered their ignorance and weakness than in that of the serpents. Here, even a Linnæus, forgetting the cautious dignity which became the character of him who was destined to reform the science of nature, seriously relates those tales which ought to have been confined to the *wigwam* of the savage, or to the cabin of the most uninformed hunter.

To this account of what I deem to be the *most effectual means of preventing the deleterious consequences of the bite of the CROTALUS HORRIDUS, or RATTLE-SNAKE*, I shall subjoin a catalogue of a number of vegetables which have been recommended for the same purpose, either by the Indians, or by the white inhabitants of our continent. In enumerating these vegetables, I have thought it proper to give both the Linnæan, or classical, and the English, or vulgar, names. Some of these reputed specifics are used *internally*, others are employed *externally*, whilst others, again,

VOL. III. P are

* The History of Louisiana, &c. p. 269. English Translation.

are used both *internally* and *externally*. To such as are used *internally* I have prefixed this mark †: to such as are applied *externally*, I have prefixed the mark*: those which are employed both *internally* and *externally* are designated by both these marks, whilst to those of which I have not learned, with certainty, the particular exhibition, I have prefixed no mark whatever.

Sanguinaria canadensis (**Puccoon, Blood-root, Turmeric*), *Hypoxis erecta* (†*Erect-Hypoxis, Star of Bethlehem*), *Laurus Sassafras* (**Sassafras*), *Polygala Senega* (†**Seneca Snake-root*), *Prenanthes alba* (†*White Ivy-leaf, Dr. Witt's Snake-root*), *Hieracium venosum* (†*Veiny-Hawk-weed*), *Cunila mariana* (†*Dittany, Wild-Basil*), *Collinsonia canadensis* (†*Horse-weed, Knot-root*), *Hydrophyllum canadense* (†*Scaly-root*), *Ribes nigrum* (†*Black-Currant*), *Eryngium foetidum* (†*Fetid-Eryngo*), *Arctium Lappa* (**Burdock*), *Uvularia perfoliata* (**Perfoliate-Uvularia*), *Aletris farinosa* (*Star-grass, Star-root*), *Asarum—virginicum?* (*Heart Snake-roots*), *Marrubium vulgare* (†*White-Horehound*), *Scorzonera hispanica* (*Garden Vipers-grass*), *Solidago* (*†*Golden-rod, Different species are used.*), *Aristolochia Serpentaria* (†*Virginian Snake-root*), *Juglans oblonga* (**White-Walnut, But ter-nut*), *Cynoglossum virginicum* (†*Virginian Hounds-tongue*), *Convolvulus—arvensis?* (**Least-Bindweed*) *Aœxa racemosa* (†*American Bane-berry, Black Snake-root, Rattle-weed*), *Sanicula canadensis* (†*Canadian Sanicle*), *Veratrum luteum* (*Rattle-Snake-root*), *Erigeron—philadelphicum?* (†**Robin's Plantain*) *Liriodendron Tulipifera* (†*Tulip-tree, Poplar* §), *Crocus sativus* (†*Common-*

§ Among the Cheerake, and probably among other American tribes, the inner bark of this tree, after being bruised, is infused in water, and the infusion given to horses which have been bitten by the RATTLE-SNAKE: It is not improbable that this medicine may sometimes be of service in these cases, as it is certain that the bark of the *American Liriodendron* possesses very active powers, as a stimulant and sudorifick. I have never heard that this bark has been employed for the bite of the RATTLE-SNAKE in man.

MAGNETIC OBSERVATIONS. 115

(† *Common-Saffron*), *Fraxinus*—(† *White-Ash*) *Chrysanthemum?* (*St. Anthony's cross*) *Convallaria* († *Solomon's seal*. Different species are used.), *Ulmus*—*Americana?* (* †? *American Elm*) *Osmunda virginiana* (*Virginian Osmunda*, *Fern-Rattle-Snake-root*), *Jussiaea?*—(* † *Wood-Plantain*, *Rattle-Snake-Plantain*) *Hieracium Kalmii* (* † *Rattle-Snake-Plantain*, *Poor-Robin's Plantain*).

N^o. XII.

MAGNETIC OBSERVATIONS,

Made at the University of Cambridge (Massachusetts) in the year 1785,

BY DR. S. WILLIAMS.

Months.	Days.	Great- est Variation.	Days.	Least Vari- ation.	Dif- fer- ence.	Mean Variation at 7 A. M.	Mean Variation at 1½ P. M.	Mean Variation at 9 P. M.
January	15 1½ P. M.	6° 50	22 } 9 P. M.	6° 28'	3½	6° 36'	6° 42'	6° 34'
February	25 1½ P. M.	6 39	23 } 9 P. M.	5 49	50	6 34	6 39	6 32
March	1 1½ P. M.	6 52	1 9 P. M.	6 28	24	6 36	6 39	6 36
April	19 ½ P. M.	7 12	25 9 P. M.	6 20	52	6 34	6 53	6 34
May	3 } 1½ P. M.	7 5	2 7 A. M.	6 28	45	6 38	6 55	6 38
June	7 } 1½ P. M.	7 8	20 9 P. M.	6 29	39	6 44	6 57	6 40
July	11 } 1½ P. M.	7 11	18 7 A. M.	6 33	38	6 46	7 1	6 49
August	6 } 1½ P. M.	7 13	31 7 A. M.	6 25	48	6 42	7 2	6 48
Septem.	11 } 1½ P. M.	6 35	8 7 A. M.	6 13	42	6 32	6 46	6 34
October	18 } 1 P. M.	7 11	5 7 A. M.	6 27	44	6 48	6 55	6 43
Novem.	27 } 1 P. M.	6 59	29 9 P. M.	6 17	42	6 44	6 50	6 38
Decem.	1 } 1 P. M.	6 58	19 7 A. M.	6 28	30	6 43	6 50	6 39
In the Year.	August 6 and 21.	7 13	February 23.	5 49	1 24	6 40	6 51	6 39

The above Observations were made with an excellent Variation Instrument, with a twelve Inch Needle.