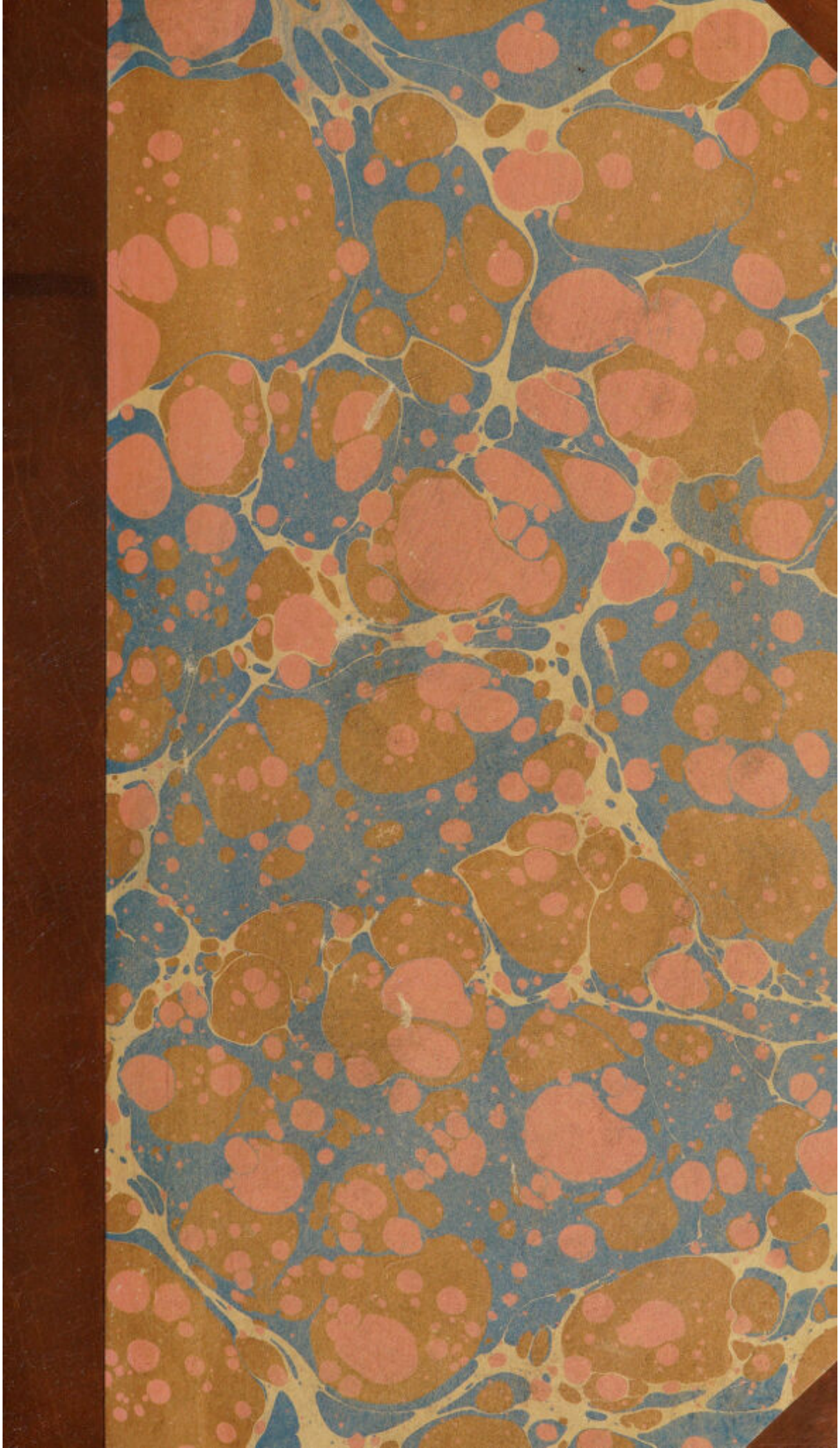
Observations on hydrophobia, produced by the bite of a mad dog, or other rabid animal. With an examination of the various theories and methods of cure, existing at the present day; and an inquiry into the merit of specific remedies. Also, a method of treatment best adapted to the brute creation. In a series of letters addressed to a friend / [James Thacher].



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G. Bradford Jr. 1813

OBSERVATIONS

ON

HYDROPHOBIA,

PRODUCED BY THE BITE OF A MAD DOG, OR OTHER RABID ANIMAL.

WITH

AN EXAMINATION

OF THE

VARIOUS THEORIES AND METHODS OF CURE, EXISTING AT THE PRESENT DAY; AND AN INQUIRY INTO THE MERIT OF SPECIFIC REMEDIES.

ALSO,

A Method of Treatment best adapted to the Brute Creation.

IN A SERIES OF LETTERS ADDRESSED TO A FRIEND.

BY JAMES THACHER, M. D.

Fellow of the American Academy of Arts and Sciences, and of the Massachusetts Medical Society, and honorary Member of the Georgia Medical Society

"So bends tormented Tantalus to drink,
"While from his lips the refluent waters shrink;
"Again the rising stream his bosom laves,
"And thirst consumes him, mid circumfluent waves."

DARWIN'S Botanic Garden.

PUBLISHED BY JOSEPH AVERY,
And for sale at his Bookstore in
PLYMOUTH (Mass.)
1813.

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ERRATA:

Page 37, line 6, from bottom, for Dr. *B*ush, read Dr. *R*ush.
39, l. 14, from bottom, for Dr. Br*a*die, r. Dr. Br*o*die.
79, foot note, l. 8, for view*s*, r. view.
80, l. 4, after the word phlogistic, delete *semicolon.*
82, foot note, for *r*almia *c*atifolia, r. *k*almia *l*atifolia.
85, l. 4, from bottom, for Van S*i*vieten, r. Van S*w*ieten.
86, l. 8, from bottom, for *o*pposite, r. *a*pposite.
88, l. 3, for *a* tonic, r. *a*tonic.
134, l. 5, from bottom, for Hosac*h*, r. Hosac*k*.
156, l. 9, for Ha*g*garth, r. Ha*y*garth.
172, l. 8, for Cut*t*er, r. Cut*l*er.
184, l. 13, for reposing *in* confidence, r. reposing confidence.
214, in two places in this page, and one in p. 230, for scutellaria *c*ateriflora, r. scutellaria *l*ateriflora.
240, l. 15, for Ha*g*garth, r. Ha*y*garth.
281, l. 1, for balsam of *rue*, r. balsam of *Peru*.

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be considered as base coin, and avoided as the box of Pandora, from which issues a multitude of evils.

The zeal and solicitude, which you manifest on every professional occasion, will abet the project suggested by you of an epistolary intercourse; though you will resort to a more ample fountain, to satiate your ardent thirst for medical intelligence. Anticipating your approbation, therefore, I shall hazard some observations relative to that most deplorable malady, denominated *canine madness*.

Although destitute, like most others of your standing, of practical knowledge, you have not permitted this interesting subject to escape your inquisitive spirit of observation. It has become epidemical in our country, and since your departure hence, commenced its devastations in this vicinity; some fatal consequences have already resulted; the people here are electrified; all interest and attention are arrested, and the spirit of your friend is animated to the field of investigation.

The human system cannot be reduced to a more awful and humiliating condition, than when exhibiting symptoms characteristic of canine affection; nor can the virtues of humanity and benevolence be more honourably exerted, than when contributing to the relief of the miserable sufferer. But alas! we have to lament the inadequate powers of human skill. For although theory has succeeded to theory, and both preventive and curative remedies have, for centuries, been multiplied and extolled; yet we appeal in vain to the annals of medicine for evidence of their

utility or success. Should it be your destiny to encounter this formidable disease, when one of your fellow men shall be the subject, your sensibility will be wrought to the highest pitch: and finding the healing art to fail of displaying on the occasion its full orbed lustre, you will be disposed to acknowledge the just application of the epithet, *opprobrium medicorum.*

The formidable disease under consideration, has probably been coeval with the canine species, or, at least, may be traced to very remote antiquity; and almost every region of the earth, which affords existence to those animals, has, at various periods, participated in the fatal consequences resulting from the malady peculiar to them. As species of the genus, *canis*, dogs, wolves, and foxes, are those in which the disease is said generally to appear, in the form of an original affection. But cats, in the opinion of some writers, may be added to the catalogue. And it has been affirmed, that the bites of cows, swine, weasels, and even cocks and hens, when in a state of madness, have communicated the infection. Whether this disease arises spontaneously in the body, or results from a specific contagion, rabid animals are capable of communicating the infection, through the medium of their teeth and saliva, to others, and also to the human species. In this form it still retains the appellation of canine madness; but, in appropriate medical language, it is termed Hydrophobia, literally signifying "dread of water." This latter term, however, is justly deemed exceptionable; for, although dread and

abhorrence of water and of all liquids, are prominent and leading symptoms of the disease, produced in the human subject by the bite of a rabid animal, yet, so far from being confined to that affection, it has been known as a concomitant of various other diseases, as hysteria, hydrocephalus, tetanus, typhus fever, inflammation of the stomach, and dysentary.

There are, indeed, some instances in medical history of persons labouring under this disease, who were not afflicted with a dread of water. Shall it be said of such, that the hydrophobous patient was not affected with hydrophobia? Hence we perceive a striking incongruity in the term hydrophobia, to designate the present affection, as it is merely descriptive of a single symptom, and constitutes but a small part of the real malady. When applied to dogs and other animals, the appellation is still more evidently perverted; since in no instance does abhorrence of water exist among that class of beings. Of all palpable misnomers, therefore, in our science, this I believe is the most preposterous; and none perhaps requires more the prompt interposition of nosologists. Nor indeed is the epithet, *canine madness*, much less objectionable, as it will be made to appear, that neither in the human or brute subject, are there, in general, any true indications of mania exhibited. Ambiguous and indefinite phraseology is equally with hypothetical conjecture, a source of embarrassment, and adverse to every species of improvement.

Upon a review of medical history, it appears, that from generation to generation, the phenomena of hy-

drophobia have been involved in the darkest obscurity; and from the accumulated labours and knowledge of many ages, posterity can derive little else than lessons of negative import. Lessons, however, calculated to diminish our veneration for the wisdom and philanthropy of our predecessors, are found in the examples of inhumanity, exercised towards their suffering patients. Under the unwarrantable pretext of avoiding a bite, the hydrophobous patient, like a demoniac, was abandoned to his awful fate, without the least resource or assistance. But an expedient still more barbarous, or shall I not say, more merciful, was frequently adopted, by consigning the deplorable victim to a premature death, by suffocation with the bed clothes or between matrasses; nor was it till the middle of the eighteenth century, that such tragical scenes were in some countries prohibited. It will not therefore be deemed profitable on this occasion, to recur to a period prior to that above mentioned, as a source from which light can be reflected on this subject. It would be resorting to a baseless fabric, to cobweb theories, and the most capricious and empirical mode of practice. According to the justly celebrated Tissot, "It is incontestible, that to the year 1730, not a single patient escaped in whom the disease was indisputably manifest, and that every medicine, then employed against it, was useless." Nor will this excite surprise, when you learn they reposed confidence in the solemn mysteries of amulets, and charms, and in such ridiculous specifics, as eating the liver of the mad dog broiled, or tying the skin of an hyæna about

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vanquished; and its ravages are equally a reproach to medicine, and a scourge to our race. The various theories both of ancient and modern medicine, and the practice founded upon them, have together with the boasted catholicons of empirics, demonstrated their own inadequate principles.

The specific nature and constitution of the subtle and refined poison of rabid animals, has hitherto eluded the most critical research. It is equally intactible, out of our sight and out of our knowledge. We are permitted to know it only by its calamitous effects, and in these we recognise its preeminent power, and unrivalled malignity. An investigation of its abstruse properties, and a solution of the intricate phenomena which mark its operation, constitute a theme for the exercise of talents and ingenuity. That the history and pathology of this singular disease, has never been clearly understood and illustrated, is apparent from the various and contradictory opinions of systematic writers, and want of uniformity of practice among physicians. Beneath the mass of contending opinions it is not easy to discriminate, and collect a comprehensive view, which is both decisive and substantially correct.

Destitute of just principles, how extremely obscure and equivocal is the course, which directs to a salutary issue! Several causes have conspired to perpetuate ignorance and error relative to this intricate subject. One of which, is the rare occurrence of the disease precluding the possibility of physicians becoming conversant with it. A large proportion of

medical men of forty years extensive practice, never having witnessed its operation, it is, of course, foreign to their study and pursuit. Another obstacle is a culpable disposition in authors and others, to adopt and copy the doctrines, and even oral traditions from one another, without due examination; as if to add darkness to their own unintelligible mysteries. But the alarming prevalence of this evil has created a new and lively interest, stimulating to a laudable emulation in the investigation of its nature and treatment. Many important facts abstracted from vague speculation, are yet in reserve to be unfolded by the joint efforts of the experimentalist and philosophical physician.

It is not a task which devolves on a single individual, but demands the combined exertions of all.

Great indeed is the labour, rich and honourable will be the harvest of reward. The field of experiment is yet exhaustless, let us unite our endeavours and resolve to give it another and more assiduous gleaning; nor cease to explore its recesses, until the hidden treasure shall be discovered; And he, whose hand shall pluck this laurel, will have achieved an object of universal interest, and rival a Jenner in celebrity.

LETTER II.

SYMPTOMS DISTINCTIVE OF MADNESS IN DOGS.

In pursuance of my purpose, I proceed to collate and accumulate materials constituent of a succinct exposition of the systems, opinions, and modes of practice existing at the present day. Leaving no accessible source uninvestigated, I shall supersede your recourse to multiplied, detached productions, for the acquirement of a portion of knowledge, which may be condensed in a few appropriate pages. But at the very threshold of research, I am ready almost to shrink from the arduous task; as it leads my mind into paths of intricacy, and rises to a magnitude I had not contemplated, and threatens to betray my incompetency in the execution.

Dogs are liable to a variety of diseases which are little understood, and it is highly important that the symptoms, characteristic of the fatal one under consideration, should be precisely discriminated.

This malady is at certain seasons epidemical, when its melancholy ravages are widely extended, though, in general, it originates from the contagious saliva communicated from one animal to another by means of a bite. The symptoms of the disorder in dogs, and all other animals, commence sometimes in ten or twelve days, but more commonly between three and eight weeks, though in some instances, not till eight months after having received the bite; and they sel-

dom survive longer than from three to seven days, after the first symptom has appeared. The varieties in the disease are numerous, and it is difficult to say, what is the first symptom that appears; but the following is a concise and accurate summary, according to the observations of the latest writers. Several days previous to the invasion of the disorder, the dog is observed to manifest a change in his natural manners; he grows dull and heavy, and shews an equal indifference to his master and his usual meat and drink. He becomes solitary, and endeavours to hide himself, does not bark as usual, but makes a murmuring noise, is peevish and easily offended. His ears and head hang down, and he walks as if overpowered with sleep, but in this stage he remembers and respects his master. A disposition to quarrel with all other dogs, is manifested early in the disease. After these symptoms the dog begins to pant, he breathes thick and heavy, hangs out his tongue to discharge a quantity of froth from his mouth, which he keeps perpetually open; sometimes he walks slowly as if half asleep, and then suddenly runs, but not always directly forward. At length, he forgets his master and will bite him if opportunity offers; his eyes look dispirited, dull, and full of tears and red; his bark is hollow and hoarse, and his tongue of a lead colour. His recollection of persons being nearly obliterated, he strays from home, and follows any path or road he happens to meet, but seemingly without purport or design. In this state, he only bites or snaps at such animals as come in his way, giving apparently but little attention to external ob-

jects, so that it is easy to avoid him. If he be confined in this advanced stage of the disease, he bites and gnaws every thing near him, is furious for a moment when approached; and his chops are covered with tough frothy saliva. He now grows faint, thin and weak, often falls down, again rises, attempts to fly at every thing, and soon grows furious. This second stage seldom continues thirty hours, death by that time putting an end to the disease. A bite received at this period, is accounted the most dangerous.

He can swallow both solids and liquids during the whole disease, and having no aversion to water, he never endeavours to avoid it.

A writer in Rees' Cyclopedia furnishes the following interesting detail. "In no instance have I ever observed a total alienation of the mind; in very few, have the mental faculties been disturbed. The disposition to do mischief is rather from an increase of irritability than absence of sense, for in most instances, even in those that are furious, they acknowledge the master's voice and are obedient. Sportsmen distinguish two kinds of madness, dumb and raging; but the distinction is not very clear.

There is a certain peculiarity in the manner of the dog; some strange departure from his usual habits; and this peculiarity cannot be laid too much stress on; for it is almost invariable and a never-failing criterion of the complaint. In a very great number of instances, the peculiarity consists in a disposition to pick up straws, bits of paper, rags, thread, or the small

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iously seeks; much less frequently does he attack human persons. It is said that a rabid dog will not turn out of his road to bite; but this can only apply to the last stages of the disease: for in the middle stage, which is when the mischievous propensity is the strongest, and when the dog is strong and active, he is industrious in seeking objects; in fact, it is his sole pursuit. In no instance is there any aversion to water, but on the contrary, the fever accompanying the disease makes the dogs very dry, and they are continually lapping, though in some instances they are unable to swallow. The complaint is generally accompanied with costiveness, and there is evident marks of pain and uneasiness in the bowels in almost every instance. It is this inflammatory affection of the bowels that makes many of them paralytic, and falter behind. We have seen some, from this same cause, have a tendency to sit upright on the rump. We have dissected carefully nearly an hundred cases, in every stage of the complaint, and under every variety of the disease, and some appearances have been found common to all. More or less, every instance shews inflammation of the stomach and bowels together with the lungs. But these are by no means in equal degrees. In those cases where there are much restlessness, quickness, violent panting and much mischievous tendency with almost incessant howling, the inflammation of the lungs is found to be excessive: and the bowels though never without some inflammation, are found less so. But when there is more mildness, when the dog appears affected in his loins,

when he eats much straw, dirt, or unusual substances, and frequently brings up what he has taken down, then, on dissection, it will be found that the stomach and bowels are principally inflamed. In what is termed dumb madness, the stomach and bowels are still the organs that suffer most; but to this is added a peculiar affection of the throat and mouth. In some the throat alone is affected, producing a difficulty of swallowing, and a very odd deep choaking noise; in others, the whole mouth is affected, the tongue is inflamed to the end, nearly black. The jaw drops and slaver runs fast from the mouth, and there seems almost a total paralysis of the parts. There is seldom much mischievous tendency in this variety of the disease. On the contrary, some are to the full, as mild and as tractable as at any other time; and shew not the smallest disposition to bite throughout.

"In the wild kind there is a very slight redness in the vessels of the brain. In almost every instance the stomach is filled with the most unusual substances; stones, straw, coal, wood, and whatever can be got at. It is a remarkable fact, but it has occurred to us so often that we are positive as to its existence, that if, in the progress of the complaint, any very great violence is offered to the animal, the disease seems arrested, and he lives many more days than he otherwise would do, judging from analogy.

"The duration of the complaint is various, it seldom destroys before the third day, and few survive beyond the seventh. The average number die on the fourth, or fifth, from the appearance of the disease."

It has been alleged by some writers, that a loss of appetite, is one of the first symptoms of madness in dogs, but this circumstance is not to be regarded as correct, for instances have occurred of dogs, far from exhibiting any appearance of illness, treacherously fawning upon persons, and turning from eating their food at the moment the fatal bite was given. In the Medical and Surgical Journal of Edinburgh for 1809, an instance is related of a dog which gave a fatal bite, and yet the animal for ten days after he had bitten the person, hunted and fed and drank as usual, visiting houses where there were children without biting or any way manifesting his illness. A similar case may be found in the Medical Repository, of a boy, who received the fatal poison by a bite from a dog in apparent health, while he was teaching him to fetch and carry. Other cases are recorded of the disease being received by persons suffering their sores to be licked by dogs, in whom no signs of indisposition were observable.

In the opinion of Dr. Mease, a certain sign of madness is that of the dog affected, being avoided by all others.

"This instinctive principle of self preservation," he says, "wisely implanted in those animals, is sufficient to distinguish the actual presence of the disease, although it may not appear by any symptom whatever." This circumstance, however, may be deemed questionable, as it receives no confirmation by the observations of the latest writers. The experiment, recommended by Mr. Petit as a criterion of madness after the dog has been killed, appears to

be founded on the same principle. He directs a piece of meat to be rubbed round the teeth and gums of the dead animal supposed to be infected, and given to another, who will eat it, if the dog was free from infection, but reject it, if the disease existed in him.

I have thus presented you with the principal remarks from the best authorities, respecting the signs of rabies in dogs; and these, if properly regarded, will afford the most correct information, and point out sufficient marks by which this destructive disorder may in general be ascertained to exist, even in its early stage. But the fact should be held constantly in recollection, that the fatal effects of this dreadful poison may result from the bite of a dog given many days before he discovers a single symptom of indisposition. During a season of the prevalence of rabies, whenever a dog looks dull and shews an aversion to food, and a departure from his usual habits, and an uncommon disposition to quarrel with other dogs, danger is to be apprehended, and the animal should be properly secured as soon as it can with safety be effected.

When a dog exhibits symptoms of madness, or is known to have received a bite from one affected with it, the general practice is to have him immediately destroyed, that fatal consequences may be prevented; but when a bite has been given, it becomes extremely desirable to ascertain, whether the dog was, or was not actually mad; to this end, he should be carefully confined, till by the issue, that fact can be decided.

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tion, as leading principles, and applicable to many of the unexplained phenomena of canine poison.

"Mr. Hunter divides animal poisons into the natural and the diseased. The first are those which form a part of an animal when in health, and though deleterious to another, do not communicate a power of affecting others. Of this kind is the poison of the scorpion, the adder and other venomous animals. The morbid poisons, on the contrary, never exist but under disease, and have a power of exciting a similar disease by the secretion of matter which will have the same properties."

According to Mr. Hunter, three states of the body are necessary for the existence of morbid animal poisons, *susceptibility, disposition, and action.*

Susceptibility is either of a part or of the whole constitution, and depends on the state of either of them at the time it is exposed to the influence of a morbid poison. If the susceptibility exists when the poison is applied, the *disposition* must take place: and after a certain period, various according to the laws of the poison, the *action* will follow.

That *susceptibility* is necessary we know, because we find that some people cannot be affected by a poison, to the influence of which the rest of mankind are subject. We find also that some constitutions, or even some parts, are insensible to a poison at one time the influence of which they feel at another time. It also appears that at certain times the *part* to which a poison is applied will be found susceptible thereof,

yet that the constitution will resist it. Dr. Adams offers the following as marks by which inoculators can very early satisfy themselves whether the part, or constitution, or either is susceptible of small-pox or cow-pox when a puncture is made and matter applied.

"1st. If neither the part nor the constitution is susceptible, the puncture heals like the effect of any common injury.

"2d. If the part only is susceptible, inflammation takes place early, and suppuration soon follows, with little or no fever.

"3d. If the constitution, as well as the part, is susceptible, the local action takes place more slowly, as if interrupted by the constitutional *disposition*. As the local action advances, the suppuration is preceded by the constitutional action, and the disease becomes general. If the *susceptibility* exists, and the disposition takes place, though the action must follow, yet it may be suspended for a while, if the constitution is engaged in another action. For,

"4th. Two actions cannot be carried on at the same time in the same part, or in the same constitution."

Having illustrated the foregoing posititions, and applied them to particular circumstances the ingenious author further observes, "The following laws, then, are to be admitted with as few exceptions as any others that are received in pathology. To render them as plain as possible I shall offer them in the form of aphorisms and add a few commentaries to illustrate them still further.

"1st. All persons are susceptible of the impression from a morbid poison, in proportion as they are unaccustomed to it.

"2d. That *susceptibility* and *disposition* are necessary in a constitution or part, before the *action* excited by a morbid poison can take place.

"3d. That after the constitutional disposition has taken place from a local diseased action, the destruction of that local action will not prevent the future appearance of the constitutional disease.

"4th. That no two actions from two different morbid poisons can be carried on at the same time in the same part, or in the same constitution.

"It will follow from this and the third aphorism, that,

"5th. If a constitutional disposition to one morbid poison exists, whilst the action of another is going on in the constitution, we ought to expect the action of the first to appear after the action of the second is completed or has ceased.

"6th. Though nothing can prevent an action from following after a *disposition* has taken place, yet a *disposition* may be prevented by preventing a susceptibility in the constitution or part.

"7th. The susceptibility may be prevented by rendering the constitution familiar with the morbid poison, or, as long as the constitution is exposed to it, by keeping up a constitutional action previously excited by another morbid poison or any other cause."

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dogs were seized with the disorder on their arrival in the harbours of the islands from foreign parts.

In many other countries, although the heat be extreme, the disease has never been known to prevail. South America is noticed as an example, on the authority of Don Ulloa and various other writers. "The malady is rare in the northern parts of Turkey, more rare in the southern provinces of that empire, and totally unknown under the burning sky of Egypt.

"At Aleppo, where these animals perish in great numbers for want of water and food, and by the heat of climate, this disorder was never known. In other parts of Africa and in the hottest zone of America, dogs are never attacked with madness."*

Among the numerous herds of hounds kept in the southern states, for the purpose of hunting, the malady, I believe, is less frequent than in the northern states. It does not therefore clearly appear, that the present disease is peculiarly prevalent in warm countries, and that external heat should be assigned as a principal agent in producing it. Nevertheless, since all hot climates prove extremely enervating to the animal system, it is not unreasonable to suppose, that excessive and long continued heat by inducing morbid debility, may have considerable influence as a predisposing cause.

It must not, however, be conceived incompatible with the foregoing observations to assert, that intense cold is still more a powerful agent in producing that

* Ree's Cyclopedia.

state of general debility, favourable to the attack of the disease in question.

Although considerable controversy has subsisted among physicians respecting the mode of action of cold on the living body, the position is now conceded that the abstraction of the influence of heat, or the action of cold, produces a direct sedative effect; and by its continuance, all the actions of the system, and the functions of life, are enfeebled and ultimately destroyed. Hence it follows that the two opposite causes of heat and cold, when applied in a manner more violent than the system has been accustomed to sustain, will produce the same debilitating effect, and predispose to the attack of the malady. Thus Dr. Mease observes, "The influence of excessive cold or heat, as equally favouring the production of the disease, was known at a very early period of time. Ætius informs us, that it was common in those countries, where the violence of winter and summer was was equally excessive.* During several hard winters within my remembrance, in this city, (Philadelphia) dogs very commonly went mad. This was particularly the case in that of the year 1779–80, when more of those animals perished by the disease, than for a long time before. Throughout Maryland, I am informed on very good authority, it was still more general. That dogs are capable and do actually labour under debility in the beginning of this complaint, is fully proved by their being affected with the same

* Ætius, Lib. 6. Chap. 24.

symptoms which so clearly characterize the existence of that state in men; an aversion from motion, love of solitude, downcast look, tendency to sleeping, &c."†

2d. Putrid aliment in the opinion of some reputable writers, should be supposed to favour the production of the disease; while by others it is denied to have any influence to that effect, as dogs that are fed on carrion are not more liable to it than others. Among the supporters of this last opinion is Mr. Meynall of England, who avers, that madness never originated from putrid provisions, or from any other cause than the bite.

On the other hand, the fact is stated by Dr. Mease as a remarkable proof of the influence of carrion eaten by dogs in producing madness among them in the city of Philadelphia, that "at the conclusion of the late war, and before that period, all the horses and other animals that died in the city, were carried out to the commons, and suffered to putrify there, and it is well known, that at this period, madness was a most common disease among the dogs that used constantly to devour those carrion: but of late, it more rarely occurs among them, since the former practice is not any longer suffered." Dr. Bush, enumerates putrid aliment among the most frequent causes of canine madness.

"A dog was affected with madness in New Jersey, a few years since, and the physician to whom he belonged, traced the disease to the first dog known to be

† Inaug. dissertation.

affected in the country where he resides: this dog had been feeding upon some putrid dead bodies of animals; soon after which, he was observed to be sick, and to eject from his stomach the matters eaten." Med. Repos. vol. i. p. 382.

3d. It has been conjectured, that a *deficiency* of *water* has proved influential in the production of canine madness; but no well substantiated facts have been adduced in support of that opinion.

4th. A supposed want of *perspiration* is enumerated among the most powerful predisposing causes of the present disease; and this erroneous opinion is traced to the respectable authority of Dr. Mead; who says, "no dog ever sweats."* But on the principle that similar laws govern the economy of all animated nature under similar circumstances, Dr. Mease justly observes, that "the assertion of there being no perspiration in dogs is a mere hypothesis;" and adds, "that they do perspire and in a copious manner, is fully proved by the strong smell that every one perceives on approaching them; and by one of those animals being able to trace another by the scent of his foot-steps, which could not happen, if a large quantity of perspirable matter was not constantly going off."†

5th. *Worm, under the tongue.* The idea that dogs are furnished with a worm under their tongue, which gives origin to rabies in those animals, is derived

* Mead's Works.

† Note to Monro's Comparative Anatomy in the new system, vol. iii. p. 347.

from ancient authority. It has been maintained by writers of merit and eminence, and is countenanced by popular opinion at the present day.

"It appears," says a writer in Ree's Cyclopædia, "that the prevention of canine madness has been attempted in the earliest ages. For this purpose Pliny recommends the worming of dogs, and from his time to the present it has had, most deservedly, says Mr. Daniels, its advocates. He tells us that he has had various opportunities of proving the usefulness of this practice, and recommends its general introduction." There is however strong ground to doubt the existence of such a worm, and to conclude that the opinion relative to its influence in the present distemper, is altogether fallacious.

Dr. Bradie says, "he never could discover on dissection, any worm." "Others who deny the existence of this supposed worm, assert that it is a gland, and secretes the venom which produces the disease; but no secretory duct has been seen, which being essential to the nature of a gland, this idea must then be equally futile; neither is it a nerve as supposed by Dr. James, but a spiral substance between the nature of a ligament and tendon, as shewn by that excellent anatomist Morgagni."* Dr. James, who, according to Dr. Hamilton, was a professed "dog doctor," and a man of great experience in diseases of the canine tribe, asserts, that not the least security is afforded to any dog by the extirpation of this substance; for al-

* Dr. Mease Inaug. Disse.

though thus treated, they run mad equally with those who have never suffered this absurd operation: and Dr. Hamilton, author of an elaborate treatise on canine madness, in two volumes, has proved, by the testimony of a person of credit, at Ipswich, England, who has wormed many hundred dogs, that it affords no security. In fact, the position is open to controversy, if accounted of sufficient importance, but appears destitute of support by reason or analogy.*

Doubts are frequently expressed, even by the most recent inquirers, whether rabies ever originates spontaneously in the canine species, the facts which follow furnish irresistable evidence, that it sometimes is produced in dogs by the influence of an inquinated atmosphere.

From a communication by Mr. H. W. Dobbyn to Dr. Mitchel, dated January 26, 1802, (Med. Repos. Hex. 2, vol. ii. p. 85.) it appears that in the autumn of the year 1782, Mr. D. had in Ireland a pack of fox-hounds, consisting of thirty couple. They were kept in a kennel inclosed by a wall fourteen feet in height. A mania broke out among them by which the whole were destroyed; and fresh dogs being put into the kennel, were also seized with the disorder,

* The *worming* of whelps is performed with a lancet to slit the thin skin which immediately covers the worm; a small awl is then introduced under the centre of the worm to raise it up: the farther end of the worm, will with very little force make its appearance, and with a cloth taking hold of that end, the other will be drawn out easily. Care should be taken that the whole of the worm comes away without breaking; and it rarely breaks unless cut in two by the lancet or wounded by the awl. *Ree's Cyclopedia.*

without being bitten by any animal. With the view of finding a remedy for this evil the walls on two sides of the square, were thrown down, the rooms, boiler, and other vessels were washed with soap-suds, and afterwards with vinegar, and the place left unoccupied. After the lapse of six months, twenty-seven couple of whelps were brought from nurse, and put into the kennel, and in about one month, the same disease again made its appearance.

As the animals were fed on wholesome food, well dressed and boiled, Mr. D. found much difficulty in ascertaining the cause of their sickness. The door of a stable opening into the kennel, the manure was thrown out into it, and it was at length observed, that many of the dogs preferred sleeping among the fresh manure, and those that did so were seized with the disease; and that it constantly originated with them, and with such as lay on the litter with the horses in the contiguous stable; while all others escaped. Mr. D. adds, that those dogs were affected with rabies, is confirmed by this proof, that all animals bitten by them went mad, (two cases excepted) in about fifteen days.

Dr. Mosely testifies that while in the West Indies, many dogs were seized with madness which had no communication with each other; and some dogs that were brought from Europe and North America, and were not on shore, went mad upon their arrival in the harbours of the islands. An intelligent ship master informed me, that ten or twelve days after his arrival at

the port of Lisbon, after a lengthy voyage from Boston, a dog which he took with him was seized with madness; and that some gentlemen whose official duty called them on board, informed him that the malady was then epidemical in the city and its vicinity. Thus it appears that the infection may exist in a certain state, or peculiarity in the atmosphere, similar to that which produces other epidemics in the brute creation. Mr. Meynall, a celebrated sportsman in England, has paid particular attention to this disease among his dogs, and is confident that madness never originates from hot weather, putrid provisions, or any other cause than the bite; he never knew the distemper to commence without being able to trace it to that source, and it was never introduced into the kennel, but by the bite of a mad dog. He has for many years preserved his dogs from the disease, by subjecting every new hound to a quarantine, before he was introduced to the pack.

Dr. Bardsley has endeavoured to prove, "that dogs never experienced the hydrophobia or canine madness, without having been previously bitten or infected; and secondly, that the disease in this species of animals always shews itself in five or six weeks: and concludes from hence, that this dreadful malady might be annihilated by making all the dogs in Great Britain, perform a kind of quarantine, by shutting them up for a certain number of weeks. Though the disease from the bite of a mad dog, is perhaps more analogous to those from the wounds inflicted by ven-

omous animals, than to those from other contagious matter; yet these observations are well worthy further attention, which the author promises." Zoonom. vol. ii. p. 97.

The editors of the Medical Repository bring objections to the above doctrine of Mr. Meynall and Dr. Bardsley, by enquiring, "How should the disease originate in a new country? How could it originate at all? What first occasioned it, may occasion it a second time."* Admitting the justness of these queries, the same principles will equally apply in the instance of small-pox and syphilis. No one ever questioned the fact, that the venereal, like the canine affection, is perpetuated through the medium of one subject to another by contact. If, therefore, the above mentioned facts are well founded and the analogy admissible, we have only to impose the laws of quarantine upon the canine species, and a non-intercourse to control the licentious propensities of our own, and these two sources, so productive of evils to mankind, may be happily annihilated.

* Medical Repository, vol. i. p. 890.

LETTER IV.

OF THE VARIETY IN THE PERIOD WHICH INTERVENES BETWEEN THE BITE, AND ACCESS OF RABID HYDROPHOBIA.

THERE is a singular trait in the character of the canine affection, in regard to the length of time that elapses between the infliction of the poison, and the actual attack of the consequent disease. This circumstance arrested attention at an early period, and the causes of the astonishing variety have frequently been the subject of investigation, but not satisfactorily explained. The stories related by various authors, of twenty, or even forty years, having intervened between the period of the bite and the commencement of the disorder, are justly to be suspected as proceeding from dubious authority. That the appearance of the symptoms has been known to occur, in all the intermediate periods between ten days, and nineteen months, after the reception of the poison, is incontestibly true; though the most usual period may be included, between three and six weeks. One well attested instance, and that of recent date, is recorded by Dr. Mease, of a boy who remained free from hydrophobia during a period of three years and four months after the bite, which was inflicted by a cat.* In the attempts

* "Dr. Hamilton, after a laborious research fixes the tenth day as the earliest period at which the disease has appeared, and nineteen months

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fers to numerous authors who have recorded examples in point.

The stage of the animal's disease at the time of inflicting the bite, the original activity of the virus, and the quantity of the poison inserted in the wound, are all, according to Dr. Mease, equally void of influence, respecting the attack or fatality of this direful malady.

Having shewn the fallacy of the several causes assigned by authors for the comparative early or late attack of the disease in different persons, our author proceeds to delineate such particulars, as he conceives will account for the variety. There is in the poison a peculiar property to induce a morbid sensibility of the nervous system, and its action is first exerted on the nerves of the part where it was inserted; and by which the whole system is brought into sympathy. The earlier or more protracted appearance of the disease will, therefore, greatly depend on the influence of the greater or less sensibility of the nervous system. Accordingly, "those persons who either by habit or other circumstances were of an irritable nature, have been observed to be attacked much sooner than those who possessed less sensibility of the nerves. Thus in women and children, who, for the most part have their nervous systems very easily moved, a much shorter period has intervened between the bite and the commencement of the symptoms, than in men, who, from possessing less sensibility of their nerves, have remained longer free from the disease."

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despondency, till it was discovered, that the dog which gave the bite was not affected with madness. "The boy whose history is recorded by Dr. Dickson," says the author already quoted, "perceived no indisposition until he heard that a person in the neighbourhood, who had been bitten by the same dog as himself, died that day. A still greater proof of the effects of fear in bringing on this disease is derived from the knowledge of the fact, that an actual dread of fluids and convulsions at the mere sight of them, have come on by the influence of fear alone, and where the poison was not in the least concerned."

"Dr. Percival has given two remarkable cases, where the operation of mental impression from a bite being inflicted by a supposed mad dog, produced these symptoms: and an instance occurred in this city, (Philadelphia) some years since, where the natural fears of a gentleman receiving a bite, were increased to such a degree by the improper suggestion of his physician, that *an actual dread of water* took place and continued for several days. Finding however that without the use of any remedy his apprehensions were groundless, his reason triumphed; and when he became convinced of his error, he laughed at his own credulity, and at the fright that was occasioned by the fatal prognostic of his physician.

"Some persons have had so permanent a horror of water, merely from having been once bitten, as never after to be able to view it without uneasiness nor to

touch it without painful sensations." Med. Commen. Edinburgh, vol. vi.

Amidst the horrors experienced during a period of suspense after having received a bite, there is a source from which the sufferer may derive considerations of a soothing and consolatory nature. Numerous writers of the most established credit, have recorded, and the intelligence of Dr. Mease verifies the position, that a large proportion of persons bitten by dogs actually mad, are never affected by the disease, which sometimes arises from a bite, even though they dispense with preventive remedies. The celebrated Cocchi, relates, "that among several persons bitten at the same time, some died notwithstanding the most noted methods of cure had been used: and that others again remained perfectly well although they underwent no manner of treatment." "Dr. Vaughan, (Cases and Observations on Hydrophobia,) informs us that between twenty and thirty persons, which were bitten by the dog which gave the fatal wound to the boy whose case he relates, not one felt the least ill effects except himself." Mr. John Hunter declares from his own knowledge, that there were twenty-one persons bitten by the same dog; nothing was done for any of them, and only one was taken ill. On another occasion related by Dr. Houlstons, (Con. Med. Journal. vol. vi.) one only out of nine received the infection. Indeed we have an instance recorded of one, who appeared to be unsusceptible of the infection. "I once knew a footman," says Dr. James,

"who was three times bitten by dogs manifestly mad, in as much, that several animals bitten by the same dogs, near the same hour, contracted the distemper and died. This fellow could not be persuaded to do the least thing by way of precaution, and yet never had the least tendency to hydrophobia." When the part of the body bitten is covered with cloths, boots, or shoes, the saliva is often wiped from the teeth before it can reach the flesh, and of course the poison is not communicated; or the part bitten, or the constitution may be at the moment unsusceptible of the poison. It is also to be remarked, that every dog that bites, is not to be considered as actually affected with madness. When one of these animals is observed to labour under indisposition, he becomes suspected and is soon hooted and provoked till his resentment is excited and a bite is given. This affords occasion for the administration of empirical remedies, a favourite nostrum which is said never to have failed, is exhibited, the patient happily survives and escapes an attack of the hydrophobia; the remedy is of course extolled, and its reputation established; whereas, on strict inquiry, it is found undeserving of the least consideration.

It is from similar occurrences, that such numerous pretended remedies are imposed upon the credulity of mankind, and which with their authors acquire unmerited reputation. Dogs and other animals are vastly more susceptible of the infection than the human species.

Although daily experience and observation substantiate the grateful fact, that many persons bitten, without the employment of a single medicine, actually escape the infection; yet these exemptions ought not to induce a security which may prevent every precaution being taken, to avert the dreadful calamity. From the consideration, that one even in twenty may be the victim, it would be the height of indiscretion and folly, not to resort to the most judicious and respectable source for early advice and assistance.

LETTER V.

HISTORY OF THE SYMPTOMS DISTINCTIVE OF THE DISEASE IN THE HUMAN SPECIES.

THERE is a question of an interesting nature, which presents itself here, previously to a description of the symptoms, viz. Does an actual and idiopathic hydrophobia ever arise in the human body, independent of the action of contagion, for its production? The position has been contested, and in the opinion of some of its opposers, completely refuted. The facts, however, which have a bearing upon this question, may be considered as involving a doubtful conclusion, and upon the principle of analogy with other diseases, which depend on a specific poison, as the small-pox, venereal disease, and measles, which furnish no such examples, we might be justified in denying the existence of spontaneous hydrophobia. But whoever has made himself acquainted with the observations of professor Rush on this topic, will be disposed to yield assent to the affirmative, or to contest the principles of the champion of American medicine, in whose works you will find an instructive account of spontaneous hydrophobia, with the various causes from which it originates.

There is undoubtedly a dread of water occurring symptomatically, and without any contagion, in some

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sometimes it resists all kinds of healing applications, and forms a running ulcer, which discharges a quantity of matter, for a considerable time. The approach of the disease is known by the cicatrix becoming high, hard, and elevated, and by a peculiar sense of pricking and itching at the part; pain resembling rheumatic pain extends into the neighbouring parts and towards the throat.

Sometimes the part is surrounded with livid or red streaks, and seems to be in a state of inflammation, though frequently there is nothing remarkable to be observed about it. There are more general pains of a flying convulsive kind, which are said to affect the patient in the neck, joints, and other parts, after a dull pain seizes the head, neck, breast, belly, and along the back bone.

Towards the conclusion of the disorder, the patient complains of this pain shooting from the arm towards the breast and region of the heart. A lassitude, a dull pain in the head, and a vertigo, soon come on; the patient is melancholy, mutters, is forgetful and drowsy; his mind seems disordered, his temper irritable and irregular; his slumbers disturbed, and convulsive agitations immediately follow his waking. A deafness is sometimes complained of; the eyes are watery, the aspect sorrowful, the face pale and contracted; sweat breaks out upon the temples, an unusual discharge of saliva flows from the mouth, though the fauces are dry; the tongue becomes foul, and the breath occasionally fetid. The fetor is often only per-

ceived by the patient, and sometimes it attends the discharge from the wound, the dressings of which are said to be frequently black. Besides these, from the beginning, there is a peculiar stricture and heaviness on the breast, a struggling, as it were, for breath, a sighing, a nausea, and often a billious vomiting. This oppression of the precordia, is one of the constant symptoms of this disorder; it begins, increases, and ends with it. As the above symptoms increase, the second stage advances, a fever comes on, which at first is mild and attended with momentary horrors, though there is sometimes no fever; sleep is lost, the mind is more and more disturbed, a delirium approaches, and an aversion at first to polished bodies, then to light, afterwards to fluids, is perceived. The air offends, if it touches the skin, and the slightest sound is very painful. A constriction of the gullet, with a difficulty of swallowing, first occurs, but as yet liquids are freely taken; afterwards, however, they are refused. This symptom augments so visibly that on the sight of any liquid a horror seizes the patient, and if he strive to drink, spasms, anxiety, and loss of strength follow. As soon as the surface of the liquid is touched, a strangulation in the throat is felt, the stomach is inflated; the larynx is suddenly swelled externally, though the swelling quickly disappears. While liquids are thus rejected, solids are swallowed with tolerable ease; yet this symptom may become so violent as totally to prevent solids also from being swallowed. The patient now mourns bitterly, and,

at times, loses all knowledge of his intimate acquaintance. But reason returns at intervals, and he laments his own calamity; thirst excites in him a desire to drink, but he strives in vain to swallow, and soon sinks into the most affecting despondency. He advises his friends to keep at a distance, and it is supposed that he feels an inclination to bite: but this is suspicion only, and it is highly improbable, that with the disease of a dog he should adopt the manners. Biting is the common method by which that animal shows his resentment. The barking like a dog is equally imaginary.

A priapism, and involuntary emissions of semen and urine, sometimes attend this stage; and as the conclusion approaches, the fever and thirst increase; the eyes are bright and furious; the urine is high coloured, acrid, and in small quantities; the tongue hangs out, the mouth foams, the pulse throbs, strength fails, cold sweats come on, the tightness of the breast increases, and the patient expires in spasms, often losing the difficulty of swallowing liquids for many hours; so that the dread of water is by no means a pathognomonic symptom.

Sometimes the peculiar symptom of the disease, the dread of water, comes on all at once. We have an instance of one, who having taken a vomit of ipecacuanha for the sickness he felt at his stomach, was seized with the hydrophobia during the time he was drinking the water. Sometimes the disease begins like a common sore throat, and the soreness daily in-

creasing, the hydrophobic symptoms show themselves like a convulsive spasm of the muscles of the fauces. In others, the mind seems to be primarily affected, and they have a real dread of water, or any liquid, before they try whether they can swallow it or not. Dr. James, in his treatise on canine madness, mentions a boy, sent out to fill two bottles with water, who was so terrified by the noise of the liquid running into them, that he fled into the house crying out that he was bewitched. He mentions, also, the case of a farmer, who, going to draw some ale from a cask, was terrified to such a degree, at its running into the vessel, that he ran out in great haste with the spigot in his hand.

But in whatever manner this symptom comes on, it is certain that the most painful sensations accompany every attempt to swallow liquids. Nay, the bare sight of water, of a looking glass, of any thing clear or pellucid, will give the utmost uneasiness, or even throw the patient into convulsions.

With regard to the affection of the mind itself in this disease, it does not appear that the patients are deprived of reason. Some have, merely by dint of resolution, conquered the dread of water, though they never could conquer the convulsive motions which the contact of liquids occasioned; while this resolution has been of no avail, for the convulsions and other symptoms increasing have almost always destroyed the unhappy patient.

In this disease, there seems to be an extreme sensibility and irritability of the nervous system. The

eyes cannot bear the light, or the sight of any thing white; the least touch or motion offends them, and they want to be kept as quiet, and in as dark a place as possible. Some complain of the coldness of the air, frequently, when it is really warm; others complain of violent heat, and have a great desire for cold air, which never fails to increase the symptoms. In all, there is a great flow of viscid saliva into the mouth, which is exceedingly troublesome to the patients, as it has the same effect upon their fauces that other liquids have. This, therefore, they perpetually blow off with violence, which, in a patient of Dr. Fothergill's, occasioned a noise not unlike the hollow barking of a dog, and which, he conjectures, might have given rise to the common notion, that hydrophobous patients bark like dogs. They have an insatiable thirst, but are unable to get down any drink, except with the utmost difficulty; though sometimes they can swallow bread soaked in liquids, slices of oranges, or other fruit. There is a pain under the scrobiculus cordis, as in tetanus; and the patients mournfully point to that place, as the seat of the disease. Dr. Vaughan is of opinion, that it is pain, rather than any difficulty of swallowing, which distresses the patient on every attempt to drink.

The voice is commonly plaintive and mournful, but Dr. Vaughan tells us there is a mixture of fierceness and timidity in the countenance, which he cannot describe, but by which he could know a hydrophobous person, without asking any questions. In this distemper, indeed, the symptoms are so various, that

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paroxysms which this poor woman suffered, resembled those of hysteria, and increased in duration as the disorder lasted. She described their commencement to be in the stomach, with a working and fulness there, and that a pricking substance passed up into her throat and choked her; she screamed suddenly, and grasped firmly hold of her attendants, as if voluntarily; and muscular convulsions came on, which were sometimes more, sometimes less general and violent; the causes from which these paroxysms arose, were extremely slight; the passage of a fly near her face, the attempt to swallow a pill, a stream of air, the sight of oil or wine, or any other liquids, even the sound of water, and other such circumstances, were sufficient; she now also complained of inconvenience from light, which was accordingly moderated. The effect of sounds was peculiar; for, though in the subsequent stages, their influence became more general, at this period the effect was rather proportionate to the ideas they excited in her mind, than to their violence. Bells, and other strong noises, did not agitate her, but the clatter of earthen ware, the noise of a distant pump, or any thing connected with liquids, produced the paroxysms in all their violence. She could swallow fresh currants with less resistance than any thing else, taking care that they were perfectly dry. Her mind had, till now, been quite calm and composed, and her conversation and behaviour proper, during the intervals of the convulsive attacks. But Dr. Powell was obliged to discontinue the pills of argentum nitratum, in conse-

quence of the sufferings which the attempt to swallow them regularly brought on. Fifteen grains of this substance had been given without any sensible effect. The fits and the irritability to external objects increased. The pain shot from the back to the neck, round to the angles of the jaws, the chin and throat. At length the paroxysms became more frequent, and, indeed might be said to come on spontaneously: seven occurred in one hour. She looked pale and exhausted, and a tremor and blueness of her lips and fingers were observable; her pulse became weaker and more rapid, and her scalp so tender, that touching it brought on convulsions. She had, latterly, eructations of wind, and spit up thick, viscid saliva. Her urine now came away involuntarily, and she was more and more irritable and uncontrolable. She now passed two hours in almost constant convulsions; became extremely irritable and impatient of every thing about her; complained of failure of her sight; wished to be bled to death; her words were fewer and interrupted; she struck, and threatened to bite her attendants; had copious eructations of air; discharged an increased quantity of viscid saliva with much convulsive effort; said the affection of her throat and stomach had quite left her; and continued in a general perspiration, with a weak pulse, from 140 to 150. She afterwards bit some of the attendants, and was therefore confined with a waistcoat. From this period, she had lost all control over her mind, and continued for almost four hours, in a paroxysm of furious insanity. She now

swallowed, with an effort, near half a pint of water; but this was, in a few seconds, vomited up, with some mucus, and a greenish fluid. In this violent, raving state, she continued till within two hours of her death, which took place forty-seven hours after the first marked occurrence of hydrophobia.

"In the course of the case, she swallowed, once or twice, a little porter; and also some common water, with tinct. opii; but they were always vomited up. On opening the body, the most remarkable appearances were, a turgid state of the vessels of the brain; great distension of the intestines with air; œsophagus rather redder than natural, and covered with a thin layer of coagulating lymph; nearly half a pint of greenish fluid in the stomach, which was rather redder than natural, and had, under its internal coat, near the cardia, a few spots of extravasated blood." Dr. Powell's case of hydrophobia.

It is a circumstance much to be lamented, that little or no advantage or information, relative to the pathology of this singular disease, can be derived from the dissection of the bodies of those who have been its victims. So various are the statements made on this head, as to lead to the conclusion, that the change in the human structure upon which the disease depends, is beyond the reach of anatomical investigation. In two bodies dissected by Dr. Vaughan, there was not the least morbid appearance. In the very fauces, where we might have expected that the disease would have shown itself

most evidently, no mark of inflammation was discovered; and the stomach, intestines, diaphragm, œsophagus, &c. were all in a natural state. In some instances, indeed, a slight degree of inflammation has been detected in those several organs, and also in the brain; but the morbid appearances were far from being adequate to account for the symptoms, or to elucidate the pathology of this fatal disease. Dr. Rush thus describes the morbid appearances which he observed on dissecting a boy, who died of rabid hydrophobia.* The epiglottis was inflamed, and the glottis so thickened and contracted, as barely to admit of a probe of the common size. The trachea below it was likewise inflamed and thickened, and contained a quantity of mucus in it. The œsophagus exhibited no marks of the disease; but the stomach had several inflamed spots upon it. From these circumstances the learned professor has been induced to allege, that it is the temporary *closure* of the glottis which produces the dread of swallowing liquids: hence the reason, why they are taken in suddenly and at intervals. The same danger and difficulty attend the swallowing saliva; and hence he thinks the symptom of spitting, which has been so often noticed in hydrophobia; and it is from the same cause, he conceives, that the usual symptoms of suffocation ensue in this disease, and to which death is to be ascribed.

You are not insensible, that, in general, an intolerable aversion to water and all liquids, is one of the

* See Case 8, Letter 10.

most remarkable and predominant symptoms in the disease which we are investigating. Authors are not precisely agreed respecting this supposed pathognomonic symptom, and a particular examination of its real nature and cause ought not to be omitted. The position to be illustrated is, whether the affection referred to, is to be accounted for upon the principle of some change induced in the system from the action of the poison whereby a specific dread of fluids is induced, independent of every other cause; or whether it should be attributed to a morbid sensibility of the fauces, exciting a painful sensation when liquids are applied to them. According to Dr. Whytt, "the hydrophobia is only a violent convulsion of the gullet and stomach, arising from the disagreeable sensation excited by the liquid touching the fauces." This explanation would probably have been more satisfactory, had he premised, that in consequence of the action of the poison upon the nervous system, a morbid and excessive degree of sensibility affected the muscles employed in the act of deglutition. Dr. Darwin conceives that it is, "occasioned by a violent inversion of the motions of the œsophagus, on the contact or even approach of water or other fluids. The pharynx seems to have acquired the sensibility of the larynx in this disease, and is as impatient to reject any fluid which gets into it." He adds, "Is not the cardia ventriculi the seat of this disease? As in cardialgia the pain is often felt in the pharynx when the acid material stimulates the other end of the canal, which

terminates in the stomach." Dr. Seleg thinks, "that it is seated in the par vagum and intercostal nerves, for most of the symptoms happen where these nerves are interspersed." As to the difficulty in swallowing, generally believed to accompany dread of water, Dr. Vaughan treats it as a misrepresentation, as well as that the œsophagus with the muscles subservient to deglutition are especially concerned in this disease. The principal foundation of the evil, he thinks, rests on a morbid sensibility both of the external and internal fauces. For the sight of a liquid or the application of any substance to the internal fauces, but more especially of a fluid, instantly excites the most painful feelings. Nay, the same symptoms are produced by touching the external fauces with a fluid, or by the contact of cold air with these parts, and nearly in as great degree. But a solid or a fluid substance being conveyed into the œsophagus, the transit into the stomach is accomplished with little or no impediment; so that in fact the difficulty is surmounted before the patient be engaged in the action of swallowing. Nor is the excruciating pain, which never fails to be the companion of every attempt to drink, felt in the fauces and throat: it is, he says, "at the *scrobiculus cordis*, to which the sufferer applies his hand. From this last circumstance, therefore, from the presence of the *risus sardonicus*, from the muscles of the abdomen being forcibly contracted, and from the sense of suffocation, which seems to threaten the patient with immediate death, Dr. Vaughan has been

led to think, that in the hydrophobia, a new sympathy was established between the fauces, the diaphragm, and the abdominal muscles; and that the latter were drawn into a most severe spasm as often as any offending cause operated upon the former." Encyc.

Dr. Mease, in his excellent inaugural Dissertation, thus argues in favour of the pathology which he endeavours to establish. "In consequence of the action of the poison on the nerves of the body, as before mentioned, a morbid and excessive degree of sensibility is induced, whereby the action of the slightest stimuli produces the most disagreeable effects. The fauces, also particularly the muscles employed in deglutition, partake of this general morbid state; as soon, therefore, as any liquid touches them, they are seized with spasmodic affections, which consequently excite pain; in the very irritable state of the parts this pain becomes extreme: upon a second attempt, therefore, to drink, or a mere mention being made of it, the idea of the patient's former sufferings will be immediately excited, and consequently, he will refuse it with disgust. But even this pain may be excited by the irritation of the saliva on the very irritable fauces, whereby, an attempt will be made to swallow it, and this gives the first idea of disgust to fluids before any exertion has been made to drink. Accordingly, the patient will endeavour to avoid a repetition of an act which excited so much pain, and any liquor will be refused afterwards, or the mere sight of the water renewing the idea of his pain, will produce the same effect.

"This explains the cause of the terror, shewn by some persons in the first stage of this disease, before any attempt has been made to drink, and which has seemed to establish the common idea that the aversion from fluids was not owing to a difficulty of swallowing, but to a specific dread of them." The author proceeds to enumerate from various authorities, appropriate examples, evincive of the doctrine which he has advanced, and these amount to positive proof, that in many cases the affection of the throat precedes the aversion to drinking, that the latter depends entirely upon the former, and that in those persons where the throat was entirely free from any affection during the whole course of the disease, or where the violence of the symptoms had abated, water and other fluids were taken with the greatest composure. "If, therefore, the aversion from drinking most commonly shewn by those persons who labour under the effects of the canine poison, were owing to the poison simply, and some specific change wrought on the system, the absence of the affection of the throat, entirely in some cases, and its abatement in others, ought not to make the least alteration in the generally supposed pathognomonic symptom; for the poison being still in the system, its effects should invariably and constantly continue. But the direct contrary is observed to take place. How then can this specific dread be accounted an universal cause?"

Another proof of the truth of his explanation of which he would avail himself, is derived from the de-

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ertion of the muscles than solids, which create great pain by increasing the preternatural distension already existing. In the present disease liquids are swallowed with greater difficulty for the same reason, viz. requiring more exertion of the muscles of which the patient has entirely lost the command, but solids are enabled to descend with greater ease, as by their bulk they do not require such a forcible contraction of the muscles in order to force them down. When the fauces are affected with a morbid sensibility and the healthy action is taken away, as in the present disease, a fluid is no sooner applied to them than a spasmodic affection is excited in the part, and they not being able to overcome this, it terminates in a violent convulsion; but solids by their distension overcome the stricture and resistance made to their progress by the convulsion of the parts and thus they descend into the œsophagus with greater ease: they are also enabled to press down the epiglottis, which liquids, by their want of this distending power, are rendered incapable of doing." It does not escape the observation of Dr. M. that in several cases great difficulty was experienced in swallowing solid food, and in some the attempt was rendered almost impracticable.

"After this discussion of the apparently simple question respecting the cause of the aversion from fluids," says Dr. Mease, "I expect no doubt will remain as to the propriety of referring it to the affection of the throat. I have shewn that in those cases where this did not occur, fluids were swallowed with the

same ease as in health, and also explained the reason why, for the most part, solids excite less pain. From the actual declaration of the patients themselves, it was likewise rendered clear, that there was no specific dread of fluids, but that the sole cause of the horror expressed at the sight of them originated from their renewing the idea of their former pain. But lastly, the same aversion to fluids happening in other diseases, where a similar spasmodic affection of the muscles of the throat, and a similar excessive sensibility takes place, proves the falsity of the opinion which supposes the aversion to depend on the poison." Many other concomitant symptoms are deemed inexplicable, except only upon the principle of the astonishing change induced on the whole nervous system by the action of this singular poison.

Dr. A. Fothergill considers hydrophobia, as a species of *angina*, produced by a specific contagion which exerts its influence first on the injured part, and afterwards on the organs of deglutition; and this sentiment is in perfect accordance with the general theory of which I am a decided advocate, unless by the term angina he would ascribe to the disease an inflammatory character.

LETTER VI.

OBSERVATIONS RELATIVE TO THE CANINE POISON, AND ITS ACTION ON THE HUMAN SYSTEM.

THE poison of rabid animals is so extremely virulent and subtle, that the smallest quantity is sufficient to produce the fatal consequences. Hence some writers have detailed numerous casualties, by which the virus is supposed to gain access to the human system; some of which, however, are described in the tone of fabulous credulity. Well attested examples of a melancholy nature, are in fact recorded of the infection being communicated by the smallest scratch from animals, even previous to their exhibiting symptoms of madness; and many of this description, are the more remarkable, as the fatal disease was produced in consequence of persons suffering their sores to be licked by dogs, while in apparent health, but which went mad after the accident. While we are told by some, that the infection is communicated by means of a variety of incidents, independent of a bite or broken skin, it is with equal confidence affirmed by others, that it never operates upon the system, but through the medium of a broken surface. In the Philosophical Transactions, (vol. 23. p. 1074,) two cases of the disease are mentioned, which arose from putting the

hands in the mouth of a puppy affected with rabies, although no bite was given; and Dr. James Currie, of Liverpool, gives an instance of hydrophobia, in a girl, derived from the saliva of a rabid dog, applied to the inside of her lips, without any wound being produced. (Med. Reports.) Similar instances have also been reported, but not fortified by authority sufficiently respectable to avert the suspicion of fallacy. Such facts, moreover, are not accordant with the analogy of other animal poisons, which require to be inserted beneath the cuticle to infect. When unhappily the poison of syphilis and of putrid bodies have affected the hands of the operator, it was by means of sores or cuts permitted to come in contact with a divided blood vessel.

Dr. Mease expresses the strongest conviction that a wound is essential for the operation of canine poison. And Professor Rush, to whose name we are accustomed to attach the highest honours, observes that happily for mankind the disease cannot be communicated by blood or saliva falling upon sound parts of the body. The adverse opinion, that the infection may be communicated without any visible marks of injury being made, is favoured by Dr. Struve, a learned German Physician. There are, he says, instances of hydrophobia occasioned merely by being licked by a mad dog, and he cites Dr. Hahnemann, as affirming, that several cases in point came under his immediate observation: among others, a fatal one of a boy whose face was licked by a dog that afterwards went mad.

The following anecdote is scarcely calculated to increase our confidence in the above mentioned authority, however intelligent and respectable.

"Canine madness," says Dr. Struve, "may likewise be communicated by means of the instrument with which the animal is killed. A gentleman, after having killed a mad dog with his sword, thoughtlessly returned it into the scabbard. Eight years after this circumstance, having a quarrel with two gentlemen, he wounded them both with the same sword. The wounds were inconsiderable and soon healed, as is frequently the case with those occasioned by the bite of a mad dog; but again opened after the lapse of three years, when the unfortunate men were seized with hydrophobia and died. This may serve as a caution, respecting instruments which have been used in killing mad animals. It may also be proper to observe, that the lancet with which the wound has been scarified, ought to be tempered afresh."* Due precaution is in every exigency commendable and should be strenuously inculcated, but fabulous tales serve only to sharpen our credulity, and create unreasonable alarm. I cannot avoid remarking also, that Dr. Brooks evinces a most accommodating belief in all these visionary tales of wonder. "It takes effect," he says, "through the clothes, without fetching blood, by the breath of the animal drawn into the lungs, by a touch of the froth if recent, and by applying it to the lips or tongue when it has been long dried; or by

* Struve on Suspended Animation, p. 179.

kissing a dog that is mad; or by handling the wound or instrument which occasioned the death of the animal; or by handling things which have been infected by any of the former means."* We can view this in no other light, than a servile echo of sentiments, not precisely investigated and established; for such assertions have not been corroborated by a single well authenticated example. I might also furnish traditionary relations apparently verifying the creed of Dr. Brooks, were I disposed to entangle the subject with unphilosophical details, or to tempt your credulity to assume a latitude discountenanced in these more rational days. It is a fact most clearly ascertained, that the circulating mass is scarcely changed by diseases once supposed to reside exclusively in it, and the natural and morbid states of the secreted fluids being also more accurately understood than formerly, we are taught to disregard many imaginary evils and sources of terror. I am aware that of all the maxims in medicine, none has been perhaps more universally respected, than that the morbid poisons of various diseases, are absorbed into the blood through the medium of the lymphatic vessels. Systematic writers have constantly affirmed, and practitioners readily conceded, as a fundamental principle, that the virus of small pox and other eruptive diseases, with cancer and syphilis, although local in their origin, exert their deleterious effects ultimately by contaminating the blood and humours. Modern improvements, however, do not permit this doctrine to escape a more critical in-

* Prac. Physic.

vestigation, and its most strenuous advocates will undoubtedly admit, at least, that it is in some respects, exceptionable. If the blood is possessed of a vital principle, an idea revived by the celebrated John Hunter, how can it exist when saturated with morbid poisons?

But we must not omit duly to appreciate the principle, that poisonous materials, when mingled with the vital fluid, are immediately determined to the salivary glands, or some other excretory of equal discernment, that they may be expelled as noxious intruders. Hence you are reduced to the perplexing alternative, either of ascribing to the glands, the attributes of intelligent agents, endowed with elective powers, or to adopt the supposition, that the effect of absorption does not extend beyond the lymphatic system, and that such morbid causes operate upon the living fibre by irritative sympathy. I have been made acquainted with a case of syphilis, in which the ulcerated state was so extensive, that almost the whole corporeal body was reduced to a mass of corruption, and yet the action of the arterial system was scarcely accelerated, and was the last part that participated in the general affection. If absorption be admissible in this instance, it will be difficult to account for the absence of those symptoms which in general demonstrate the reciprocal action and reaction, between corporeal and vital powers induced by morbid causes.

But a full and particular discussion of this abstruse subject, is neither within the sphere of my present purpose, nor compatible with my limited powers,

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I approach with much diffidence to a discussion of the interesting question relative to the absorption of canine virus, or by what particular means it exerts its operation upon the human system. I shall not, however, attempt to describe the process by which this active agent is diffused, and on what principle in the animal economy, it is supposed to dance the round of circulation, until at uncertain periods of months or years, it is ripened into a state capable of producing the awful explosion by which the stoutest frame is rent asunder: but assuming the negative, I shall endeavour to produce such arguments and facts as will tend to refute the hypothetical doctrine of absorption of canine poison. The absorption of poisonous materials into the system, is said uniformly to be accompanied or followed by inflammation, swelling and soreness of the lymphatic glands, situated between the place of absorption and the common receptacle of the thoracic duct; and these symptoms are constantly observed to attend the transmission of the variolus, syphilitic, and vaccine virus into the system. Their action also on the arterial system at their periods of accession is announced by a state of general inflammation, attended by increased heat, hard and full pulse, and other symptoms peculiar to inflammatory diseases. And these are considered as sure criteria of the specific operation of the virus in the general system. But in the disease under consideration, none of these appearances have been known to supervene, and among the numerous cases, whose histories have been commu-

nicated to the public, no mention is made of such occurrences. There is moreover a remarkable dissimilarity between the canine affection, and other animal poisons, in regard to the different periods of attack; that of the former remaining in many instances in a dormant state for several months or years, while that of venomous serpents, small-pox and cow-pox, &c. invariably exhibit marks of their virulence either instantaneously, or at periods not exceeding a few days after the infection has been received. The venomous fluids of the viper, the scorpion, the wasp and bee, progress in their operation with such astonishing rapidity, as to resemble more the electric fluid than the tardy agent of lymphatic absorption. If these produce their deleterious effects through the medium of the blood, as some authors believe, the fact proves that the specific effect is simultaneous with the accession of the poison. On the contrary, if the nervous system be admitted as the medium, it affords evidence not less decisive in favour of the doctrine of non-absorption of canine poison.*

* It was once the opinion of Dr. Mead, that the blood is the medium through which the action of the poison of the viper renders itself general. Before concluding his researches, however, he was induced to change his opinion, and he adopted the idea that the disease arising from the poison of the viper is altogether nervous, and that it is communicated by the medium of the nerves and not of the blood vessels.

That profound naturalist, Fontana, about the year 1770, instituted a wonderful series of experiments, with the views of ascertaining the properties and effects of the poison of the viper, and of some of the vegetable poisons. So greatly multiplied were his experiments, and so judiciously conducted, that the results were in general essentially important and

Another circumstance to be noticed, respects the appearance of the blood, which, when drawn from persons affected with small-pox, &c. is in general covered with a buffy coat or size exhibiting phlogistic; diathesis; whereas, in the present disease, the blood has not in most instances appeared different from that

satisfactory. He procured upwards of 3000 vipers, and employed more than 4000 animals, which were bitten by vipers in his presence, or were otherwise subjected to the operation of the poison; and the whole number of his experiments exceeded 6000. From some of his first trials upon rabbits he received the impression, that the venom of the viper exerts its action on the muscular fibre, and by destroying the natural irritability, a coagulation of the blood and a cessation of the circulation immediately ensue. But after having multiplied and diversified his experiments to a prodigious extent, this celebrated philosopher furnishes the following results. In a number of instances when he injected the venom of the viper into the jugular veins of rabbits, the animals cried out the moment the venom had entered the vessels, and were seized with violent convulsions, and died in less than two minutes. There were not more than seven seconds spent in the injection. The blood in all the large vessels, and also in the heart and auricles of these animals, was black and coagulated. The author's conclusion therefore is that, "the nervous system does not concur more to the production of the disease of the venom, than does the tendon, or any other insensible part of the animal. On the other hand, all the experiments on the blood, the injection of venom into the vessels, and so on, constantly evince that the action of the venom of the viper is on the blood itself; this fluid is alone changed by the venom, and this fluid conveys the venom to the animal, and distributes it to the whole body. The action of the venom and its effects on the blood are almost instantaneous. The colour of the blood is suddenly changed, and the bright red colour that is natural to it becomes livid and black. This first effect is succeeded by a second. The blood coagulates very suddenly in the lungs, heart, auricles, liver, and in the large venous vessels. In a word, the circulation is totally impeded and stopped, and the animal dies." *See Fontana, on the Venom of the Viper, and on the Cherry Laurel. By J. Skinner, vol. I.*

drawn from persons in health. Dr. Wolf, of Warsaw, in his account of five deplorable cases, observes that blood drawn a few hours before death appears good in every respect. Dr. Mease is decidedly opposed to the idea of absorption of canine virus; and speaking of the affection of the lymphatic glands, he says, "in all the histories which I have consulted with a direct reference to this circumstance I have never found it mentioned; and in the many cases which Dr. Hamilton has abridged from various authors and subjoined to his treatise, the affection is not taken notice of in any one of them."

The same intelligent writer quotes these words of Dr. Vaughan. "The progress of the virus towards an admission into the system, cannot be discovered by the diseased lymphatics between the wound and next conglobate gland, or what is more common, in the gland itself."* Dr. Thomas, the ingenious author of Modern Practice of Physic, declares, that so far as his inquiries extend, nothing of that nature has occurred. The celebrated Darwin, whose talent in developing the intricate laws of animal life, is universally applauded, observes, that "the contagion from a bite of a mad dog differs from other contagious materials, from its being communicable from other animals to mankind, and from many animals to each other, the infectious matter does not appear to enter the circulation, as it cannot be traced along the course of the lymphatics from the wound, nor is there any

* Mease, Inaugural Dissertation.

swelling of the lymphatic glands, nor does any fever attend, as occurs in the small-pox and in many other contagious diseases, yet, by some unknown process, the disease is communicated from the wound to the throat, and that many months after the injury, so as to produce pain and hydrophobia, with a secretion of infectious saliva of the same kind as that of the mad dog which inflicted the wound." Zoono. vol. 1. p. 203.

If the theory of absorption be admitted, may it not be conjectured that the virus combining and assimilating itself with the whole mass of fluids in the process of nutrition, the solids and all the secretions of the animal would be contaminated and rendered poisonous? We learn, however, of no fact of this description having been verified by experience. The liver of mad dogs was for a long period in repute as a specific against the poison, and was frequently eaten for that purpose. "In Maryland," says Dr. Rush, "the negroes eat with safety the flesh of hogs that have perished from the bite of a mad dog, and I have heard of the milk of a cow, at Chestertown, having been used without any inconvenience, by a whole family, on the very day in which she was affected by the disease, and which killed her in a few hours. Dr. Baumgarten confirms these facts, by saying, that the flesh and milk of rabid animals have been eaten with perfect impunity."* Another instance of the milk

* The flesh of partridges after eating the berries of laurel, (ralmia catifolia) is impregnated with noxious qualities, and very alarming, and in some instances fatal consequences have resulted from eating those

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have been known to result.* From these accidents, therefore, no solid determination can, or ought to be deduced, since a small proportion of persons who are bitten by dogs actually mad, are infected with the poison. Nor does the experiment of Dr. Vaughan furnish an infallible test that the saliva of a human person labouring under canine affection, is incapable of imparting the infection to the class of inferior animals. The dog, it is true, which he inoculated with saliva from a hydrophobous child, escaped the infection, but similar experiments have not, it is presumed, been in any degree sufficiently numerous to decide a point in its nature so truly difficult and intricate. Dr. Vaughan further observes, that, "a nurse who was constantly with the child whose case he relates, often kissed it and received its breath full in her face, and no bad consequences ensued." To this I can add my own testimony from the fact which I witnessed the last year, of a mother, who discharged all the tender duties towards a child in this melancholy condition, constantly receiving its breath, and wiping the viscid saliva from its mouth, without experiencing the least ill effects from the practice. It will come in aid of my views also to notice the circumstance, that persons having the misfortune of being inoculated by a bite, remain in perfect health until the poison comes into action, performing all the natural functions equally

* After this sheet was prepared for the press, a singular incident of this description in the person of Dr. Childs was announced, and is narrated under Case 14, and sequela.

well, as before the accident, unless its action be accelerated and increased by the influence of fear and grief or other depressing passions of the mind. Nay, some have, subsequent to the bite, undergone the full force of the operation of small-pox, and other general diseases, and in numerous instances, the system has been thoroughly impregnated with mercury, both during the interval, and at the accession, without arresting this fatal disorder, while daily experience evinces, that however abundantly the system may be affected by the syphilitic poison, it is, in general, completely eradicated by a mercurial course. If, therefore, we assent to the idea of absorption of both syphilitic and canine virus, why are they not equally accessible to the operation of medicine? If the canine virus be mingled with the blood and juices, why do not the secretory and excretory organs act as auxiliaries in facilitating the expulsion of this most dangerous intruder?

The case related by Mr. Nourse is too worthy of notice to be omitted in this place. He cut a boy for the stone, several months after receiving a bite; the wound exhibited the most favourable appearances and was so soon healed that the boy was abroad in five weeks after the operation, and yet was afterwards affected by the disease.* Van Sivieten, taking notice of the local nature of the virus, says, "it seems very surprising that the most considerable changes that can be made in our humours, should so often neither

* Mease, Inaugural Dissertation.

be able to expel the infection, nor yet move it into action."*

It will not, it is presumed, be considered mal-apropos to notice, in this connexion, that the poison of small-pox and syphilis cannot be communicated by inoculation with the blood or any of its secretions; and another relative fact is also known, that the poison of those two diseases, and also the viper, plague, &c. have in a solid form been swallowed and received into the stomach without injury. It is not pretended, however, that any correct inference can be drawn from such facts, as affecting the question of absorption, since poisons are supposed to be indigestible in the animal stomach; if, indeed, they were digested, they would be divested of the criterion of their nature and cease to be poisonous. But if the blood and secretions of small-pox and syphilitic subjects are not infectious, why, I would ask, should it be apprehended that those proceeding from persons in the present disease are impregnated with noxious properties?

Upon the strength, therefore, of the preceding authorities and opposite facts, it may be affirmed as highly probable, that the canine virus, instead of joining the tide of circulation, lies dormant in the part where it was originally inserted, until some debilitating or other exciting cause, affecting the nervous system, sharpens its powers and quickens its activity; and the constitution having become exquisitely susceptible to its action, this destroying agent preys upon

* Mease, Inaugural Dissertation.

the nervous sensibility until a total extinction of the vital principle is accomplished.

Such then is my conviction, that I feel little hesitancy in favouring the opinion, that few well authenticated examples have been produced of the canine virus having gained access to the human system, save by the actual bite or licking an unsound surface by a rabid animal. It is therefore obvious, that if the theory of absorption be rejected as untenable, the conjectural opinion respecting the propagation of the disease by kissing the hydrophobous patient, or by mere contact of the saliva on the sound skin, will require no particular refutation; nor will the supposition, that the poison may assume an aeriform state, and be conveyed through the medium of the lungs, rest on a more substantial foundation. But you are probably impatient to be apprised of the particular constitution and theory of this singular poison, and the peculiar manner of its action on the system. I meet your solicitude with that profound diffidence which the recondite subject cannot fail to inspire. The supposition, that it is absorbed and immediately diffused through the general mass in an harmless condition during a period of several months, in despite of the various existing causes to which the constitution is continually exposed, is in my view inconsistent with logical deduction or just physiological principles. Conscious, however, of the various sources of error, this opinion is not advanced without doubt and distrust, and the nature and operation of canine poison must long re-

main a problem extremely difficult of solution. By what mechanic means, or chemical combination does the venom of a serpent, the morbid matter of a tonic gout, the influence of a tainted atmosphere, or the depressing passions of the mind, affect those wonderful changes in our nervous system, is equally out of the sphere of investigation, as is the power by which iron is attracted by the magnet; they are nevertheless facts which can neither be doubted or satisfactorily explained. The discovery of truth on this occasion is evidently an arduous task, but next to truth is probability. With assiduity and zeal I shall avail myself of the fruits, derived from the exertions of those who have advantageously preoccupied the thorny ground, and endeavour in my next, to bring to your view an exposition of the theories instituted by modern authorities, and to designate that which I conceive to be more substantially founded, and better susceptible of support, than any other hitherto offered.

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to fathom her recesses, she sometimes delights to reconcile contradictions and to envelop in darkness the most specious realities. The group of diseases of this class, are distinguished by a remarkable concatenation of symptoms, which, though they may be distinct in their natures, yet are they inseparable in their effects; pull one link of the chain and the whole series must follow. Debility, both general and local, and, on some occasions, an exquisite degree of irritability are their well known characteristics.

There is scarcely a more striking analogy in medicine than that subsisting between the disease under consideration and those under the class neurosis, in general, but particularly the affection termed tetanus. In rabid hydrophobia,debility and morbid excitement are among its prominent features; hence, says Dr. Vaughan, "we must seek for the action of the poison solely in the nervous system;" and Dr. Percival ascribes the disease entirely to "nervous irritation." We have also the invaluable testimony of Dr. Darwin, that "this fatal disease resembles tetanus or lock-jaw in its tendency to convulsions from a distant wound; having witnessed a case where hydrophobia preceded the lock-jaw from a wound in the ancle occasioned by a fall from a horse. Hence it seems rather the immediate consequenee of a pained tendon, than of a contagious poison; and is so far analogous to tetanus according with the opinions of Drs. Rush and Percival." Such, in fact, was the theory unfolded by

Professor Rush, and in the year 1794, it was published in his Medical Inquiries and Observations.

In treating on tetanus and hydrophobia, this laborious investigator remarks, that "the predisposition to tetanus depends upon a relaxion of the muscular parts of the nervous system." And again he says, "the more I have considered the causes and symptoms of hydrophobia the more I am disposed to ascribe it to the same proximate cause as tetanus. They both affect the muscles of deglutition. I have lately seen tetanus brought on by a fractured leg, in which an attempt to swallow the smallest quantity of any liquid, produced the same sudden and general convulsions which occur in hydrophobia. They both proceed from causes which appear to be related to each other, viz. from wounds, and from the action of cold after the body has been previously weakened by heat and exercise." The indications of cure, the author observes, are the same in tetanus and in hydrophobia. "They both yield to the same remedies; viz. to the excitement of an inflammation in the wounded part of the body, or to a long continued discharge of matter from it, and to mercury."

The foregoing sentiments of his respected preceptor were cordially embraced by Dr. James Mease, to whose valuable productions I again have occasion to refer. He thus expresses himself in support of his opinion.

"1st. In both tetanus, and the disease consequent on the action of the canine virus, we may observe,

that the same affection of the throat takes place, and the same morbid sensibility over the whole body.

"2d. The pain at the pit of the stomach and the rigidity of the muscles of the abdomen, which are such constant symptoms in tetanus, likewise occur in the present disease.

"3d. In both these complaints, we may observe the same affection of the urinary organs; the same freedom from disease of the arterial system; and lastly, the same tendency to putrefaction, in the bodies of those who die of the disease.

"But the paralytic affections and numbness, which have seized the bitten limbs, and dimness of sight, and sometimes total blindness, without any visible fault in the eyes, which are well known symptoms of nervous diseases, admit not the least room or suspicion for doubt as to the action of the canine virus on the nerves."

"It was asserted," continues our author, "that the poison remained long dormant in the part where it was first inserted, and afterwards brought the whole system into sympathy; this I apprehend can clearly be proved. We see the same thing every day in other cases where topical affections of nervous and other parts, remain long without affecting the whole system, until the application of some cause renders them manifest." He next refers to a case in point related by Dr. Percival, of a "lady who had received a bruise on the *os sacrum* by a fall when she was young: she soon recovered from its effects; but, eighteen years afterwards, the rheumatism fixed on the

part, was attended with unusually excrutiating pain, and long resisted the remedies commonly employed, with much more speedy success in that disorder. And in a case of obstinate head-ache, in which Dr. Rush was consulted, it came on eighteen months after the stroke which caused it had been received. And also, that affections of the abdominal viscera, which had long been dormant, were resuscitated in those affected with influenza." Although it would afford you a fund of instruction were I to follow this writer through his lucid train of reasoning on this topic, it must suffice if I give you a general view only of the able manner in which he endeavours to support the theory which he advocates. Under the head of Proximate Cause our author asserts, "that the virus induces a general debility of the nerves, and deprives them of their healthy tone, and the customary energy which they had over the whole system." In regard to the query, whether it is by a direct or indirect operation that it produces its effects, or in other words, "shall its mode of action be explained on the principle of its inducing that debility, depending on the application of *excessive stimulus*, and therefore denominated indirect, in contradistinction to that proceeding from the abstraction of usual stimuli termed *direct?*" He, in the first place, firmly assents to the idea of the stimulant action of those contagions and poisons which enter the system in consequence of absorption by the lymphatics, yet having fully proved the impossibility of accounting for the symptoms of the present

disease on that principle, he proceeds to offer such arguments as he conceives will tend to invalidate the position, and to prove in this instance a different mode of action. Having denied the existence of any symptoms, indicative of preternatural excitement on the general system, and shewn, on the contrary, that the most opposite set of symptoms are observed from the beginning, he confidently affirms, that it is by a direct debilitating operation on the nervous system that the canine virus acts in producing the disease. Sensible that this contradicts the theory of the ingenious Brown, in whose opinion all things in nature are stimulant, the author justly observes that there are many things capable of acting as direct sedatives on the human body, which do not contain a particle of stimulus. To exemplify this idea, he adduces nitre as a very remarkable instance. So clearly evident is the direct sedative properties of this medicine, that instead of producing the least stimulant effect, that, from the moment it is taken into the stomach and shews any operation, it does not increase the force or frequency of the pulse a single stroke, but produces a diminution of both. According to the theory of Professor Rush and Dr. Mease, a general relaxation of the nervous system, favours the production and increases the power both of tetanus and the fatal disease in question. This is predicated on the axiom, that a general debility of the nervous system, when not morbidly affected, is always accompanied with a proportional excitability or disposition to be acted on by

external stimuli: or, "that the sensibility of the nerves, when in a natural state, is in a direct ratio to the debility that prevails in those organs of the body." This doctrine, as applied to the present subject, Dr. Mease has illustrated in a tone of language, and strength of reasoning, which cannot fail of being received as unexceptionable truth, verified by experience and observation. But in no particular, is he more satisfactory than in elucidating the close affinity, which obtains between tetanus and hydrophobia. This may be found in their predisposing and proximate causes, and in their concomitant symptoms; and not improbably, the most successful method of treatment in each, will confirm the supposition. That tetanus is a disease depending on nervous debility has been demonstrated by Dr. Rush. His own reasoning, and what is still more to be regarded, the success of the tonic plan, both in his and the hands of numerous practitioners, seemed to establish the point beyond a shadow of doubt. The sequel of the story, however, reveals a circumstance both singular and important. After the theory of Professor Rush was disseminated through the medical world, and sanctioned by the sure test of experience, the venerable author was led to distrust the principles which emanated from his own capacious mind, and having taken a new view of the pathology of the two allied diseases, he was induced to abandon the fabric which he had so successfully constructed. None but elevated minds are capable of making a candid disclo-

sure of their own erroneous sentiments, whatever may be the convictions which they feel. It would not, indeed, be consistent with the pious and philanthropic spirit of Dr. Rush, to adhere to and countenance opinions, such as he deems erroneous and of pernicious tendency. Accordingly, with an air of dignity and instruction, he denounced his first theory and adopted that which he had not long since subverted and destroyed. Beneath the banners, therefore, of this veteran in science, the opinion is now advocated, that both tetanus and hydrophobia depend on excess of action, and that they are to be cured by debilitating remedies. Thus then are we left to await the issue of more extensive observation and experience, to determine whether the first theory of Dr. Rush was founded on a solid and permanent basis, or whether it be ingrafted on a "rope of sand," illusory and deceptive as the passing spectre of a day.

The theory which Professor Rush has now adopted and supports, is, that the disease in question is a "*malignant state of fever.*" His reasons are, the febrile nature of the disease in all rabid animals, its prevalence at the same time that malignant fevers are epidemic, the resemblance between the symptoms of canine madness and malignant fevers, and the appearance of the bodies of dogs dead of the disease, as discovered by dissection. The respected author views rabid hydrophobia in the human body as of the nature of malignant fever, from its symptoms, from

its appearing like a malignant fever at different intervals after the time of receiving the infection, from the similarity of the appearances of the blood when drawn in both cases, from the agreement of the disease in point of duration, from the equally rapid putrefaction of bodies dead of either disease, and from the sameness of appearances in the dead bodies upon dissection.

In full accordance with the views of the author of the first theory, favouring a connexion of hydrophobia with tetanus, Dr. Mease gave to it his cordial aid and support, in his Inaugural Essay, to which Dr. Rush himself affixed the meed of applause. But the subsequent secession of the professor prompted from the pen of this gentleman, a vindicative reply, which evinces a mind replete with medical erudition and amply adequate to the task he has undertaken to execute. I shall be indebted to the editors of the Medical Repository, (vol. 5, page 50,) if they will indulge me, with the language in which I cite the following perspicuous review of the production above mentioned. "In addition to the respect which the intrinsic merits of this pamphlet inspire, we applaud the author for the constancy and spirit he exhibits, in still advancing on the *forlorn hope* of this medical contest with hydrophobia. The laurel of victory and the gratitude of mankind will be well bestowed upon him who shall enable us to triumph over this direful distemper.

"Dr. Mease, some years ago, adopted the opinion, then taught by Professor Rush, that hydrophobia, like tetanus, was a disease of relaxation and debility, and

to be treated with tonic and stimulant remedies. In the further prosecution of his inquiries, the Professor abandoned that opinion, and now believes the disease in question, like malignant fevers, to result from excess of action, and to demand a bold use of depleting remedies. The reasoning which effected this change of opinion in Professor Rush, produced no conviction on the mind of our author; and the object of the present publication is to vindicate his adherence to his former principles.

"In the course of the discussion, Dr. Mease follows Professor Rush through a long train of argument, sometimes questioning the authenticity of his facts, and sometimes combating the inferences drawn from them. In opposition to the doctrine which the Professor had endeavoured to establish, that the disease of all rabid animals is of the nature of a malignant fever, Dr. Mease insists that, in many important particulars, the analogy contended for is not sufficiently close and constant; and that, although some circumstances of rabies resemble malignant fever, there are other leading ones in which no such affinity can be traced.

"Professor Rush had also maintained that the disease in the human species, produced by the bite of a rabid animal, is a malignant fever. This he supposed to be proved by the similarity of the symptoms; by the accession of the disease at various intervals after the reception of the infection into the body; by similar appearances of the blood drawn from persons

labouring under the two diseases; by the agreement between them in point of duration; by the equally rapid putrefaction of bodies dead of both diseases; and by the discovery of like appearances in such bodies, when examined by dissection.

"In reply to this doctrine of analogy between hydrophobia and malignant fever, as manifested by the circumstances of the two diseases in the human system which have just been mentioned, Dr. Mease contends, that if the similarity of symptoms, to a certain extent, be admitted, there still exists a dissimilarity of symptoms in many important particulars, which brings the disease in question to a nearer resemblance of what are called *nervous* than *febrile* affections; that, as to the interval between the application of the remote cause and the attack of the disease, Professor Rush's analogy must be acknowledged to fail, as hydrophobia from canine virus, unlike malignant fevers, has been known to come on at all intermediate periods between ten days and nineteen months after the infliction of the bite; that appearances of blood drawn in diseases are too variable and fallacious to afford any dependence, and that, even if they deserved any degree of reliance, there is still a deficiency in the proof of the appearances insisted upon by Professor Rush; that mere sameness of duration, if admitted in the fullest degree, is too loose an analogy to allow any inference of moment to be drawn from it; that the rapid putrefaction of bodies dead of hydrophobia, though by no means an universal occurrence, is yet

so common in cases of sudden death without loss of much blood, as to justify no such conclusion as that Professor Rush attempts to draw; and that, as to the similarity of the phenomena exhibited by dissections, which are admitted in some degree, but which Dr. Mease supposes to be stated in too strong and unqualified terms, they may be accounted for on the principle of the irregular distribution of blood and of nervous influence, which remarkably takes place in this disease, and in some analogous nervous affections.

"Notwithstanding these plausible objections to Professor Rush's doctrine of analogy between hydrophobia and malignant fevers, we are persuaded that a view of the whole phenomena will go far to confirm such an analogy. We are also convinced that the appearances of bodies dead of these diseases, as laid open by dissection, do warrant the same conclusion. Two instances of hydrophobia from canine virus, which lately occurred in this city, are cases in point. Besides the general similarity of their aspect to malignant fevers, in one of them black vomiting, exquisitely characterized, was frequent during many of the last hours of life, and the stomach, on dissection, was found deranged in the manner commonly described after malignant fevers; and in the other, an unusual yellowness of the skin, with livid spots interspersed, was observed after death. In the latter case a dissection did not take place.

"Dr. Mease proceeds, in the next place, to examine the validity of Professor Rush's proofs of his

theory, derived from the cure of the disease by blood-letting. After a careful examination of the cases, as described by the reporters of them, he suspects that many of them were in reality other diseases, mistaken by the observers for hydrophobia from the canine virus; and that, as to the rest, the use of many other remedies at the same time makes it doubtful how far the cure was to be ascribed to blood-letting. It is difficult, and perhaps impossible, in the present state of our knowledge of this disease, to determine how far blood-letting may be directly useful or pernicious, and how far it should be employed as auxiliary or rejected as detrimental to other remedies. That it has been used to a great extent, in a multitude of cases, without any apparent advantage, is abundantly evident. And upon the whole, we are disposed to believe, from many phenomena of the disease, as well as from its general want of success, that this remedy, used alone or in combination with others, in any manner hitherto distinctly known, may be properly placed on the long list of those which experience has adjudged to be ineffectual in the treatment of hydrophobia. How far its powers may hereafter be efficaciously applied as preparatory or relative to other remedies, we presume not at present to describe." The novel but ingenious pathology of Dr. Rush being announced, a large field for declamation to the speculative physician is displayed, but the intricate problem has not yet been satisfactorily resolved, nor the discordance of opinion in any degree reconciled.

It is obvious to you that the reviewers are favourers of the new system, and I now quote a subsequent communication, (vol. 5. p. 79,) tending to enhance the weight of their authority. "The kindred nature of hydrophobia and malignant fever is not a mere speculative notion. Practical observation confirms their similitude. This will appear by a case which occurred in the autumn of 1798, in the New-York Hospital, under Dr. Mitchell's eye and prescription, wherein hydrophobic symptoms supervened the symptoms of yellow fever.

"Nicolas Wager, a farmer from the town of Troy, aged fifty-six years, after having been unwell several days, with the complaint of the season, was brought from his lodgings near Carter's slip to the hospital, on the 25th of August, 1798. He had undergone some evacuations. At the time of his admission, his tongue was dusky and pulse moderately full: he had a rending pain across his forehead and great distress at the heart. By degrees, however, he fell into that heavy and torpid state which so often accompanied the distemper. A variety of food and drink, of a nourishing kind, had been prescribed for him. On the 28th he became disinclined to take them; the whole quantity swallowed during the day amounting to no more than a few ounces of panada. The aversion to fluids increased until the next morning. The following extract from the hospital record exhibits his situation a little before he died. He has continued much agitated during the night, and an aversion to fluids

came on. This is so remarkable as to be manifestly hydrophobic; for on offering him drink at this moment, there was evidently an abhorrence of it; and on putting some lemonade with a spoon into his mouth, the pharynx was convulsed, and spasms extended thence along his arms, symptoms of epistho-tonos took place immediately after, and on attempting to raise his body, the whole muscles of the back were rigid; while raised up the spasms of the pharynx were renewed by attempting to give him some warm wine which he was unable to swallow. His extremities are now cold, his pulse not perceptible at the wrist, and he appears under the spasms and tremors of departing life. He soon after expired."

Dr. Miller, an eminently intelligent and instructive writer, and one of the editors of the Medical Repository, (vol. 5. p. 300,) undertakes to illustrate the doctrine of affinity of hydrophobia with malignant fever, and refers to two cases which occurred in New-York, the phenomena of which presented complete examples in point. These cases will be described in another address, where you will see that in many essential particulars they exhibit symptoms corresponding with the malignant disease which has so often prevailed in the cities of the United States. Whatever therefore may be its intrinsic character, hydrophobia, it seems, has effected a monstrous league with malignant or yellow fever, and with tetanus, and the whole class of nervous diseases, and is armed with all their terrors united! To what source then shall we resort for

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pathy the most exposed to be involved in this morbid connexion. The phenomena of hydrophobia, he observes, from canine poison, one of the most exquisite and deadly forms of malignant fever, the diseases produced by the bites of certain serpents, and of confluent small-pox when it happens to be the consequence of inoculation, serve to exemplify the wonderful mobility, and associability of the stomach, as well as of other vital organs, with which it is especially connected by sympathy, and thereby to lay a broad foundation for the sympathetic theory of fever. In regard to hydrophobia, Dr. Miller thinks the virus received on any part of the external surface of the body at the most distant point of the upper or lower extremities, after lying awhile, like the miasmata of fevers, though generally for a longer time, excites the stomach into violent morbid action, and then successively all the important and vital parts of the system. Dr. R. Pearson, an eminent British physician, is another authority who admits Dr. Rush's opinion of the near alliance of hydrophobia to the class of malignant fever. He thinks that "the canine rabies might be not unaptly denominated *typhus hydrophobicus*," and he rejects the employment of depleting remedies. But he appears to have a misapprehension of the views of Dr. Rush, relative to the pathology of the disease. By the term, "malignant fever," as applied on this occasion, our author does not mean typhus, but *synochus* of Dr. Cullen; such are the inflammatory malignant fevers that frequently prevail

in summer and autumn in the United States. Notwithstanding this last mentioned disease has generally yielded to the depleting system so forcibly inculcated by Dr. Rush, hydrophobia, its reputed ally, has constantly and victoriously resisted its efficacy and so completely foiled the sanguine expectations of the learned author, as to draw from him the confession that "blood letting is not its cure." Those who advocate the ingenious doctrine of the kindred nature of the two maladies, confidently rely for proof on the morbid appearances said to be detected on dissection. Particular reference is therefore had to the high authorities of the celebrated Mr. John Hunter and Dr. Baillie, who concur in the testimony, that an appearance has, in general, been seen on the inner coats of the stomach near the cardia similar to what is found in the bodies of persons who have had slight inflammation, that is a greater number of red vessels with small streaks of red blood, &c. Numerous instances of dissection are recorded by others in which no such condition of the stomach was observable. It is remarked by Dr. R. Coxe, (Medical Repository, vol. 5. p. 262) "That it is not perhaps one case of an hundred of yellow fever terminating fatally in which inflammation of the stomach and intestines is not detected; but, on the contrary, in hydrophobia not more than one of an hundred will probably exhibit this symptom on dissection, and even then in so slight a degree as to render it highly probable that it arises from the long continued action of the undiluted

gastric juice or from the remedies employed." Admitting, nevertheless, that in every instance the stomach, intestines, and even the brain, should exhibit marks of inflammation, who will have the boldness to declare that from hence we ought to infer the real identity of the two diseases, or a just explanation of the phenomena of hydrophobia? It is clearly understood by every experienced practitioner, that excessive doses of opium, cantharides, and other stimuli will induce an inflammation of the stomach, and that black vomiting and death will be the consequence.

If we recur to the theory maintained by Dr. Mease, we shall find that he makes a prerequisite that the action of the virus, induce a local debility of the nerves, and that the subsequent phenomena depend upon the consequent irritation and sympathy. No truth, however, is more self-evident than that external agents are capable of exciting the parts possessed of the vital power into preternatural mobility. The titillation of a feather creates a new action, and induces a degree of sympathy. The poison of a serpent when applied to a naked nerve, or the sting of a bee, diffuse their deleterious influence through the nervous system with astonishing rapidity.* Such is the close connexion between the sanguiferous and nervous system, that pain and irritation will effect a change even in the appearance of the blood.

If it be admitted that hydrophobia is "a malignant state of fever," it must appear astonishing that among the innumerable instances which are recorded, so few

* Dr. Mead tells us that the bite of a rattle snake killed a dog in a quarter of a minute.

should exhibit the real distinctive marks of inflammatory action. Although in malignant fever, the rigid full pulse, heat, &c. are not the most prominent symptoms, yet other appearances indicate to the vigilant observer, the true inflammatory nature of the case, and by the judicious employment of the lancet a cure is happily effected. In rabid hydrophobia, on the contrary, spasm and other symptoms of nervous sympathy are the characteristics, and blood letting, as is supposed, has not in a single instance been successfully employed. Little indeed is known as to the manner in which animal and other poisons affect the system, and the constitution of the canine virus is probably of all others the most intricate; the precise manner in which it effects a chemical injury to the human system, seems to have eluded hitherto the most vigilant research; but I reject with strong conviction the idea of immediate absorption. The theory which, from mature deliberation, I consider as best adapted to explain the phenomena of hydrophobia, and more susceptible of support than any other hitherto offered, is substantially this: the virus being infused into the contexture of the vital solids, acts primarily as a local poison; the whole nervous system partaking of the irritation, is brought into general sympathy, even the functions of the stomach, brain, heart, and lungs suffer indirectly by its influence, and by a continuance of morbid action, the structure of the living fibre is destroyed, or the principle which is essential to its natural action becomes dissipated, and the entire extinction of the vital principle is ultimately completed.

LETTER VIII.

COLLECTION OF CASES.

BEING solicitous to impart to you as comprehensive a view of the formidable malady we have been considering, as our very imperfect knowledge of it will admit, I shall, previously to a discussion of the merit of the various remedies which have been employed to arrest its progress, furnish some melancholy examples of its unconquerable powers and victorious termination.

Faithful and judicious histories of cases out of the ordinary course of observation, cannot fail of constituting a fertile source of improvement and instruction. The selection which follows consists of a summary of communications derived from the most unexceptionable authorities and to which some observations will be superadded. In the Encyclopedia, (American edition,) we are furnished with concise narratives of twelve fatal instances, attended by circumstances the most melancholy and deplorable.

Five of these are related in a letter from Dr. Wolf, to Henry Banks, F. R. S. dated Warsaw, Sept. 26th, 1767, of seventeen people bitten in the neighbourhood of Warsaw, the preceding April, by a mad wolf; eleven applied to him on the ninth day. Their wounds were all deeply scarified, diligently washed,

and fomented with vinegar and salt, and kept open till the 80th day, in those who survived to that period. Every two weeks they were bled largely, and purged once a week. Their diet was mostly vegetable, and their drink whey and water. They all partook liberally of the anagallis, and other herbs and compositions which had acquired the popularity of the day as prophylactics.

Besides the general treatment, two were rubbed daily with a drachm of mercurial ointment and took purges of calomel.

Two took every day forty ounces of vinegar and three drachms of tincture of poppies, and half an ounce of robsambuci every night. One took every day sixteen grains of camphor, with four scruples of nitre. Two took twenty-four grains of musk, with fifty of cinnabar. The other two took from forty to sixty drops of spirits of sal ammoniac, prepared with quick lime. One of the first who used the mercurial ointment was seized with hydrophobia on the 22d day, and one of those who took the vinegar and the camphor was attacked on the 23d day. A girl who used the musk with cinnabar, became ill the 62d day, and a woman who employed no means of prevention, on the 40th day. These miserable people when visited with hydrophobia received every possible aid and effort for relief. One of them after being bled copiously, was plunged abundantly in cold water. Two pounds of oil and as much of drink were poured down by force, also a drachm of salt of

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all his former restlessness soon returned; his pulse sunk, and he died about two o'clock in the morning.

In this valuable work, many other desperate instances are narrated in which the combined powers of medicine directed by physicians of eminent skill, proved ineffectual. The internal and external administration of mercury in its various forms, together with the famous nostroms called the Ormskirk medicine, and Tonquin powder, the cold and warm bath, blood letting, opium, musk and turpeth mineral, &c. like blunted arrows directed at random, utterly failed to effect the great object in view, or even to satisfy curiosity. Two of Dr. Wolf's patients, it is asserted, were fortunately cured, although the disease seems to have been perfectly genuine; but in these the writer remarks, "the poison seemed to vent itself partly on some other place, besides the nervous system. In one, the blood was evidently infected, as it had an abominable fœtor; and the other, who was a woman, had a violent pain and swelling in the belly. In all the others it seemed to have attacked only the nervous system; which, perhaps, has not the same ability to throw off any offending matter as the vascular system. There is, however, a possibility that the prodigious affections of the nerves, may arise only from a vitiated state of the gastric juices; for it is well known that the most terrible convulsions, nay, that hydrophobia itself will arise from the affection of the stomach, without any bite of a mad animal. This seems to be somewhat confirmed from one of

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cation will naturally lead us to think of large doses of alkaline salts. 'These will, it is certain, destroy any animal substance with which they come in contact and render even the poison of serpents inactive.' By exhibiting a few doses of them, larger, no doubt, than what could be safely done on other occasions, we would be certain to change the state of the stomachic juices; and this might free the patient from those intolerable spasms, which always occasion death in such short time. Another remedy which seems adapted to change the nature of the gastric juice is ardent spirits. In one of Dr. Wolf's patients, a woman, two bottles of brandy seem to have affected a cure."

Although the statement and observations just quoted are doubtless entitled to much respect and confidence, yet a more circumstantial account of the two cases in which cures were so happily effected, would have gratified my own curiosity and obviated the suspicion of fallacy. The recovery of the woman is ascribed to two bottles of brandy, which she found means to swallow, while every other liquid was rejected. To what extent such a quantity of ardent spirit may be expected to affect a change in the stomach, or its vitiated juices, is quite problematical, but as we are not favoured with a detail of symptoms with which the patients were visited, it cannot be determined, with certainty, whether they were actually hydrophobic; it must therefore remain unexplained.

Having now finished a concise view of the prevalent opinions in Europe relative to this subject at the close of the last century, I shall next produce a selection of cases exhibiting the various modes of treatment of this fatal disease in the United States.

CASE 1.

By Dr. Alexander King, of Suffield, Connecticut.

[Med. Repos. vol. 1. p. 337]

"On Saturday, 28th October, 1797, James Remington, a lad about six years of age, was on a visit at a friend's, when the dog belonging to the family shewed a disposition to bite him, and soon after, while at play in the street with other boys, the dog fell upon James and bit him in the face. The other boys beat him off and he ran home; but when James approached the house, the animal flew at him again with great fury and wounded his face in a desperate manner; the lids of one eye were rent asunder, and his cheek and other parts of his face were greatly lacerated and mangled. The lacerated eyelids were properly united by a suture, and the wounds dressed in the usual manner.

"A considerable degree of inflammation succeeded; and in the space of about forty-eight hours, both eyes were entirely closed by the swelling, and he continued perfectly blind for some days. After the inflammation had subsided, a good digestion and pretty free discharge came on, which were encouraged by stimu-

lating digestives, in order, if possible, to prevent the effects of infection, in case the dog had been mad, which was apprehended by many people; the accident having excited a general alarm in the neighbourhood, particularly in the family, and among the friends of the wounded lad. No pains were spared to obtain the best advice, as to the mode of treatment proper to be adopted in case of infection. He was put on a mercurial course of medicine, and the ungt. coral. frequently applied to the parts affected. As the inflammation went off, he soon recovered his appetite, and with that his cheerfulness and activity, and appeared to be in a favourable state of recovery.

"But on Tuesday, the 10th day after he was wounded, towards evening, his friends observed he began to droop, and did not appear so cheerful and active as usual. In the night following, he was rather restless and disturbed in his sleep, and appeared not to rest so quietly as he had done before.

"Wednesday (11th day) morning, on removing the dressings, the wounds were dry without any discharge, notwithstanding the plentiful discharge which appeared on the dressings the preceding morning. He complained of some pain in the wounded eye, and in his head; appeared to be rather dull and listless, with a slight fever, and other symptoms usually attending an incipient cold; and it was hoped that his complaint originated from that source only. In the afternoon of the same day, however, his attendants observed, as he attempted to drink, that he was

attacked with starting and twitching, particularly in his neck, which drew his head back. On being asked why he did so, he replied, it would do so, he could not help it. This symptom alarmed the family, and they immediately called in his attending physician, who observed that he was frequently attacked with sharp darting pains through his head and breast, attended with spasms; particularly when he attempted to drink. He, therefore, concluded, that these were the precursory symptoms of approaching hydrophobia. The night following, he was very restless and uneasy, slept but little, and that only in short disturbed naps, frequently starting up in a fright. These symptoms increased during the course of the night.

"On Thursday (12th day) morning, all the complaints before enumerated, had increased to an alarming height. He inclined to lie on the bed, and chose not to be moved; his countenance was pale, attended with momentary flushes in the cheeks; and he appeared in a state of general debility, while, at the same time, the nervous system seemed to be excited to the highest state of sensibility, Fearfulness, anxiety, and anguish, were particularly apparent in his countenance. And, indeed, fearful apprehensions seemed to be a predominant symptom, not only at this period, but through the subsequent stages of the disease. His respiration was difficult and laborious, especially in the return of the paroxysms, which had now become frequent and distressing. At each inspiration, spasmodic catches, resembling quick and short sigh-

ing, interrupted his breath. When he attempted to drink, he was seized with violent spasms, particularly in his neck, and drew his head back with great force, notwithstanding his utmost efforts to avoid it. Barely mentioning drink to him, would produce sensible agitations, and hasten the return of the paroxysm. He was able to swallow a teaspoonful at a time, and with great difficulty, which he would seize with eagerness, trembling and agitation. He appeared to have the same dread and aversion to the wet clothes which were used in fomenting his stomach, as to drink, and renewing them produced nearly the same effect. At short intervals of ten or fifteen minutes, he was seized with violent retching, consisting of one effort only at a time. This symptom was singular, and what I never before had noticed in any disease, (this being the first instance of the disorder within my knowledge.) The noise produced by this effort, was sharp and shrill, different from what is usual in retchings occasioned by sickness at stomach, and appeared to be the effect of violent spasms without sickness, as he never discharged any thing from the stomach, except a little wind. But this exertion seemed to afford a momentary respite to his anxiety and distress, and he said he felt better after it.

"This symptom bore some kind of resemblance to singultus, but rather more like a retching to vomit, and attended him at different intervals, as the spasms were more or less violent, through the course of the disease. He would frequently shriek out in great agony, from the acute darting pains in his head

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to drink, he was unable to retain his urine, and would call for the pot when they offered him drink, or even mentioned it in his hearing. This symptom likewise continued through the remaining progress of the disease. He could not swallow with less pain and agitation than before. He passed this night without any sleep or rest. About midnight, the pulsations were one hundred and twenty in a minute.

"On Friday (13th day) morning, there was a sensible variation in the symptoms. The pulsations had decreased to ninety in a minute, and frequent intermissions. He refused altogether to lie on the bed; but chose to continue in an erect posture. He appeared extremely wild, in great hurry and agitation, constantly in motion, and continually talking. The catching in respiration had, in a great measure, subsided; but the violent retching still continued. He could take liquors with less terror and agitation. About this time he began to complain that his throat was full, and felt sore. At evening, a hoarseness came on. The pulsations had fallen to about eighty-five in a minute, with frequent intermissions, and were now become exceeding weak and feeble. A coldness of the extremities had been perceptible some time before, but was now very apparent. He vomited in the evening, which seemed to afford momentary relief. He vomited again in the course of the night. The matter discharged from the stomach was no way discoloured.

"He had taken about sixteen grains of Thebaic extract, in the space of twenty-four hours, from

Thursday morning to this time; which had, in some measure, moderated the violence of the spasms, but had not subdued the virulence of the disease.

"Fearful apprehensions, which had been constant through the various stages of the disorder, now assumed the most formidable aspect, and threatened a speedy dissolution. Foaming at the mouth, grating of his teeth, and by turns, raving distraction succeeded the other symptoms, and were among the last, in this sad catalogue of complaints, which before morning put an end to his life and suffering together, and brought relief to the sympathizing spectators."

CASE 2.

This is copied from the Connecticut Courant.

[Med. Repos. vol. 1, p. 567.]

"*Hartford, April* 23, 1797.

"Died at Southington, on Sunday the 15th instant, Levi Woodruff, aged 43.

"The progress and origin of his disorder will probably be thought worthy of being recorded.

"He felt himself considerably indisposed on Thursday, was affected with a pricking pain in his ear, head-ache, &c. On Friday he was abroad. At evening, feeling his indisposition increase, a physician was called in. From a slight degree of hydrophobia, the physician was alarmed with an apprehension of canine madness; but having never heard, though a near neighbour, of the patient's having been exposed to be bitten, he suggested nothing, at that time, of

his fears. On the morning of Saturday he saw him again, and, observing an increase of the same symptom, he suggested the idea to the family. It was recollected by them, that for a length of time, the patient had accustomed a small dog, belonging to the neighbouring family, to lick an ulcerated sore within his ear; that four weeks previous to that time the dog was put to lick the sore; that the operation was more than commonly painful, and that a small breach was made in the skin of the ear, by the tongue or teeth of the dog; that the next day the dog was affected with symptoms of madness, and the day following was killed. No apprehensions of mischief were entertained at that time, nor had it been thought of after. The physician was now convinced that the disorder must have proceeded from the virus infused by the dog; but this conviction was obtained at too late a period to admit of an effectual application of remedies. Through the whole Saturday he was constantly craving water; but was thrown into the most violent agitations and horror upon the sight of it. Through the night he was very restless. In the morning his disorder increased to an height astonishing to all the spectators. He continued in a most distressed condition till sun-set, and then expired in all the anguish which ever attended this most terrible of human disorders.

"He appeared to possess a considerable degree of reason through the whole scene; was perfectly able to distinguish and speak to every acquaintance around

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him uneasy and restless, throwing himself about in every direction, and talking incessantly. On being asked what was the matter, he complained of his throat, of a burning sensation in his stomach, and said he was thirsty; he thought he could drink a gallon of water, but that whenever he attempted to swallow, he felt a pain in his throat, 'that seemed as if it would take his breath away.'

"Not suspecting the nature of his complaint at first, I examined his throat, supposing I should find it considerably inflamed, he objected strongly to this examination, and would scarcely allow the handle of a spoon to enter his mouth, to hold down his tongue. With some difficulty I obtained a view of his fauces, and found them entirely free from inflammation. I now offered him some water in a glass. He took it with his hand, but as soon as it was within a foot of his mouth, jerked back his head convulsively, and his countenance expressed marks of great horror. Notwithstanding this, he was prevailed upon to repeat the attempt, which produced similar effects. He now desired a lime to be brought him, the juice of which he squeezed into a spoon, and sipped down, with great difficulty, a small quantity of it.

"His pulse was full, hard, and preternaturally frequent; his skin hot and dry; bowels had not been opened for two days; ℥xvj. of blood were taken from his arm, and an antimonial emetic ordered. The small quantity of it which he was able to take, vomited him once, and procured two stools.

"Thursday (29th April) 9, A. M. He passed a very restless, uneasy night, without any sleep. All his symptoms continue, and his dread of water seems augmented. Some milk was offered him, which was equally offensive; indeed, he appears much distressed when any thing whatever is suddenly presented to him. In taking out my handkerchief, it happened to fly before his face, and this produced the same convulsive motion of his neck and throat as the sight of water. He objected to having the window open, on account of a stream of air which rendered him uneasy.

"Sixteen ounces of blood were taken from his arm. About one o'clock, he was visited by Dr. Rush, and he directed him to be bled again. At this bleeding he lost ℥xiv.—℥ij. of strong mercurial ointment were rubbed upon his skin, and four grains of calomel, in pills, ordered, which, however, he was unable to take.

"At 4, P. M. I invited Doctors Mease and De Wees to see him with me:—His pulse now intermitted irregularly, and was tense. At this time ℥xx. more blood were drawn; by which the force of his pulse was considerably reduced, and it was made very frequent. His stomach became sick, and he called for something to puke in: the nurse carried a chamber-pot suddenly before his face, which caused him to start back as if gasping for breath; he knocked it out of her hand with great violence, and broke it in pieces against the opposite wall of the room. He spits very frequently a small quantity of thick white saliva; he was persuaded to attempt to swallow it, but it oc-

casioned him a return of the spasms; has had one watery stool to-day.

"Nine o'clock, P. M. It has been ascertained beyond a doubt that this boy was bitten in the foot by a mad dog about five weeks since; the dog bit also a maid servant the same morning, and snapped at a third. The uneasiness of my patient to-night is as great as ever, though he has been able to take several teaspoonfulls of water; not, however, without having the spasms excited each time; says he is better; pulse very frequent and tense. Several medical gentlemen visited him this evening: he complained of great uneasiness from having six persons at once in the room; was bled ℥xii.; after which he became faint, and spat up much frothy, viscid saliva which appeared almost to choke him. He now insisted on getting out of bed.

"It was intended to apply sinapisms to his throat and legs, and blisters to his thighs; but, before they could be prepared, he died suddenly at ten o'clock, as if suffocated.

"Next morning (30th), at ten o'clock, leave was obtained to open the body. The pharynx, larynx, and trachea were first examined. They appeared in a natural state, quite free from inflammation. On the inside of the trachea, one part appeared rather more red than the rest. The abdomen was next opened; externally the viscera of a natural appearance; the stomach considerably distended with air; when cut open, was found nearly empty. Some small specks

of a brownish coloured mucus adhered to its inner surface, at the great curvature, near the pylorus. On removing this mucus, the villous membrane under it exhibited a very faint red colour, hardly amounting to inflammation. The gall-bladder contained a natural bile.

"In the thorax were observed no marks of disease. The lungs were found free from adhesions, and in every respect perfectly natural.

"Reflecting on the symptoms which took place in the case above related, it appeared to me, that the dread of water arose chiefly from the convulsive or spasmodic contraction of the muscles of the glottis, which rendered the patient unable to breathe, and involved him in all the horror of impending suffocation. When asked why he could not drink, he answered, that whenever he attempted to swallow any thing, it took his breath away.

"Perhaps the reason why swallowing liquids is more difficult to such patients than swallowing solids, is, that in the former case the glottis must be completely closed by the action of its muscles, whereas, in swallowing solids, the epiglottis is pushed down mechanically, so as to cover that aperture as much as is necessary, and, of course, little, if any muscular action is requsite. Now, in this disease, whatever occasions the muscles of the glottis to contract, will excite spasmodic action in them, owing to their diseased disposition, and hence a danger of suffocation is experienced, which eventually takes place from this cause.

"The black boy, whose case I have related, was unable to swallow his saliva without having the spasms excited, which induced him to spit it out continually. To this constant spitting I attribute the burning sensation, which he felt at an early period of the disease; and I have myself experienced it from a similar cause.*

"Will not this circumstance, together with the irritation which excessive thirst occasions in the stomach, sufficiently account for the slight inflammation observed in this organ on dissection? We know, that in animals starved to death, the stomach is found much inflamed, and it must be remembered, that want of drink is far more intolerable than want of food.

"Under the influence of these opinions, I am disposed to believe that *tracheotomy* would have saved my patient, at least for a time, if it had not altogether prevented the fatal termination of the disease. Probably, had this operation been performed, he would have been able to swallow drink and medicine: because there was no action in the pharynx or œsophagus preventing deglutition, when the patient could summon resolution sufficient to attempt it.

* "In the year 1798, when at the city hospital, being apprehensive of inconvenience from swallowing my saliva,(supposing it to be contaminated with the nauseous effluvia of the sick), I made it a constant practice to spit it out, in consequence of which, I was distressed with a burning sensation in my stomach, that forced me to desist from this practice to procure relief. Of this I made several experiments, so as to ascertain it beyond a doubt; and my friend and colleague, Dr. Cooper, experienced the same."

"I cannot suppose that the spasms of the muscles in hydrophobia would be attended with much danger to life, were it not for their influence in suspending respiration; because we see, occasionally, more muscles in other parts of the body affected with spasm, without any risk whatever being incurred by the patient, even though they may continue many days. It is possible, however, that the inflammation of the stomach, excited by excessive thirst, may also be a cause of death. Cases are recorded of persons afflicted with hydrophobia for several days, who, some short time before death, were able to drink freely: probably such persons, after the cessation of the spasms, die of inflammation of the stomach.

"After tracheotomy has been performed, it is likely that bleeding, blisters, and mercury, would answer the purpose of removing spasms, or any inflammation which may have taken place."

Every observation from the pen of Dr. Mease, bears an interest of no inconsiderable value; the following are some of his remarks respecting the above case:

"The first fact which the excellent case related by Dr. Physick assists in proving, is, *that the size of the wound is in no way connected with the time of the attack, nor with the fatality of the disease.* The wound which gave admission to the virus in York's foot was so small, that when questioned about it in my hearing, he said, 'Oh, it was nothing; a mere scratch near my toe.' Dr. David Ramsay, of Charleston

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the disease, and he will find a mass of evidence against which there can be no resistance."

CASE 4.

By S. Borrowe, M. D. of New-York.

[Med. Repos. vol. 5. p. 73.]

"On the evening of the 11th of April, 1801, I was requested to attend a son of Col. B. Swartwout, a boy of nearly thirteen years old, who, half an hour before, had been bitten in the left fore-arm by a dog supposed to be mad. I immediately employed ablution, and continued it for more than a quarter of an hour; after which I dressed the wound with strong mercurial ointment, and directed the arm to be freely rubbed with it. Every fourth hour he took calomel and opium, together with wine and generous diet. In a few days a ptyalism was produced, which continued for more than two weeks. Lunar caustic was frequently applied, which, with common poultice, kept the wound open for better than a month. As the dog was not known to be mad, and the boy had not had any unfavourable symptoms, he was now permitted to discontinue the preventative plan, except wine and cordial diet, which he continued, though not in such great quantities.

"He appeared now to be in perfect health, and remained in that state, until the third day of July in the afternoon, when I was again requested to make him a visit.

"He complained of considerable pain in the left arm and shoulder, somewhat similar to rheumatism;

said he had passed several restless nights, and that he was very costive. I directed the pained parts to be bathed with volatile alkali, and gave him a dose of pulvis purgans, which had the desired effect.

"On the 4th, early in the morning, when a bason of water was brought to him for the purpose of washing, he directed it to be removed, as it made him uneasy to look at it; he, however, attempted to wash himself, but on putting his hands into the water, discovered great alarm, and left it with horror. He was offered some common tea at the breakfast table, which he found great difficulty in swallowing. At ten this morning, I found him labouring under all the symptoms of distinctly marked hydrophobia. The part where the wound was received, which had long since healed, was now of a darker colour than before; his countenance was remarkably pallid; the pulses were small, and intermittent, his skin rather below the natural temperature: the pupils were somewhat dilated, attended with some little confusion of intellect. He complained of the air being extremely unpleasant to him when the door of the room was opened: the light gave him uneasiness; light-coloured objects were particularly disagreeable to him; looking at which, he said, made him sigh.

"Dr. Post was requested to visit the patient at eleven, at which time he ordered a blistering-plaister to be applied to his throat, and one on that part of the arm where the wound had been inflicted. He took two grains of calomel and one of opium every fourth

hour, together with bark, ginger, and cloves; had ten grains of calomel applied to his gums every second hour; took some animal food, and drank freely of wine. At eight in the evening his blisters had acted powerfully; his pulses were stronger, and regular; he could drink with more ease: his intellect was more clear, and he discovered less horror at the sight of fluids.

"Dr. Tillary saw him, for the first time, this evening. His medicines were continued. He slept but little.

"5th. At nine in the morning the hydrophobia was much increased. On offering him any fluid he would scream out aloud, hide his head under the clothes, and then attempt to jump out of bed. Although he complained of being extremely thirsty and hungry, he could neither swallow liquids nor solids. Whenever he attempted it, particularly fluids, the muscles of the throat and face were most violently convulsed, and he appeared as if he would immediately suffocate. If a particle of the saliva, which he was constantly throwing out, touched the surface of his body, or he saw it, his spasms were renewed. At one o'clock we requested Drs. Miller and Hosach to visit the patient. His symptoms were now somewhat abated. The same tonic and stimulant plan of treatment was advised to be pursued: in addition to which, warm brandy was applied to the region of the stomach and abdomen.

"6th. The symptoms continued the same, except the delirium, which was considerably increased. We directed him to take thirty drops of the tincture of cantharides every hour. This was continued through the day without producing any sensible effect. In the course of this night he was seized with great uneasiness at his stomach, and threw up considerable quantities of dark coloured matter. Little or no sleep this night.

"7th. At six this morning he refused every kind of nourishment. His delirium was greatly increased, and strength much exhausted. He had now the black-vomit, accompanied with a constant discharge of saliva. Twelve o'clock at night he died.

"8th. At nine this morning I opened the body, in presence of Drs. Miller, Post, and Tillary. The intestines were much inflated. The smaller contained a considerable quantity of black matter, similar to that which he threw up the preceding day. The stomach was collapsed and empty, except a small quantity of dark flaky matter which adhered to the villous coat. The greater part of the internal surface of the stomach appeared to be much inflamed: and one spot, near the cardia, had the appearance of blood effused beneath the villous coat."

"The case treated by Dr. Borrowe," says Dr. Mease, "does not militate against the efficacy of the excellent plan of ablution as a preventive, though early instituted. It would have been well to have continued it for a longer time, and the wound ought

to have been previously enlarged to permit the penetration of the water to the sinuosities made by the dog's teeth, as recommended by Dr. Haygarth. A disease which appears in all the intermediate periods between *ten days* and *four years*, (as I shall presently show) must render an internal preventive remedy useless, for it is clear that the system could not be kept under the impression of any remedy during that long period, to a degree sufficient to counteract the effect of the canine poison. Numerous records of cases beside that by Dr. Borrowe, prove that the use of mercury internally, even to salivation, and of other remedies, do no good as preventives. We have only to depend upon an early incission of the part if practicable, or otherwise upon washing out the virus by *long continued streams of water from a tea-kettle, and putting an issue in the part.* The tincture of cantharides could not be said to have had a fair trial. It was given to the extent of thirty drops every hour, but not until the fourth day of the boy's illness. No sensible effect was produced, though the medicine was continued through the day. A more early exhibition would probably have enabled us to determine whether that remedy would not succeed as well in the disease produced by the bite of a mad animal as in tetanus.

"Dr. Hamilton has fixed upon the tenth day as the shortest period at which the disease has ever appeared. and nineteen months as the longest interval that has hitherto been known to take place between the bite

and the attack. But I have lately been informed of a case in which the destructive virus lay dormant four years and three months before it began to operate.* I wrote to the boy's father, Mr. Isaac Pyle, of Bethel township, Delaware county, Pennsylvania, to request the particulars, and was favoured with the following account:

CASE 5.

By James Mease, M. D. to Doctor Miller.

[Med. Repos. vol. 5, p. 298.]

"On the 14th of the seventh month (July), 1797, Mr. Pyle's son, about fourteen years of age, was sent for the cattle, and, while crossing a fence, a cat seized his great toe; and he was not able to disengage her until after descending from the fence, and placing his other foot upon her, when he drew the toe from the animal, but not without having it completely divided by her teeth. Being armed with a club, the youth killed the cat. Upon a supposition that the cat was mad, the nostrum of the Goodman family of this city was taken, but, as will appear, with as little success as attended the host of other absurd compositions to which lives in all countries have been sacrificed. No symptom of indisposition appeared until Sunday, the 19th day of the eleventh

* Dr. Mease seems to have committed an error respecting the period which intervened in this case. Estimating from 14th of July 1797 to 19th Nov. 1800, is not four years and three months, but three years and four months.

month (November), 1800. He was then seized with a pain in his hip, head, and back, and appeared dull and heavy. Occasionally he would fall asleep in his chair; and though, while in this state, his respiration was so loud as to be heard out of doors, yet, when awakened, he could scarce be brought to believe that he had been asleep. He was extremely irritable, and when taken hold of, would start and cry out as if frightened. His mouth was filled with saliva, he had a strong aversion to drink, and, when it was offered to him, would appear as if about to be attacked with convulsions. In this state he continued until the following Sunday evening, when he became occasionally delirious, had a wild look, talked much, and declared his belief that he should not long survive. The following day he appeared more calm; but on Tuesday, about noon, he fixed his eyes on the ceiling, and appeared as if he beheld something which greatly alarmed him, and which he could not be prevented from viewing. He continued in this way until the next morning, *when, after twice discharging matter resembling strong coffee*, he expired.

"The above case, which I believe to have been produced by the operation of the canine virus, affords the longest interval between the bite and death of the person bitten, of any well authenticated instance on record. It will long be a problem of difficult solution to explain the reason of the very irregular operation of this subtle and powerful poison, and to determine upon what principle it happens that it remains dor-

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LETTER X.

CASE 6.

By John R. B. Rodgers, M. D.

[Med. Repos. vol. 5. p. 75.]

"J. Opie, a boy of thirteen years of age, was, on the first of April, 1801, bitten by a dog (supposed to be rabid) on the upper part of the nose and inner angle of the left eye. He was, on the afternoon of that day, sent to a person in New-Jersey, who was said to possess a remedy preventive of hydrophobia. By him he was treated, had some internal remedies administered, and the wound dressed, but with what particular application is not known. In a short time (less than a fortnight) the sore was healed, and the lad apparently in perfect health. He continued so till Friday, the 10th of July, when, in the evening, he complained of being feverish, and, on Saturday, of pain in the head. He had a large dose of castor-oil given him by his sister, which operated briskly and relieved him much. On the evening of the same day he complained of some difficulty of swallowing fluids.

"On Sunday, the 12th, in the morning, I was first called to see him, and found him with a dry skin, pulse at 110, and full, but soft; face flushed, eyes languid, and the countenance having the air of great dejection. He was sitting up: complained of a dull

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seven o'clock, his pulse was 100. He complained of being heated. The opium was omitted; bowels had been restrained by the opium. He was advised to have his throat and breast rubbed with a solution of camphor in olive oil, in the proportion of ʒss. of the former, to lb. j. of the latter; this to be done when he came from the bath.

"13th, A.M. Pulse quickened to 118. Bath had frequently been used in the night, and the alkaline solution diligently given. His difficulty of swallowing fluids increased; complained of an uneasy sensation when the bed-clothes were suddenly raised, or a white handkerchief thrown over his face. On showing him a mirror he viewed it without any repugnance. This plan was pursued through this day. In the evening the pulse was 120. He constantly expressed satisfaction from the tepid bath.

"14th. Seven o'clock, A. M. Pulse 144: heat then increased: more uneasy and restless: difficulty of swallowing greater. A blister was applied to the throat. His head was directed to be shaved, and washed in iced water for some time, and then covered with a large blister. Seven o'clock P. M. Pulse very quick (150): skin growing cold. The alkaline course had been as steadily used as before. Blister to the throat had drawn well: but the directions with respect to the head had not been attended to. This evening he became frantic, though readily restrained from doing harm. After about five hours he was calm, yet delirious; and, continuing in this state, expired at four o'clock in the morning of the 15th. His

skin became yellow after death, with many livid spots interspersed.

"On such a melancholy case I have little to say, for I know but little. The alkaline treatment, like all others that have gone before, has failed. Opium was not long continued, as it increased his heat."

CASE 7.

By John Redman Coxe, M. D. to Dr. Miller.

[Med. Repos. vol. 5. p. 257.]

"Sir, "*Philadelphia September* 19, 1801.

"The following case of hydrophobia, which came under my notice during my residence in London, is much at your service, should you think it worthy of insertion in the Medical Repository.

"I am with great respect,

"Your very obedient servant,

"JOHN REDMAN COXE.

"*London Hospital, Tuesday December* 1, 1795.

"A boy, aged about eleven years, was admitted at 4, P.M. labouring under an attack of hydrophobia. The account given of him was, that, about twenty months ago, he was bitten by a mad dog on the —— carpus; for which he was bathed in salt water at Gravesend. He received a second bite, about a year ago, on the fingers of the same hand, and again was bathed at Gravesend. From that time, till Sunday last, he continued perfectly well; but, in the evening of that day, he complained of a pain in his stomach, and of being sick all over. He dined and

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by Dr. Rush, in tetanus. The boy was immediately placed in a large tub, and one or two buckets full of cold water suddenly thrown over him from behind. Our anxiety was relieved by finding how well he bore it, without any convulsions, of which we were fearful. In about half an hour it was repeated, with apparent advantage. As a diminution of those constant convulsive motions I before noticed, appeared to take place, the pulse, at the same time, becoming more full, Mr. Blizard ordered it to be repeated every hour, and to administer a second injection, in a short time, with the addition of forty drops of laudanum.

"At half past eight in the evening I saw him again; since when the bath has been repeated *three* times, or *five* times in all. His pulse, though considerably quicker (upwards of 140,) seems not much altered in strength. The convulsions are less frequent and violent; and he *now drinks* without any very great degree of violence to himself; for although when a fluid was brought in a glass he appeared desirous to avoid drinking, yet, on being urged, he at length seized and drank several mouthfuls. His attendants say, he has both eaten and drank several times since we were last here. He is quite sensible, and though he prefers silence, yet he answers all questions with less aversion. His countenance has a wild and very peculiar expression; tongue whitish; he passes his urine with perfect ease, and without regarding the sound; though the sound of water pouring in the tub, in which he was placed, appeared, at first, to cause great agitation. The convulsions now appear almost

entirely under the form of a constant hickup, accompanied with a more violent retraction than usual of the head and neck.

"He seems much distressed by something in his mouth, which he imagines is the hair of the rug and blanket of his bed, and endeavours continually to remove it, by passing his hand quickly and frequently over his mouth; as no hair could, however, be discovered on inspection, it most probably arose from the viscidity of the saliva, which adhered considerably to the fauces. He notices no one but his mother, and her only when spoken to.

"This being a *medical* case, the physicians of the hospital met about this time in consultation; and concluded to suspend the use of cold water, and endeavour to excite a speedy salivation, by means of mercurial frictions; for which purpose, two persons were ordered to relieve each other, during the night, in rubbing in the ointment on various parts of the body; but before this could be effected, death released the unfortunate sufferer, about two in the morning. He died with ease; and his body was immediately removed by his friends, so that no information was afforded by dissection.

"In the above case we may notice several circumstances:

"1st. The time between the bite and the actual disease. Whether the *first* bite had any influence in the production of the disease is, perhaps, impossible to ascertain. At any rate, the *second* bite, at the distance of twelve months, is another mourn-

ful proof of the great length of time which this very extraordinary virus is capable of remaining in the system, unaltered, and unassimilated to the general healthy state of the fluids. We have two authentic instances of a lapse of eighteen and nineteen months between the bite and the consequent disease.* As for the cases on record of twenty and even forty years interval, I must either dispute their credit, or consider them as accidental concomitants of some other disease; as hysteria, &c. which I shall speak of presently. It would doubtless be very desirable to ascertain with precision, the utmost limits between the bite and the disease, as this knowledge would tend to allay, after the expiration of that time, the dreadful apprehensions of those, who at any preceding period, have unfortunately been bitten. Dr. Babington considers from four to twelve weeks as the interval in most cases which have occurred.† What becomes of the poison during this interval? Are we to suppose it remains in the part bitten till near the time of the disease taking place? If so, we must also suppose, that excision of the part, at any period prior to the commencement of the attack, would prove a certain preventive. How far this is actually the case I know not; but it certainly deserves more accurate investigation than has, I believe, been afforded it. At all events, it appears to me, that a removal of the part, *at any time*, is to be recommended, even though weeks or months have intervened.

* Philos. Trans. vol. 11th p. 5, London Medical Journal, vol. 8, p. 156.

† Medical Records and Researches, p. 130.

"2d. Some of the symptoms occurring during its continuance deserve notice. As to the *dread of fluids* existing in this disease, we find a remarkable relief from the difficulty of swallowing was experienced towards its close. The same was observed in Dr. Ferrier's case,* and he refers to Mead, Lieutaud, &c. to shew that the 'disease has even been said to exist without any horror of water or difficulty of receiving it into the stomach.' It is well known that this symptom has occurred, not only in hysteria and tetanus, but also in the yellow-fever, in typhus, and in hydrocephalus.† Dr. Rush has also enumerated a variety of other causes of this extraordinary symptom;‡ and Dr. Cullen says, 'We have known an instance of hydrophobia, in consequence of an inflammation of the stomach, independent of any bite of a mad dog.'§ The greater contraction of the muscles, of the glottis, in swallowing fluids, than is necessary in swallowing solids, by which, in their highly irritable state, such as spasmodic constriction, takes place

* "Medical Facts and Observations, vol. 1, p. 6."

† "This was remarkably the case in a young boy, of about ten years of age, in whom the usual symptoms of hydrocephalus supervened an attack of common inflammatory fever in March, 1792. 'He was vomited, bled, purged, and blistered. About the 9th or 10th day from the first attack, he began to find *great difficulty in swallowing*, which continued to increase to such a degree, that, whenever the smallest quantity of any fluid touched the muscles of deglutition, he was *thrown into convulsions*, and finally died of a fit which lasted about three hours, and was induced by attempting *to swallow a small quantity of cold water.*' The viscera of the thorax and abdomen were healthy; but water was found in the pericardium and ventricles of the brain. M.M.S. Cases.

‡ "Observations on Hydrophobia, p. 213.

§ "Clinical Lectures, p. 173.

as to endanger, and eventually to occasion suffocation, is sufficient to account for the difference of pain in these two actions. But, I apprehend, the association of ideas of pain, with the attempt to swallow, is scarcely to be considered as adequate to an explanation of this symptom. That the imagination has something to do with it, is evident from this, that even a looking-glass presented to the patient, will sometimes produce the same effect. In some cases, also, of angina, the pain of swallowing is excessive; yet I do not recollect, that the dread of fluids or solids ever amounted to an actual state of hydrophobia, although the recollection of past pain in swallowing must have been pretty considerable.

"Whether the cold bath, employed in this case, had any effect in relieving this symptom, is, perhaps, difficult to ascertain. I have always considered it dependent on this cause, as it took place so soon after its use, and as its powerful effect in resolving spasm is well known. Its employment at so late a period of the disease, perhaps, precluded the possibility of perfecting a cure; yet I consider the suspension of its application as a cause of regret. In Southwell's Medical Essays* it is noticed, that the horror of water was overcome by pouring water on the patients till they were almost suffocated; "thus among others, a man was tied to a tree, and had 200 buckets of wa-

* "Volume 3, p. 93, 94, abridged from the Memoirs of the Royal Academy, Paris.

ter thrown upon him: he recovered without any other assistance."

CASE 8.

By Benjamin Rush, M. D. to Dr. Edward Miller.

[Med. Repos.—Hexade 2d, vol. 1, No. 2.]

"In the first number of the fifth volume of your Repository, Dr. Physick has supposed death from hydrophobia to be the effect of a sudden and spasmodic constriction of the glottis, inducing suffocation; and that it might be prevented by creating an artificial passage for air into the lungs, whereby life might be continued long enough to admit of the disease being cured by other remedies. The following account of a dissection is to show the probability of the Doctor's proposal being attended with success.

"On the 13th of September, 1802, I was called with Dr. Physick, to visit, in consultation with Dr. Griffith, the son of William Todd, Esq. aged five years, who was ill with the disease called hydrophobia, brought on by the bite of a mad dog, on the 6th of the preceding month. The wound was small, and on his cheek, near his mouth; two circumstances which are said at all times to increase the danger of wounds from rabid animals. From the time he was bitten, he used the cold bath daily and took the infusion, powder, and seeds of the anagallis in succession, until the 9th of September, when he was seized with a fever which at first resembled the remittent of the

season. Bleeding, purging, blisters, and the warm bath were prescribed for him, but without success. The last named remedy appeared to afford him some relief, which he manifested by paddling and playing in the water. At the time I saw him he was much agitated, had frequent twitchings, laughed often, but with uncommon excitement in his muscles and nerves; his mind was unusually correct in its operation.

"He discovered no dread of water, except in one instance, when he turned from it with horror. He swallowed occasionally about a spoonful at a time, holding the cup in his own hand, as if to prevent too great a quantity being poured at once into his throat. The quick manner of his swallowing, and the intervals between each time of doing so, were such as we sometimes observe in persons in the act of dying of acute diseases. Immediately after swallowing water, he looked pale, and panted for breath. He spoke rapidly, and with much difficulty. This was more remarkably the case when he attempted to pronounce the words *carriage*, *water*, and *river*. After speaking he panted for breath in the same manner that he did after drinking. He coughed and breathed as patients do in the moderate grade of the cynanche trachealis. The dog that had bitten him, Mr. Todd informed me, made a similar noise in attempting to bark a day or two before he was killed. We proposed making an opening into his windpipe. To this his parents readily consented: but while we were preparing for

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dinary manner in which malignant fevers produce it, but by a sudden or gradual suffocation. It is the temporary closure of this aperture which produces the dread of swallowing liquids; hence the reason why they are swallowed suddenly, and at intervals, in the manner that has been described; for, should the glottis be closed during the time of two swallows, in the highly inflamed state of the system which takes place in this disease, suffocation would be the immediate and certain consequence.

"The same difficulty and danger attend the swallowing saliva, and hence the symptom of spitting, which has been so often taken notice of in hydrophobia. Solids are swallowed more easily than fluids, only because they descend by intervals, and because a less closure of the glottis is sufficient to favour their passage into the stomach. This remark is confirmed by the frequent occurrence of death in the very act of swallowing, and that too with the common symptoms of suffocation. To account for death from this cause, and in the manner that has been described, it will be necessary to recollect, that fresh air is more necessary to the action of the lungs in a fever than in health, and much more so in a fever of a malignant character, such as hydrophobia appears to be, than in fevers of a milder nature. An aversion from swallowing liquids is not peculiar to this disease. It occurs occasionally in the yellow fever. It likewise occurs in the disease which has prevailed among the cats both in Europe and America, and probably in

both instances from a dread of suffocation in consequence of the closure of the glottis, and sudden abstraction of fresh air.

"The seat of the disease, and the cause of death, being, I hope, thus ascertained, the means of preventing death comes next under consideration. Tonic remedies, in all their forms, have been administered to no purpose. The theory of the disease would lead us to expect a remedy for it in blood-letting. But this, though now and then used with success, is not its cure; owing, as we now see, to the mortal seat of the disease being so far removed from the circulation as not to be affected by the loss of blood in the most liberal quantity. As well might we expect the inflammation and pain of a paronychia, or what is called a felon on the finger, to be removed by the same remedy. Purging and sweating, though occasionally successful, have failed in many instances; and even a salivation, when excited, (which is rarely the case) has not cured it. An artificial aperture into the windpipe alone bids fair to arrest its tendency to death, by removing the symptom which generally induces it, and thereby giving time for other remedies, which have hitherto been unsuccessful, to produce their usual salutary effects in similar diseases.* In removing faintness, in drawing off the water in ischuria, in composing convulsions, and in stopping hæ-

* The hoarse barking, or the total inability of mad dogs to bark, favours still further the idea that the mortal seat of the disease is in the glottis and that the remedy which has been proposed is a rational one.

morrhages in malignant fever, we do not cure the disease, but we prevent death, and thereby gain time for the use of the remedies which are proper to cure it. Laryngotomy, according to Toureroy's advice, in diseases of the throat which obstruct respiration, should be preferred to tracheotomy, and the incision should be made in the triangular space between the thyroid and cricoid cartilages. Should this operation be adopted in order to save life, it will not offer near so much violence to humanity as many other operations. We cut through a large mass of flesh into the bladder in extracting a stone. We cut into the cavity of the thorax in the operation for the empyema. We perforate the bones of the head in trepanning; and we cut through the uterus, in performing the Cæsarian operation, in order to save life. The operation of laryngotomy is much less painful and dangerous than any of them; and besides permitting the patient to breathe and to swallow, it is calculated to serve the inferior purpose of lessening the disease of the glottis by means of local depletion. After an aperture has been thus made through the larynx, the remedies should be such as are indicated by the state of the system, particularly by the state of the pulse. In hot climates it is, I believe, generally a disease of feeble re-action, and requires tonic remedies; but in the middle and northern States of America it is more commonly attended with so much activity and excitement of the blood-vessels as to require copious blood-letting and other depleting remedies.

"Should this new mode of attacking this furious disease be adopted, and become generally successful, the discovery will place the ingenious gentleman who suggested it in the first rank of the medical benefactors of mankind.

"Before I conclude my letter, I have only to add a fact which may tend to increase confidence in a mode of preventing the disease which has been recommended by Dr. Haggarth, and used with success in several instances. The same dog which bit Mr. Todd's son, bit at the same time, a cow, a pig, a dog, and a black servant of Mr. Todd's. The cow and pig died; the dog became mad, and was killed by his master. The black man, who was bitten on one of his fingers, exposed the wound for some time, immediately after he received it, to a stream of pump-water, and washed it likewise with soap and water. He happily escaped the disease, and is now in good health. That his wound was poisoned is highly probable, from its having been made eight hours after the last of the above animals was bitten, in which time there can be but little doubt of such a fresh secretion of saliva having taken place as would have produced the hydrophobia, had it not been prevented by the above simple remedy. I am not, however, so much encouraged by its happy issue in this case as to advise it in preference to cutting out the wounded part. It should only be resorted to where the fears of a patient, or his distance from a surgeon, render it impossible to use the knife.

"*Philadelphia, July* 27, 1803."

LETTER XI.

CASE 9.

By Dr. Robert Burton to Dr. Benjamin Rush.

[Med. Repos. Hex. 2. vol. 2. p. 13.]

"SIR, "*Bent-Creek (Virginia), August* 21, 1803.

"BELIEVING that you are always disposed to encourage any thing which may throw light upon the treatment of diseases, I take the liberty of addressing to you the following case of hydrophobia, requesting a line or two, if you think it deserving your attention.

"On the 4th of July, 1803, at nine o'clock in the evening, I was desired to visit Thomas Brothers, aged twenty-eight years. I was informed by the person who came for me, that he had been bitten by a dog, which his friends suspected to be mad. I found him in the hands of four young men, who were endeavouring to confine him, and thereby prevent him from injuring himself or friends. He recognized me, and requested me to give him my hand, which he made a violent effort to draw within his mouth. Conscious of his inclination to bite, he advised his friends to keep at a distance, mentioning that a mad dog had bitten him.

"His symptoms were as follow, viz. a dull pain in his head, watery eyes, dull aspect, stricture and heaviness at the breast, and a high fever.

"Believing as you do, that there is but one fever, I determined to treat this case as an inflammatory fever. I therefore drew ℥xx. blood; and as he refused to take any thing aqueous I had him drenched with a large dose of calomel and jalap.

"July 5th, four, A.M. Finding the symptoms worse, I took away ℥xvj. blood, and applied two large epispastic plaisters to his legs, hoping thereby to relieve the oppression of the præcordia and other symptoms.

"Twelve, M. Was informed that one of his friends had permitted him to take a stick in his mouth, which he bit so as to loosen several of his teeth. As he craved something to bite, I desired his friends to give him a piece of lead, which he bit until he almost exhausted his strength.

"One, P.M. Finding but little alteration, I drew ℥xviij. blood, and had him drenched with the antimonial powders."

"Two, P.M. He slept until half after three, when he awoke with the disposition to bite, oppression, &c. but not so violent.

"July 6th, eight, A.M. Found him biting the bed-clothes; his countenance maniacal, his pulse synocha, with a stricture of the breast, difficult deglutition, laborious breathing, and a discharge of saliva. I took away ℥xxiv. blood, gave him a dose of calomel and jalap, and continued the powders.

"Twelve, M. Drew ℥xvi. blood, and gave him laudanum.

"Five, P. M. Found him in a slumber; his skin moist, and his fever and other symptoms much abated.

"July 7th, eight, A. M. Was informed that he had only two paroxysms during my absence, and that he had lost ℥xvi. blood, agreeably to directions. Notwithstanding the favourable aspect which the disease wore, I resolved to bleed him twice more, and then to induce an artificial fever by mercury, which would predominate over the hydrophobic. I therefore drew ℥x. blood, and requested his friend to take ℥xviij. at night, to rub in a small quantity of mercurial ointment, and to give a mercurial pill every four hours.

"July 8th, nine, A. M. Found him convalescent, but continued the mercurial unction and pills.

"July 9th, ten, A. M. Found his gums sore, and discontinued the mercury.

"July 15th, one. P. M. Found him well, but with a considerable degree of debility.

"It would be doing injustice to you, not to mention that I was indebted to your lectures for the successful treatment of this disease."

"Dear Sir, "*Philadelphia, August* 29, 1803.

"Accept of my congratulations upon your rare triumph over a case of hydrophobia. I give you great credit for the boldness of your practice. You have deserved well of the profession of medicine.

"In order to render your communication more satisfactory, permit me to request your answer to the following questions:

"1. On what part of the body of your patient was the wound inflicted? and how long was the interval between the time of his being bitten and the attack of his fever?

"2. Did he discover any aversion from the sight of water; and did he refuse to swallow liquids of all kinds?

"3. What were the appearances of the blood drawn? Did it differ in the different stages of the disease?

"Your answer to the above questions will much oblige your sincere friend,

"BENJAMIN RUSH.

"*Dr. Burton.*"

"SIR, "*Bent-Creek* (*Virginia*), *September* 18, 1803.

"I regret that business of an indispensible nature prevented me from being more particular in my communication. I drew it up in a hurry, intending to transcribe it and insert such other notes as would throw light on the case; but being called out a few hours before the post set out from this place, I was obliged to forward the communication in the manner in which you received it.

"The part of the body of my patient on which the wound was inflicted was a little above the union of the soleus and gastrocnemius muscles, which form

the tendo-Achilles. The interval between the time of his being bitten and the attack of the fever was twenty-four days.

"He was, I was told, dull and solitary a few days previous to the attack. A few minutes before it his friends found him two hundred yards from the house, apparently in a deep study. He has informed me, since his recovery, that he had a slight pain in the wound, attended with itching, and an uneasiness in the inguinal gland, several days before the fever.

"He refused to swallow liquids; and the sight of water threw him into a convulsive agitation.

"With regard to the appearances of the blood drawn, I am sorry to inform you that after it became cold I did not examine it.

"I am, Sir, yours,

"ROBERT BURTON.

"*Dr. Benjamin Rush.*"

The successful treatment of Dr. Burton's patient, together with the novelty of circumstances with which the case was attended, have excited considerable interest and produced much animadversion from various quarters.

You are not unapprised of my own impressions, that whenever Dr. Burton may be called to witness an example of genuine hydrophobia, he will be disconcerted by the comparison, and when again he shall have occasion to deplete the very heart of his patient, he will see the utility of ascertaining the quali-

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scratch and bite when Dr. Burton approached him. "Can we think it strange," Dr. Mease inquires, "that a man, like the patient of Dr. Burton, ignorant of the many chances against his supposed infection, and of the nature of the disease to which he deemed himself liable, and whose natural fears had been increased by the injudicious conduct of those around him, should be driven to a state of frenzy?" The absence of some symptoms, and the presence of others, in the case referred to, Dr. Mease claims as additional argument in favour of the opinion that it had no connexion with the canine affection. "A cursory view of the list of symptoms detailed by Dr. Burton will evince that many of the most prominent did not occur."

The dread of water, Dr. Mease considers as far from being a proof that the disease proceeded from the cause suspected; and the disposition to bite is alone sufficient to convince him that the case had no connexion with the canine virus, for no such disposition ever occurs in the true disease, whereas it always appears in those which have been falsely ascribed to the canine poison. The last objection urged by Dr. Mease is the remedy by which a cure of Dr. Burton's patient was affected. In strict conformity with the theory which this physician had recently imbibed from Professor Rush, that the disease occasioned by the canine virus is highly inflammatory, he had recourse to copious and repeated bleeding in this instance, and in the short space of four days his pa-

tient lost 138 ounces of blood. The event, indeed, most clearly demonstrated the inflammatory nature of this man's disease, but being diametrically opposed to the theoretical and practical ideas of Dr. Mease, he concludes that the case under consideration was entirely unconnected with true canine rabies, in which bleeding never has in a single instance succeeded. In addition to his own judicious observations, Dr. Mease has subjoined an extract from a paper on the same subject, published in the Medical and Physical Journal of London, for May 1806, by Dr. R. Hall of Clement's Inn.

The views of Dr. Hall are in such direct coincidence with Dr. Mease on this occasion, that it is inexpedient to retrace particularly the sentiments of this excellent writer. After a minute examination of circumstances and symptoms, Dr. Hall expresses a decided opinion, that the malady, under which Dr. Burton's patient laboured, cannot be considered as having exhibited true characteristics of rabid hydrophobia; but that the Doctor had fallen into an error, and mistaken an affection of a very different nature, for that proceeding from canine virus. He thus closes his observations. "From the history of this case it appears sufficiently obvious, that violent inflammatory action and acute pyrexia prevailed throughout the whole progress, and constituted the principal part of the disease; circumstanees which are never observable in well defined cases of hydrophobia. On a careful review of the whole concourse of the symptoms,

as detailed by Dr. Burton, we are of opinion, that they must appear to every impartial observer, far more characteristic of a phrenitic attack than of true rabies; for in phrenitis, the raving is almost incessant, with few intervals of reason; whereas in rabies, the paroxysms are short and sudden, and the patient is seldom bereft of all consciousness and perception of what is passing around him. In phrenitis, moreover, the delirious furor early manifests itself, and the patients are generally outrageous: but in rabies, on the contrary, timidity is a prevailing feature, and the patient seldom attempts to injure any of the by-standers, or becomes outrageous, till towards the very close of the malady. The only symptoms in which the disease under consideration bore the slightest resemblance to rabies, were, the patient's refusal to swallow liquids, and the convulsive agitation he is said to have experienced at the sight of water. Now these symptoms, as already shewn, are no uncommon occurrence in phrenitic, as well as in maniacal affections. In phrenitis, besides, it is well known that the mind frequently recurs to objects which had before made a deep impression on it. That this was the case in the present instance, is clearly evinced by the patient continually warning people to keep at a distance from him, for he had been bitten by a mad dog.

"With regard to the discharge of saliva in this instance, it seems altogether to have arisen from impeded deglutition, and the convulsive action of the muscles of the throat and fauces, and is well known to be a frequent occurrence in epileptic as well as in

maniacal and phrenitic affections; to the last of which the disease in question appears to have had a more striking resemblance, not only in the mode of its attack, but in its subsequent symptoms, than to the peculiar malady resulting from the bite of a rabid animal. It was not marked by any of the leading symptoms of hydrophobia rabiosa; such as an aversion to noise and cold air, to the sound or contact of water and other liquids, to any violent contractions of the lower jaw, any strictures about the throat, with occasional apprehensions of immediate suffocation or strangulation, any violent efforts to disengage from the mouth a thick and viscid saliva, any change of voice, incessant restlessness, and a marked aversion to a recumbent posture. Lastly, it not only differed from this dreadful disorder by the absence of all these symptoms, but in its termination, which was so unlike that of true rabies, hitherto deemed incurable, that it yielded in less than a week to copious and repeated bleedings, and the employment of other remedies; means which, in the hands of other practitioners, have uniformly proved inefficient. On the whole, so far as we can form any judgment from a comprehensive view of the present case, there seems, we think, every reason to conclude, that whatever might be the disease under which the patient laboured, it was not genuine hydrophobia."

CASE 10.

A son of Mr. Silvanus Weston, of Duxbury, county of Plymouth, aged three years and eight months,

was, on the 16th August 1810, so furiously attacked by a mad dog passing the house, that thirty-one wounds were inflicted on various parts of his body before his mother could rescue him from the jaws of the animal. By the direction of a physician, a mercurial course was immediately commenced and persisted in to the point of ptyalism for thirty or forty days, and one of the wounds kept in a state of ulceration about three weeks. The other wounds were soon healed, and the child continued to enjoy his usual state of health until 28th October, seventy-three days from the injury. He was now seized with symptoms precursory of fever, with severe pains particularly in those parts where the wounds had been inflicted; restlessness, anxiety, and a peculiar sensibility to external air and objects, were extremely distressing to him, and admitted of no palliation, for they were the harbingers of mortal hydrophobia, which with a kind of wild delirium soon succeeded. When liquids were presented to him he eagerly grasped the cup with both his hands, and with great agitation carried it to his mouth, by which a convulsive and suffocating sensation was instantly excited; and, terrified at every object, the most fearful apprehensions and anxiety were depicted in his countenance, and manifested by unnatural actions and gestures, tossing himself about in every direction, and making the most hideous efforts to fight and to bite all within his reach. Imagining the dog in every corner of the room, he darted his eyes continually around and entreated his mother to drive the animal

from his presence. When I was first called to visit him, November 3d, the sixth day of his illness, his skin was remarkably livid, and his extremities cold. The pulse imperceptible at the wrist, but strongly marked at the carotid arteries. In less than three hours after my arrival, his efforts became more and more feeble, his countenance assumed the image of death, and I could only witness the distressing scene and the fatal termination which ensued. This furnishes one in addition to the numerous instances already promulgated of the absolute inutility of a mercurial course as a preventive of the malady.

CASE 11.

Ezra Silvester, of Duxbury, aged 73, while walking the road on 16th August 1810, was overtaken by the same mad dog by which the son of Mr. Weston was bitten, and which gave him a bite on one of his fingers. Silvester was eccentric in his manners and conversation, and as no instance of canine madness had ever fallen under his observation, his mind was peculiarly perverse and incredulous relative to any serious consequences: he uniformly treated the accident with contempt, and appeared much disgusted when his friends introduced the circumstance in a serious light. Even the death of the child bitten by the same dog, made no impression upon the temper of his mind. On the 14th November, 90 days from the accident, some indisposition was perceived, particularly a laxness of bowels, which a dose of rhu-

barb soon removed. Symptoms, however, of a more formidable nature were insidiously approaching; he was observed frequently to rub the hand and finger on which the wound had been inflicted, and to press with his hand the muscles of his face and jaws, complaining that the air affected those parts and excited a sensation altogether new and unaccountable to him. In about three days his nervous system appeared greatly affected, his nights were sleepless, and his strength was continually diminishing. When I was requested to visit him, on the 19th of the month, his friends assured me that his debility had increased rapidly during the last twenty-four hours. Finding him in possession of his full measure of mental powers and not susceptible of alarm respecting the nature of his complaints, I was resolved to wrest from him all possible information relating to his case. I poured water into a bowl in his presence which excited great agitation and tremor, and an involuntary motion of the muscles of the face and jaws, with marks of horror and aversion. Wishing to witness his efforts to swallow liquids, I presented a cup of drink for the purpose. In this attempt, the symptoms characteristic of hydrophobia were still more unequivocally demonstrated. His utmost endeavours with one hand and with the other, and finally with both, to carry the cup to his mouth were altogether unavailing. Having myself reached the cup to his mouth, I desired him to make every effort to swallow; a small portion of the fluid passed into his stomach, while the remainder was suffered to run out of his mouth. A painful

suffocating sensation attended, and the lungs and muscles pertaining to respiration were singularly affected: as if combining their powers to obviate the approach of the obnoxious fluid, they exhibited alternate emotions similar to those induced by immersing the body suddenly into cold water. I inquired of him, whether he suffered pain in his throat in attempting to swallow? He replied, "No, not at all; it is not in my throat." Why then have you such aversion to liquids? "Because it makes the lock-jaw catch me, and it takes away my breath." Did you ever experience such sensation before? "No, not till within these three or four days." Under these distressing circumstances his appetite for solids was unimpaired, and I witnessed with some surprise his chewing and swallowing animal food with his usual ability.

His eyes were much inflamed, his strength prostrated, his extremities were cold and the skin of a livid colour; and such was the diminished energy of the heart and arteries, that the pulse at the wrist was only fifty in a minute, low and extremely irregular. He was restless and desired frequently to be assisted in changing his position, and was constantly wiping from his mouth a viscid saliva. He had not for several nights enjoyed much sleep; his bowels were constipated, and a general torpor seemed to pervade his system internally, yet so great was his susceptibility to external impressions, that a breeze of air created by a flirt of the bed-clothes, produced unpleasant sensations. Although the debilitated and desper-

ate condition of my patient could afford scarcely a ray of hope, and precluded the possibility of a decisive experimental test of the powers of any remedy, yet I was induced during my attendance of twenty-eight hours, to administer several doses of the saturated tincture of *lobelia inflata*, at intervals of about fifteen minutes: on taking the third dose, consisting of half a spoonful, he was seized with vomiting. The efforts of retching were extremely violent, and continued without intermission for about twenty minutes, but nothing except mucus was ejected. Soon after this operation some liquid was offered him, which he received without perturbation or abhorrence, and passing it to his mouth he swallowed it without one painful emotion. With the view of imparting tone and vigour to the system, and obviating spasmodic affection, I now prescribed a liberal use of generous wine, and *balsam Peru*, to the extent of forty drops every three hours through the night. At seven o'clock the next morning, I had the satisfaction to learn that he had been in a quiet sleep without interruption during the whole night.

His pulse had now increased to seventy-three in a minute, and were more regular. A degree of warmth was diffused over his body and extremities, and no recurrence of symptoms indicative of hydrophobia were afterwards observed. Wine and balsam Peru were continued, as also two drams tincture lobelia inflata every six hours. On the morning of the 21st, his arm and hand which received the wound became entirely paralytic. He was impatient for food; after

having eat a pint of milk porridge he desired to be fed with broiled beef and bread, and with the unchewed food in his mouth he threw himself back and expired, at eleven o'clock, on the fourth day of hydrophobia.

In regard to the employment of lobelia inflata in the above related case, I was induced to try its efficacy by the recommendation of Rev. Dr. M. Cutter, a respectable clergyman, who had recently communicated to me a reputed case of hydrophobia which had yielded to the supposed powers of that medicine. Those who are conversant with the progressive stages of hydrophobia, and apprised, that, not unfrequently, an alleviation of symptoms precedes the hour of death, will perhaps be disposed to question the principle on which I ascribe merit to lobelia inflata, and inquire by what mode of action it can be supposed to have exerted its sanative powers in the above instance. Far from being tenacious of the character of this new article as a remedy in the present disease, I only contend that as an emetic it is active and speedy in its operation, that its stimulant effects are evidently diffusible, and that under the impression of its influence the nervous system may be rendered unsusceptible of spasmodic affection. Upon the principle in the animal economy, that one irritation destroys the effects of another, is it not possible that by the stimulating effects of the lobelia the irritation arising from canine poison may be counteracted? But another idea may be suggested. In describing the symptoms of madness in dogs, (page 27,

of this volume,) it was observed that if in the progress of the complaint any very great violence was offered to the animal, the disease was assuredly arrested and life considerably protracted. And a similar remark is recorded by Mr. J. Hunter, in the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, (vol. 1. p. 311.) that in two cases the panting and difficulty of breathing, as the patients called it, were remarkably relieved by running; one of them found himself relieved by running round Smithfield, which is nearly a quarter of a mile, a few hours before he died. When, therefore, we take into consideration in the case of Silvester, the extremely violent manner in which the whole frame was agitated, and the severe exertions imposed on the muscles of the mouth and throat, as well as those concerned in respiration during the efforts of vomiting and retching, induced by the medicine, we have reason to suppose, that by these means the existing spasms were resolved, irritabiltty subdued, and the integrity of the nervous system in some measure at least restored.

CASE 12.

[Taken from the Medical and Chirurgical Review, vol. 10.]

"A man was bit in the thumb by a mad dog, and, a month afterwards, came to consult Mr. Rossi, on account of the pains which he felt in the arm, in the back, and particularly in the part which had been

bitten. The actual cautery was applied to the thumb, and removed the pain; but, in a few days after, the pains returned, accompanied with symptoms of hydrophobia. The patient could not bear the sight of water without shuddering; an inflammation of the throat prevented his swallowing even bread well chewed; and he shewed a constant disposition to bite those around him. In this state he was conducted to Mr. Rossi, who, observing that he could not bear the sight of water, nor even of shining bodies, prepared in an adjoining room, a pile of fifty pairs of zinc and silver, with intermediate discs of pasteboard moistened with a solution of muriate of ammonia. He then employed strips of coarse paper moistened, as a conductor, on which he made the patient stand barefoot, and, at the moment he opened his mouth to bite, Mr. Rossi thrust into it the extremity of a conductor, communicating with the other extremity of the pile. The man appeared to suffer greatly from the operation, which, after repeated shocks, weakened him so much, that he was unable to support himself; it was then continued as he lay on the ground till he became covered with drops of sweat. This was done at two in the afternoon; and at six the next morning he went of himself to Mr. Rossi, to tell him he was completely cured, as he felt no pain, nor any difficulty of swallowing, and had lost all his aversion to water and liquids: he could not be persuaded, however, to submit again to the operation. A few days after this, upon feeling some slight pains, he was apprehensive

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LETTER XII.

CASE 13.

[From the Edinburgh Medical and Surgical Journal, vol. 5. p. 277—281.]

Case of hydrophobia, with an account of the appearances on dissection. By Henry Oldknow, Surgeon, Nottingham, England.

"On the 25th of October last, William Hill, aged forty-five years, by trade a tailor, had a portion of the scrotum torn away by the bite of a dog; at the same time he received a contusion on the thigh, close to the scrotum; and in attempting to separate the jaws of the animal with his hands, the point of a tooth penetrated the back part of one finger of the left hand, making a small wound, similar to the puncture of a small nail. There being a general alarm about mad dogs at this time, and some unpleasant symptoms existing in this dog,* it was thought prudent to take

* "It was thought at this time the dog was not mad; he eat and drank heartily, but very soon rejected the food from his stomach; he appeared lively, and shewed no signs of indisposition, except sickness after meals, but was observed to be out of temper, the day before having bit the boy who brought him his food and who generally had the care of him. This, however, was not much noticed, as he frequently had been observed to tease the animal, at those times, by pointing at him, &c. nor would the boy submit to have any thing done to him, being confident the dog ailed nothing; however it was thought proper to keep him confined. The day following, wishing to remove the dog, a very foolish and

the necessary precautions; consequently, the edge of the lacerated scrotum, (the wound being about the size of a shilling and exposing the tunica vaginalis testis) was pared away and cauterized, the contusion on the thigh and the punctured wound of the finger were cauterized only; afterwards rags wet with the aqua ammoniæ puræ were applied over the cauterized parts, until considerable inflammation was excited; so that, in a few days, a large slough was cast off from the thigh, and a small one from the punctured finger, each according to the extent of surface on which the caustic was applied. The wound of the finger suppurated very little, and soon healed; that on the scrotum and the contusion on the thigh, suppurated copiously, and healed in about a month. On the 10th of December, forty-six days subsequent to the bite, I was desired to visit this man, who I found complaining of sickness, and great oppression at the stomach, flatulence, frequently sighing, moaning, and breathing short, having great distress of countenance, and a sensation of constriction about the upper part of the throat, great difficulty of swallowing

unsuccessful attempt was made to get him into a bag, to convey him with more safety, and in the attempt the collar slipt over his head. Fearful now of some mischief, it was agreed he should be shot. The ball missing him, the report of the pistol alarmed him so much, that he sprang to the door of the yard he was confined in, and, making his escape, seized this poor man, who stood directly in his way, and did not relinquish his hold until stunned by a blow on the head, and afterwards killed. The body was opened, but no diseased appearances presented themselves; his stomach was completely filled, even to distension, with a quantity of hay he had eaten in the kennel."

liquids, the sight of which agitated him much and produced, to all appearance, a spasmodic action of the diaphragm and muscles of the glottis, similar to what is observed in hysteric paroxysms, and which was greatly increased in the attempt to swallow; he had equal difficulty in swallowing solids. On examining the wounds they were found to be healed; that on the thigh, was in part covered with a scab, which was easily separated, without tearing the new skin formed underneath; nor did the cicatrices appear unhealthy or inflamed.

"He had, however, complained, as much as four days before of a soreness, or, to use his own expression, of a sensation of roughness in the skin, about the middle of the humerus with a prickling numbness, and sometimes tremor, of the left hand and arm. It appeared, on inquiry, that the first symptoms of constitutional derangement were noticed the day preceding during dinner, at sight of which he felt great disgust; and it was with difficulty he could be prevailed on to eat, complaining of nausea, headache, and oppression at the precordia; and, in the evening, wishing to take some warm ale he saw preparing for another person, it had no sooner touched his lips than he became greatly agitated, and could not swallow more than two or three draughts. His rest was disturbed during the night, and he complained of a sensation of suffocation when lying down, so as to oblige him to keep an erect position. Notwithstanding these symptoms had existed several hours, I was

not sent for until the following morning about nine o'clock. An emetic was directed, which he took with reluctance, from the horror he felt at the sight of fluids. However, he did hastily swallow it, after many attempts, and was convulsed for about half a minute; its operation was distressing, from not being willing to drink with it. A quantity of yellow fluid was evacuated, but without relief to the stomach. Two blisters were applied to the external fauces, and two ounces of strong mercurial ointment were directed to be rubbed into the inside of the legs and arms, A consultation was appointed at twelve o'clock, at which many professional gentlemen were present, and it was further directed, that a blister should be applied at the scrobiculus cordis, another to the wound on the thigh, and one to the inner side of the arm affected: ten grains of musk, ten of carbonate of ammonia, and one of opium, to be given in the form of a bolus, every three hours, and six ounces of strong mercurial ointment to be well rubbed over the whole surface of the body. It was likewise directed, that Webb's medicine, recommended by Mr. Blane in the Medical and Chirurgical Review, should be administered, which was prepared in the form of a decoction with milk, because the poor man now felt less difficulty in swallowing liquids than solids, although the former, when taken, produced so marked an agitation of the whole frame; indeed, so incapable was he of taking any thing of substance, that the boluses

were obliged to be dissolved whenever he took them.* At six o'clock in the evening, we went again, and found our patient much worse; every symptom of the disease had increased to an alarming degree. He appeared frightened when any person approached him; spat up a considerable quantity of frothy mucus; and the constriction of the throat before spoken of, (the situation of which he described by pointing to the pomum Adami) became so distressing, that he requested the window of the room might be opened to admit more air. From this circumstance it was proposed that the operation of tracheotomy, as suggested by Dr. Rush, should be resorted to whenever the sensation of suffocation should become so urgent as to justify such an attempt for the preservation, or rather the prolongation of life. Antispasmodic clysters, with laudanum, were directed to be administered every three hours. At twelve o'clock at night, *an opening was made into the trachea*, between the thyroid gland and the sternum, but without affording any relief. The difficulty of breathing gradually increased, until about half an hour before his death, when he became suddenly relieved; he now drank, and asked for a bason of water to wash his hands in, both of which he did without expressing any unea-

* It is a remarkable fact, and worthy of observation, that the swallowing of fluids was accomplished with comparative facility, when strong pressure was made upon the lesser lobes of the ears. This expedient was suggested by a gentleman present, who recollected to have read of its good effects in lessening the difficulty of swallowing in cynanche tonsillaris.

siness, but immediately after which, sunk into a lethargick state, and died about four o'clock in the morning.

"It was observed by those present at his death, that, from the quantity of mucus collected about the glottis, respiration would have ceased sooner, had it not been for the opening made into the trachea. Not in any stage of the disease did this poor man make violent convulsive efforts of the body, nor was he ever unconscious of what passed about him. His pulse was, throughout, small, feeble, and a little irregular, averaging from eighty to an hundred beats in a minute.

"*Dissection, thirty-two hours after death.*

"The body entirely free from putrefaction; inflammation of the mucous membrane of the trachea, extending from the glottis to the subdivisions of the bronchia, and considerable mucous secretion, similar to that spat up during life; the right lung distended with air, the left collapsed; no unusual quantity of fluid in the pericardium; the heart fatty; the left ventricle distended with black blood, the right almost empty; the diaphragm free from diseased appearance; no inflammation of the pharynx or œsophagus; the stomach greatly distended with air, but void of solid contents; considerable erythematous inflammation about the cardia; the intestines somewhat distended with flatus, but healthy; the liver healthy; the gall-bladder distended with bile; the spleen, kidnies, pancreas, and urinary bladder of a natural appearance; unusual vascularity of the pia mater and

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cating the infection, which, I believe, is not generally understood.

"*Nottingham, February* 11, 1809."

CASE 14.

The history of the following case I have collected from documents communicated to me by Dr. Oliver Brewster, of Becket, and Dr. Henry H. Childs, of Pittsfield, Massachusetts. Mrs. Bush, of Washington, was bitten on her hand by a cat on the morning of 4th September, 1811; soon after which the cat seized upon one of her daughters, and fastened her teeth into the girl's clothes, but she suffered no injury. On the same day Miss Dorcas Bush, another daughter, while at her spinning wheel, and in the act of taking up a roll for the spindle, the same animal seized upon her arm with her teeth and talons, by which the limb was most severely bitten and scratched from the elbow to the wrist. About three days after this disaster, Dr. Brewster was consulted, and by his advice, both Mrs. Bush and Dorcas commenced a course of the remedy which the Legislature of New-York purchased of Mr. Crous; but Dorcas was unable to retain the medicine on her stomach, and ejected, it is said, every dose that was administered. She experienced, however, no interruption to her usual health, until 19th October, forty-five days from the accident, when, on Saturday morning, while washing her hands in cold water, she was seized with a sudden chill, which extended from her hand which

was bitten, to her shoulder, succeeded by some slight pain in the limb. During the two following days, she experienced more frequent rigors, with increased pain in her arm, shoulder and head, and to these symptoms, an inflammation and swelling of the arm and slight fever supervened. Tuesday all the above described symptoms prevailed, and were constantly becoming more and more alarming. In the evening she was visited with sharp pain darting from the axilla to the breast, and it was now perceived that she started backward with horror at the sight of any liquid. Unconscious of her hazardous situation, and reposing in confidence in the preventive course which had been employed, they had hitherto dispensed with medical assistance. But on Wednesday morning the attendance of Dr. Henry H. Childs was requested. A momentary agitation, with a deep sigh, and laboured respiration were manifested on his arrival, but she soon became collected, and conversed with calmness. Her system was now so exquisitely susceptible to the effects of external air, that the least breeze occasioned by the motion of the bed-clothes excited very distressing sensations, and she was terrified with the apprehension of immediate suffocation. She was also severely affected with spasms, and a sudden starting and throwing her head backward were constantly excited when in the act of deglutition. Her motions were extremely rapid, and when liquids were presented to her, she would instantly seize the cup as it were spitefully, and open her mouth and throw the drink down with the greatest agitation and eagerness.

She was exercised with severe pain in her arm, breast, head and stomach, and her pulse was quick, small, and hard. During the two preceding nights she had no sleep and swallowed but little nourishment. Under circumstances so obviously hazardous, Dr. Childs with commendable boldness, resolved on a course of mercury in doses proportioned to the violence of the disease and the strength of the constitution. With sub-muriate of mercury, he occasionally conjoined opium, and of the former he directed from fifteen to twenty grains every two hours, and a considerable quantity of ungt. cærul. was rubbed into the wounded arm. He is not definite respecting the precise quantity of mercury administered, but the course was persisted in during twenty-four hours, and an increased discharge of saliva was induced. An alleviation of the most prominent symptoms is said to be the consequence, the spasms were diminished both in frequency and severity, her pains were abated, she enjoyed some sleep, and afterward indulged in amusing conversation. This suspension, however, afforded as in numerous other instances, only a delusive hope of a few hours continuance. The harbingers of death were insidiously approaching; the most formidable symptoms above described soon returned with augmented violence, delirium succeeded, and death closed the scene on the sixth day from the attack of the symptoms.

It is truly unfortunate for medical science, that this awful disease is so frequently suffered to progress to its last stage before application is made for

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time I received the injury, I began to feel some indisposition; the wound on my hand was inflamed, and attended with some pain. In the evening, I had chills, headache, pain in the limb on which was the scratch, soreness in the axilla, nausea and fever. I bathed my feet in warm water, took some vinum antimonii, and went to bed, but was very restless through the night. In the morning, bright red streaks were to be seen extending from the hand along the arm, to the shoulder, and from thence to the region of the stomach. I took an emetic, which had but little operation, notwithstanding repeated large doses. Apprehensive that my sickness proceeded from the poison of the saliva of the hydrophobous patient, I had recourse to the mild muriate of mercury, as the medicine on which I wholly relied. I began by taking from one to five grains every hour, thinking a salivation would be induced sooner, and with more safety, than if larger doses were taken and not so often. This course was pursued four or five days, without effecting the desired change in the system, and the disease was progressing with more and more alarming symptoms; such as frequent spasms of the stomach, which produced some vomiting and a most distressing retching to puke, an obstinate costiveness, a quick tense pulse, great sensibility to cold air, a difficult respiration, sighing and catching for breath; the least agitation of the air, even the motion of the bed-clothes, would produce distress and fearful apprehensions of suffocation. The region of the stomach, or rather the stomach itself, seemed to be

the principal seat of the disease. A distressing burning sensation, and sometimes a deathlike faintness, were among my sufferings and increased my fears. The constant stimulus of blisters seemed absolutely necessary to support life, and upwards of twenty were applied. The warm bath was also used several times with some benefit. The doses of mercury were now increased to twenty-five grains, and frequently repeated, and a considerable quantity of ungt. cærul. was also applied. Wine and brandy were taken freely during the continuance of the disease, but little opium was employed. To these powerful remedies the disorder finally yielded, but notwithstanding the large quantity of mercury taken, no salivation was induced, nor any cathartic effect procured. Small glandular swellings, of a singular appearance, totally different from those tumours which frequently succeed to fevers, appeared on different parts of the body, particularly in the inguinal glands; those about the neck were also considerably enlarged. I was confined to my bed about twenty-five days, and left my chamber in thirty days, from the attack. I think I can reply to your query positively, that imagination had no share in influencing the disease, the reality of which was demonstrated in all its stages.

"P. S. Having shewn this statement to some who attended me, they are of opinion, that I have not described the affection of the stomach sufficiently strong. In consequence of the affection of the brain, which approached near to derangement, I do not recollect exactly the effects of the disease upon the

stomach, excepting that of extreme horror and distress. The spasms, it is said, were more severe than in the case of the hydrophobous patient who died."

The case of Dr. Childs is particularly interesting, and in various points of view, deserving of the most serious consideration. That he exhibited many emblems of the disease arising from canine poison, is incontestably true, and if it be also true, that he did not experience that horror and dread of water, which in general designates the affection termed hydrophobia, it is well understood that this circumstance is not in every instance a criterion of the genuine disease. How far the intervention of a human subject may mitigate the virulence of the canine poison, no one will pretend to determine. If, however, the case under consideration should be received as a well defined example of the specific disease proceeding from canine poison, through the medium of a human subject, it will probably favour the conclusion, that such circumstance will essentially modify and diminish its violence and fatal tendency.

The Hon. Timothy Childs, father of Dr. C. with whom I have lately been favoured with an interview, having attended with great solicitude upon his son during his severe illness, corroborates the foregoing statement in all its particular circumstances, and farther testifies, that himself and Dr. Towner, who was also consulted, were decided in the opinion that the disorder proceeded from the poisonous saliva of the hydrophobous patient. He also assured me, that he

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matter which will have the same properties." And in a point which has not been the subject of much controversy, an insulated fact may suffice. If, therefore, the melancholy position be admissible, that the saliva of hydrophobous patients bears a strong affinity with that of rabid animals, and is capable of affecting the human system in a similar manner, no arguments need be used to induce the proper precautions against the occurrence of such disastrous events.

The morbid matter from putrid bodies and from syphilitic ulcers, when by accident introduced under the cuticle, have been known to produce anomalous diseases of the most alarming and fatal nature, to which dissecters and others are frequently exposed.

LETTER XIII.

EXAMINATION OF SPECIFIC REMEDIES, AND OF THE VARIOUS MEANS OF PREVENTION AND CURE.

No subject in the sphere of medical science, no malady with which the human species is afflicted, exhibits such singular phenomena, and such inexplicable incidents, as does the fatal disease which we have been investigating. That it ever bears imperious and uncontrolable sway, we have the testimony of all records, both ancient and modern, to ascertain. Amidst all the variety of hypotheses which have prevailed at different periods, the mode of treatment has in reality improved but inconsiderably during a succession of ages.

Destitute of experimental theory, the healing art could make no considerable progress, and medical skill, like all other distinguished acquirements, can only attain to excellence by frequent and diffuse practice, and by those only who know how to submit themselves to the dictates of observation.

The remedies employed for the cure of this disease, are properly divided into two kinds.

1st. Those which are directed with the view of preventing the attack of the disease, after the infection has been communicated to the body by a rabid animal.

2d. Those which are intended to counteract or overcome its effects after the disease has actually appeared.

It is incumbent upon me, in this place, to impart to you the sorrowful truth that genuine rabid hydrophobia has not frequently, if in a single instance, admitted of a radical cure. As to those cases which have been reported, as successful examples, the result of particular investigation has shewn that the authors had mistaken a pigmy for the great Goliath, which they imagined they had successfully encountered. They have shouted victory when they had not occupied the appropriate ground of contest. Hence the necessity of a clear and accurate discrimination between this and other apparently similar diseases.

There is much reason to suppose, that various affections of an essentially different nature, have on many occasions been confounded with it, merely because an aversion to water has been observable at some period of the disorder. The most essential part, therefore, of the treatment evidently consists in the proper employment of the means of prevention, and to this point, we ought, in every instance of the accident, to direct our immediate attention, as being the sheet anchor, the only real ground of safety. But I anticipate your inquiry, whether there can be any utility in the administration of internal medicines, to avert the attack of a disease at a future period, when its subtle poison has already been instilled into some part of the system? Dr. Mease expresses an opinion, that internal

preventive remedies are useless, as the system cannot be kept under the impression of any remedy, during the long interval, to a degree sufficient to counteract the effect of the canine poison.

The limited knowledge which I possess of the laws of animal life, and of the chemical properties of medicine, will not authorize an attempt to controvert this postulatum. But had the unknown facts been asserted half a century since, that both the variolous and vaccine virus were capable of affecting such a change in the human system as to render it unsusceptible of the impressions of each other reciprocally, or that less than one grain of arsenic would speedily remove the morbid impression of a tertian ague, which had for many months preyed upon the constitution and resisted the efficacy of all other remedies, it would have met the contemptuous sneer of every theorist, as the chimera of an empirical and visionary fancy. These facts, however, are now received even by the scientific physician, as the really important axioms of truth, the invaluable acquisitions of practical experiment. It will not be denied, that preparatory and preventive medicines have constituted a part of some of the most popular systems that have existed, and that on various occasions, such antidotes are indispensible for the purpose of assuaging the anguish of a tortured mind and suspending its pernicious effects on the general system. Nor do I think the belief unwarrantable, that whether wafted by the tide of circulation, or diffused by the supremacy of the stomach, the influence of in-

ternal medicines may be determined to a local part, as well as to operate more extensively upon the nervous system in general. But the practice resulting from the opinion, that a medicine may possess properties applicable to various diseases, or to the same disease, in all the diversity of constitution and circumstances, I consider as a palpable absurdity. The immense variety of antidotes and specific remedies palmed upon the public, as preventives of the effects of canine poison, is a striking proof of the imbecility of the human mind, so prone to cling to a shadow as the refuge of indolence, rather than search diligently for the salutary precepts of substantial truth. Although the boasted specific is known to originate from a source of ignorance and superstition, and its properties unascertained by adequate proof, yet if an air of inscrutable mystery be assumed by its author, no one attempts to extort the secret of the virtues which it is pretended exclusively to possess, and of course, every new remedy glitters like meteors for a season, and during the continuance of the fashion its reputation is considered inviolable, and its infallible efficacy unquestionable. In order to explain this mysterious state of things, it must be recollected, that hundreds of persons are bitten by dogs reputed to be affected with rabies, who sustain no material consequent injury from the accident, although all prophylactic means are neglected. Dogs may and frequently do manifest many of the distinctive symptoms of rabies, when their indisposition proceeds from causes of a very different nature; but being

pursued and provoked, they are incited to give a bite in their own defence. In another instance, a dog actually affected with canine madness inflicts a bite upon twenty persons, nineteen of whom were defended from the poison by their clothes, boots or shoes, by which every particle of the poisonous saliva was wiped from the teeth of the animal, before it could be instilled into the wound: besides, the system may not, at that moment, be in a state susceptible of receiving the infection, as we sometimes see in the instance of inoculated small-pox. Now, on the supposition, that nineteen of these sufferers have recourse to some charm or other popular remedy as a preventive, and eventually escape the consequent disease, while the other person who neglects all precautionary means or antidotes should be attacked with hydrophobia; there ever have been some credulous enough to admit such examples as indubitable tests of the efficacy of any ridiculous remedies which may have been employed, believing with the facetious poet, that,

"No argument like matter of fact is."

But no opinion can be founded on a more visionary basis, for such assumed matter of fact favours equally the ignorant empiric, and medical philosopher, and comes in aidance of every vaunted nostrum, however absurd and ridiculous.

While these progenies of ancient times continue to confound our views, vain is every attempt to progress in knowledge by practical experiment. I shall now with some confidence commence an examination of the

merit of particular remedies, and endeavour to denounce all such as, from ample experience, have been found to possess no efficacy, that they may be forever exploded. If unable to point out to you the most successful course, I will not intentionally mislead, but designate, at least, every known path which ought to be avoided. From the earliest ages, mankind have never been without some boasted specific, which was pretended to be an infallible antidote against this formidable disease, till fatal experience demonstrated its total inefficacy. I shall enumerate only a few samples from among the ample variety of which the old catalogue of prophylactics consisted; such as the liver of the mad dog broiled, the ashes of the river cray fish burnt with the twigs of bryony, the powders of oyster-shells and of calcined egg-shells; the lesser sage, vervain, centaury, plantain, polypody, wormwood, rue, and the red-blossomed mulberry tree. These have long since given place to others which claim some attention as being the invention of more modern times. Bathing in the sea and drinking sea water, but more especially violent immersion even to danger of drowning, and exciting alarming apprehensions in the patient, was for a time a very popular expedient, and accounted by some a certain preventive of the disease. The famous East India remedy so universally known by the name of the *Tonquin medicine*, and called also Sir George Cobb's powder, is composed of musk and the two cinnabars, but by many years experience it has been proved to be totally destitute of utility.

Among the numerous fatal disappointments, Dr. Mease mentions the son of Admiral Rowley, who was attacked with hydrophobia during the use of it, and says that our books of medicine abound with many other instances of its failure. The celebrated powder of *palmarious* consists of the leaves of ten or twelve insignificant plants which I need not describe. The long famed *pulvis antilyssus* of Dr. Mead, is composed of the lichen cinerius terrestris, or ash coloured ground liverwort, and black pepper. But the renowned compound called the *Ormskirk medicine*, consisting of chalk, Armenian bole, alum, elecampane, and the oil of aniseeds, in due proportions, poised for half a century on the pinnacle of fame, combating, as supposed, successfully, the shafts of death when presented in the shape of rabies canini; its prosperous career, however, is now finished, and its powers and fame with those attached to the preceding farrago are alike disregarded.

The medical journals of our own country furnish numerous accounts of specifics of a similar nature, which ought next to arrest our attention. One of the most famed of this description, is a common plant of our country, *anagallis arvensis*, or common pimpernel or red chickweed. This article had acquired such universal reputation, that the highest medical authorities in Europe did not disdain to bestow on it their unqualified applause, and according to Dr. Mease, (Dom. Encyclop.) "crowned heads and republics have passed laws to preserve the plant from destruction; and learned Doctors have celebrated in classical Latin its imaginary virtue, in preventing the effects of

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drachm and one scruple. For a beast double that quantity. He assured the committee that he has given it to persons many weeks after they were bitten, never gives more than a *single dose*, and that, during his very extensive practice of upwards of thirty years, he never knew it to fail in a single instance. The committee consulted on the occasion, the Rev. Dr. Muhlenburg, an excellent botanist, who is acquainted with the plant, and says that in Germany he understands the usual dose is thirty grains of the powder, taken four times in a day, and continued one week in smaller doses; the wound washed with a decoction of the herb and some of the powder strewed in it. Mr. K. has received no other compensation for the secret, than the honourable mention of his patriotic conduct by the Legislature, and the event has proved that neither party can boast of advantage or acquisition, for a considerable number of cases have since occurred which demonstrate the entire inutility of the remedy.

From the several instances of its failure, recorded in Pennsylvania and other parts, not the smallest confidence can be reposed in the virtues of this so extensively celebrated article. Its praises should, therefore, be no longer proclaimed in the United States.

Webb's Medicine.

Whatever may be the standing of the Webb family, or whatever be the real merit of their noted remedy, it is entitled to some consideration, in as much as it is now ushered into the world and patronized by Mr.

Delabere P. Blane, a celebrated veterinary surgeon of London.

This gentleman having been attracted by the popular current on which the fame of Webb's medicine was suspended, deemed it incumbent upon him, to announce some leading facts and observations calculated to incite more particular inquiry relative to what, as he observes, may eventually prove an important discovery. His production appeared in the Medical and Chirurgical Review (December, 1807), and has since been copied into American almanacks and newspapers. Mr. B. observes, that in his profession, as veterinary surgeon, numerous cases of canine madness had fallen under his notice, and, of course, had witnessed scenes of a melancholy and distressing nature from the alarm and danger, occasioned by the bite of these animals. Information was communicated to him by a gentleman of great respectability, that the Webb family had dispensed, for more than a century, a sort of cake, or a liquid, that was considered a certain remedy for the bite of a mad dog, and which he had, during a residence on the spot of thirty-five years, repeated instances of witnessing the efficacy of, and never heard of an instance of its failure; and throughout the neighbourhood, no fear was entertained of canine madness, either to the human subject, or brutes, from the general faith that was placed in Webb's medicine.

Mr. Blane having, as he observes, been regularly educated a medical practitioner, was, at first, too

ready to give little credit to a recipe dispensed by the hands of an ignorant peasant; but reflection and experience corrected his bigotry, and taught him that the greatest discoveries have been the effect of chance, and that this would not be the first instance where the most extensive benefits had remained in obscurity for the want of some fortuitous circumstances to bring them to light. He now particularizes several striking instances, and says he could relate many other circumstances that are, at least, presumptive proofs of the efficacy of the medicine in question. As additional and convincing proof of his confidence in the virtues of the remedy, Mr. Blane mentions his having applied to Webb for his medicine in his own case, after being unfortunately bitten by a dog in the last stage of madness, though he did not neglect to apply the excision and the potent cautery at the same time.

The original recipe of John Webb, as given by a *lady to his grandmother*, 150 *years since or upwards*, was at length communicated and attested upon oath before a magistrate, by James Webb, son of the above John Webb, deceased. Mr. Blane having put the remedy to the fair test of repeated practical experiment, without disappointment of his sanguine expectations, permitted the result, with his opinion, to be published in Ree's Cyclopedia, and from that splendid work I extract as follows:

"We know of no instance of the complaint being cured, but we can name a preventive, which, from the experience of a long course of well conducted exper-

iments, we can pronounce as *certainly* efficacious. Out of more than ninety animals, as horses, sheep, swine and dogs, one only has gone mad to whom this remedy has been administered, and this failure did not occur under our own immediate inspection, so that it might have been wasted or brought up, or not properly prepared. The remedy, as prepared by us, is as follows:

"Take of the fresh leaves of the tree-box, two ounces; of the fresh leaves of rue, two ounces; of sage, half an ounce. Chop these fine and boil in a pint of water, to half a pint, strain carefully, and press out the liquor very firmly; put back the ingredients into a pint of milk and boil again to half a pint, strain as before; mix both liquors, which forms three doses for a human person: two thirds the quantity is sufficient for a large dog, and half for a middling size. Three doses are sufficient, given each subsequent morning fasting; the quantity directed being what forms three doses. As it sometimes produces strong effects on dogs, it may be proper to begin with a small dose; but we hold it always prudent to increase the dose till effects are evident, by sickness, panting, and uneasiness. In the human subject, where this remedy appears equally efficacious, we have never witnessed any unpleasant or active effects. Almost forty persons have taken this remedy, and in every instance it has succeeded as with animals; other means however had been used with many of them, as the actual or potential cautery; but in all the animals other means were purposely omitted.

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from the human body; that when applied, the stone will adhere like a leech to the bitten part, nor lose its hold till its numerous pores are literally glutted with the liquid poison. A case intended to corroborate this doctrine, is recorded by Mr. William H. Harding in the Medical Repository vol. 4. hex. 2. He relates that his child received a bite from a dog supposed to be affected with rabies. The snake stone was applied (in due form and full faith no doubt) by which every particle of poison was extracted, and no ill consequences resulted from the accident. Dr. Mease has in the Medical Museum (vol. 5. p. 1,) with his usual freedom and good sense, animadverted upon the unreasonable prejudice in favour of this popular but fallacious expedient. He informs us that in India such stones are very common, and the credulous natives believe, most firmly, in their preservative powers against the effects of the bites of venomous snakes. The author of the "Wonders of Nature and Art," says Dr. Mease, thus notices these stones in the account of Tonquin. "Persons who happen to be bitten by serpents, press out the blood, and apply a small stone, called the *serpent stone*, which is said to possess the miraculous power of drawing out the poison. When impregnated with the venom it drops off like a leech. It is then carefully washed with milk and water in which lime has been diluted, and on a second application to the wound, it exhales all the virus so completely, that in less than an hour, the patient becomes perfectly free from pain." "Two of these

stones," adds Dr. M. "are in the cabinet of the Philosophical Society, and another one is in my possession, all of which were brought last year by a gentleman from India. They are rather more than an inch long, and about five sixteenths of an inch broad, of a bluish or slaty colour and flatish shape." Several other of these stones have been announced in the public papers, as being in the possession of different individuals at Washington city and the states of Pennsylvania and Virginia. But Dr. Mease adverts to a singular speculation, by Mr. Micow of Virginia, who being a proprietor of a serpent stone, proposed to dispose of it for the moderate sum of two thousand dollars, in divided shares of ten dollars each.

Such was the avidity with which this rare opportunity was embraced, that the proposed number of shares was filled up in a few weeks by the inhabitants of four or five adjacent counties, and at a meeting of the stockholders for the purpose, the precious catholicon was deposited in the hands of Dr. Brockenbrough, of Tappahannock, as a central spot, whence it might be most readily obtained on every alarming occasion.

Thus has Mr. Micow realized the generous sum of two thousand dollars, and to Dr. Brockenbrough is assigned the honour of displaying to the gazing multitude the fascinating powers of the snake stone of Virginia! No person presumes to call in question the reputed attributes of this great specific, for it rivals in power the *metallic tractors*, and sets in equal defiance the venom of rattle-snakes and the slaver of mad dogs.

Having attracted all the venom from every part of the system to one spot, it then absorbs it into its own voracious pores, and leaves the exulting patient in perfect security. And who shall controvert the positive assertions of the credulous even though they ascribe to an air bubble the weight and solidity of a mountain? From a particular investigation of the subject, Dr. Mease affirms that the dog, which bit Mr. Harding's child, was not mad, and of course derived no benefit from the application of the stone, which he is confident, possesses none of the virtues ascribed to it.

The deception with respect to the supposed efficacy of these stones, and of all other preventive remedies, arises, he says, "from the following causes; first, from the snake giving the bite not being venomous; second, from the dog not being mad; third, from the wound, whether from snake or dog, being made through clothes or leather; fourth, from the known and established fact, that not one in twenty persons who are bitten by dogs actually mad are ever attacked by the disease. Any remedy applied under such circumstances would obtain the credit of prevention, though not in the least entitled thereto."

LETTER XIV.

CROUS'S REMEDY.

THE documents which I am now to introduce, are calculated to excite curiosity, whatever may be your impressions respecting the utility of the subject. It appears that Mr. Crous was in possession of a secret composition, which he avowed to be a never failing remedy in canine madness. The Legislature of New-York, in the spirit of philanthropy and benevolence, resolved to purchase the secret for the benefit of the community. The strength of evidence adduced in support of his claim, or of the real efficacy of the composition, is unascertained, but the particulars of the transaction are in the following form.

"STATE OF NEW-YORK.

"*Comptroller's Office.*

"Pursuant to the direction of an act, entitled, 'An act for granting a compensation to John M. Crous, for discovering and publishing a cure for the canine madness,' passed the second day of February, 1806, I do hereby certify, the said John M. Crous hath this day deposited in this office a certain writing, purporting to be the remedy used by him with certain success, for more than twenty years past, for the cure of the hydrophobia, or canine madness, which writing is in the words and figures following, to wit:

'*Cure for the bite of a mad dog.*

'The following is an account and prescription of a cure for the hydrophobia, or canine madness, made by John M. Crous, in conformity to an act of the Legislature of this state of New-York, passed in their present session, viz.

'1st. Take one ounce of the jaw-bone of a dog, burned and pulverized, or pounded to fine dust.

'2d. Take the false tongue of a newly foaled colt; let that be also dried and pulverized; and,

'3d. Take one scruple of the verdigrise which is raised on the surface of old copper by lying in moist earth: the coppers of George I. or II. are the purest and best. Mix these ingredients together, and if the patient be an adult, or full grown, take the common tea-spoonful a day, and so in proportion for a child according to its age, one half of the copper of the above kind, if to be had; if not, then a small increased quantity of any baser metal of the same kind: this to be taken in a small quantity of water.

'The next morning, fasting (or before eating), repeat the same as before. This, if complied with after the biting of the dog, or before symptoms of madness, will effectually prevent any appearance of the disorder; but if after the symptoms appear, a physician must immediately be applied to, to administer the following, viz.

'Three drachms (or 180 grains) of verdigrise, of the kind before mentioned, mixed with half an ounce of calomel, to be taken at one dose. This quantity the

physician need not fear to administer, as the reaction of the venom then diffused through the whole system of the patient, neutralizes considerably the powerful quality of the medicine.

'Secondly, if in three hours thereafter the patient is not completely relieved, administer four grains of pure opium, or one hundred and twenty drops of liquid laudanum.

'N. B. The patient must be careful to avoid the use of milk for several days after taking any of the foregoing medicine.

'JOHN M. CROUS.

'*Albany ss.* John M. Crous being duly sworn, deposeth, that the above account and prescription for the remedy and cure for the hydrophobia or canine madness, is a just and true account and prescription, and the only one used and practised upon himself more than twenty years past, and which has not failed of perfect success in any instance of the vast number of unfortunate human beings who have been bitten by mad dogs, and who have applied to him, the deponent, for relief. 'JOHN M. CROUS.

'Sworn, the 24th day of March, 1806, before me, James Kent, Chief Justice, &c.

'J. KENT.'

Given under my hand at Albany, the 25th of March, 1806. ELISHA JENKINS, *Comptroller.*"

We have now seen the remedy legally authenticated, and we have the affidavit of Mr. Crous as the foundation of our faith relative to its efficacy. More confidence, however, might have been inspired, had the deponent adduced even a solitary instance of its having been successfully employed. I suspect not his integrity, but the fallacy of his inferences. The people of the state of New-York, I learn, are taxed to the amount of $1000 to compensate Mr. C. and the acquisition as announced in the public papers might be imagined to impart a magic power to look a whole kennel of mad dogs out of countenance, and doom them to expend their venom like rockets in harmless explosion. For though the jaw-bone of a dog, the false tongue of a newly foaled colt, with the verdigrise from the copper of George I. or II. should prove palpably ineffectual, another resource remains; Mr. C. will consign the patient into the hands of the Doctor, with only a positive injunction to administer, (whatever may be his particular constitution or circumstances), *three drachms of verdigrise with half an ounce of calomel!* Much as you might pride yourself in being instrumental in rescuing an individual from the horrors of hydrophobia, you would not readily hazard your reputation by adopting the indiscriminate and very absurd practice recommended by Mr. C. and force into the human stomach such enormous quantities of the most active of all medicines. Notwithstanding, however, the singular composition in question, as a specimen of nonsense and quackery, will justify every degree of ridi-

cule, yet it must be allowed that copper, the chief ingredient in it, is an highly active substance, and entitled to some confidence as a curative remedy in hydrophobia; I shall therefore take occasion to advert to it again hereafter. It is proper to introduce in this place, the remark of David Hosack, M. D. a respectable medical professor at New-York, respecting the remedy of Crous. In a letter addressed to Dr. B. Lynde Oliver, of Salem, the Professor says, "The remedy which of all others I should be inclined to try upon any patient of mine, is that of Crous, purchased sometime since by the state of New-York; you know that, excepting the calomel, its chief ingredient is copper: all the other accompaniments I consider as so much quackery. But in the use of copper I confide, because it is among the most active articles of the materia medica, as we see in epilepsy, and many other diseases of the nervous system, in which it has been successfully administered: add to this, that the evidence upon which Crous' remedy was purchased, was very respectable, as I have been informed personally, by Governor Lewis. Analogy also sanctions the principle, that nothing short of an active medicine, or poison if you please, can prove the antidote to that of hydrophobia. Was I myself the subject of the disease, Mr. Crous' remedy should be tried as far as copper is concerned. We surely could not take into our system so much of this metal, and in the manner administered, without evil consequences when in health. I therefore conclude that the one irritation is expended

in counteracting the other. Let us then not despair of administering some stimulus calculated to arrest that of hydrophobia." *Med. and Philos. Register, vol.* 1.

To those who are acquainted with the deleterious properties of copper, it will seem scarcely credible that the human stomach should be so far depraved as to receive with impunity three drachms of verdigrise prepared from that metal; but I shall detail from respectable authority, some valuable particulars relative to the properties and effects of that active substance. "Dr. W. Saunders observes in his lectures on the materia medica," says Dr. Parr, (London Med. Dictionary,) "that all solutions of metals are sedative or ease pain, provided that the solution is not too strong; metallic astringents are more active than alum, more powerful, more easily and more quickly dissolved in the stomach; are more diffusive and extensive in their influence on the habit, and to be preferred when speedy effects are to be obtained. Of all the metals, copper is the most astringent and most soluble in the stomach, but the dose is difficultly ascertained, because of the uncertainty of acid in the stomach, so that it is rarely used. Dr. Saunders observes that an over dose of ærugo æris (verdigrise) is an active stimulant and astringent, and so quickly proves emetic as to be thrown up before it hurts; that an under dose excites a nausea."

"Dr. G. Fordice advises us to avoid cupreous preparations when the intention is to strengthen, but when it is designed to lessen irritability, he observes,

they are extremely useful, particularly in hysterical cases, attended with plethora, and in epileptic spasms. 'Of verdigrise,' says Dr. Parr, 'large portions as four drachms or more have been swallowed without any other inconvenience than the present vomiting, yet in smaller quantities besides the vomiting, it excites a pain in the stomach and griping in the bowels, tenesmus, ulcerations, bloody stools, difficult breathing and contractions of the limbs, which often terminate in death.' If copper is swallowed in its pure state it is inoffensive."

SCUTELLARIA CATERIFLORA.

The following communication, published in the Medical Repository, Hex. 3. vol. 2. and politely forwarded to me by Mr. Bowne, contains, it is presumed, all the particular information in the possession of that gentleman respecting the scutellaria. It must here be observed that there are various species of scutellaria indigenous to our country, and both in Mr. Bowne's publication and the American New Dispensatory, this article is erroneously termed scutellaria galericulata, whereas, it is now ascertained that the species employed by the Lewises and described by Mr. Bowne is the cateriflora, which has small flowers, and those in a racemus, intermixed with small leaves, and of which the annexed engraving is an accurate delineation. The species galericulata has axillary flowers in pairs and large corollæ.

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"RESPECTED FRIEND,

"HAVING observed in the Evening Post, of the 4th instant, a communication taken from a Salem paper of the 1st, respecting a mad dog which made his appearance in Haverhill, and bit several persons in that neighbourhood, I conceive it of importance to make known what I believe to be a specific preventive of the canine madness, and a certain antidote against the poison by which it is produced.

"The remedy to which I allude, has been made use of with great success, by a poor man of the name of Lewis, a resident of West-Chester county, in this state. It was known to his father many years since, and kept a secret in the family for a very considerable time. Whenever a mad dog appeared in the neighbourhood of Mamaroneck, or the Purchase, and bit either man or beast, it had long been the custom, previous to the secret being made public, to send for Lewis, or his father, who, from long experience, it was well known, would, by administering a single powder, destroy with certainty the poison, and effectually secure the animal or person that had been bitten.

"It has too often happened that dogs, supposed to be mad, but not actually so, have bitten persons, to whom reputed preventives have been given, and no ill consequences resulting from the bite, whatever might have been administered obtained the reputation of infallible efficacy. From the failure of these, in several instances, people generally had but little confidence in the powder used by the Lewises, until convinced by

actual experience of its efficacy. Instances have, I am told, occurred of several animals being bitten by dogs considered to be mad, and the Lewises, when applied to, have, in order to prove the value of the medicine, requested the owners of the animals to place one apart; which being done, they saved all the rest; and the one so placed apart, died with every symptom of the hydrophobia. This circumstance, if true, and from the result of the inquiries I have made, I believe to be so, places the character of the remedy made use of by them, beyond a doubt. I have had frequent opportunities of speaking to a number of persons well acquainted with the younger Lewis, and who had particularly observed the course he pursued in various instances; and they all concurred in expressing their full conviction of its efficacy. The remedy he makes use of is a plant that grows in the fresh meadows of our country; the botanic name of which is *Scutellaria.* In the Domestic Encyclopedia, it is mentioned under the name of *Scullcap*, and is there so fully described, that it may be known without difficulty. This plant Lewis used to gather dry, and reduce to a powder, in order to prevent a discovery of what it actually was. It was found out by John Ferris, of North-Castle, who obtained some of it from him, in a powdered state, and observing seeds in it, planted them in his garden, where they came to perfection: since then, James Mott, or one of his family, in order to remove every doubt as to the certainty of the plant produced from the seed being of the kind actually made use of by

Lewis, gave him five dollars to show it, and it proved to be the same.

"Among the number of cases in which it has been applied with success, it may not be necessary to mention more than the following one; the relation of which I had from the persons hereafter mentioned, of whom I purposely inquired the particulars. Uriah Field, father-in-law to Richard Mott, had a few years since some of his family, and a number of his cows and hogs, bitten by a mad dog. Being fully satisfied that the dog was mad, he sent immediately for Lewis, who, when he came, furnished him with a quantity of the powder before described, and directed him to make a tea of it, and give it to the animals two days in succession, in any mess they were fond of, and, on the day intervening, a small proportion of brimstone. This course was adopted, and continued for three or four weeks. It happened that, before the termination of that period, he disposed of one of the cows to a neighbour, who knew it had been bitten: he gave him some of the powder, with directions not to fail administering it to the creature; this, however, through carelessness, was neglected; and the consequence was that it went mad and died, while all the others continued perfectly well.

"About two ounces of the herb, when reduced to powder, and divided into several portions, is sufficient to secure man or beast, if administered in time. I cannot learn with certainty, whether if not given until the hydrophobia commences, it will have the desired

effect. It is difficult, if not wholly impossible, when the disorder has arisen to a height that indicates its nature, to induce the patient to take any kind of liquid whatever: indeed, in most cases, when it is presented to them, they are seized with violent, spasms, and fall backwards, strongly convulsed. To attempt forcing them, in that state, to received it, is attened with great danger. I am credibly informed that a man in New-Jersey, endeavouring to give a drench to a cow which shewed strong symptoms of the hydrophobia, died from the poison communicated by the saliva of the animal falling on a wound he some time previously had received in his hand. It is therefore best to administer it as early as possible; though it has, in some instances, been deferred until the patient has shewn signs of illness, and then effected a cure. In cases of this nature, the decoction of the herb should be given stronger than in others.

"In the instances which have come to my knowledge of animals, bitten by mad dogs, the period between the time they were bitten, and the commencement of the hydrophobia, varied very considerably: in some, the effect of the poison was discernible in a few days, and in others, not under two or three months.

"Perhaps thou mayst have some difficulty in obtaining a copy of the Encyclopedia, to which I have referred, for an account of the plant. The following description will probably enable thee to discover it, if growing in your neighbourhood.

"It is perennial, and flowers about the middle or latter part of summer; its stem is square; the leaves

come out opposite each other, and the seed-stem is within the leaf; it bears a small violet-coloured blossom, and grows from one to three feet high, according to the richness of the soil.

"I am informed by a person acquainted with the family of the Lewises, that the old man came to the knowledge of this remedy by being bit by a mad dog, and hearing of an old German, who was famous for counteracting the effect of poison, he applied to him, and by his assistance escaped the danger he had incurred; and obtained from him, in confidence, the secret of the means by which his security was effected.

"Thou mayst be fully assured, that every circumstance which I have stated, respecting this remedy, I have the greatest confidence is correct. My information has been derived from the most respectable sources; from persons of probity, who were eye-witnesses of the facts which they related; and I have no doubt, but that, in a very short time, I could collect more than one hundred instances of security, effected by the Lewises, since the remedy came to their knowledge. My confidence in the virtue of this herb is so great, that if bitten, I would trust my life to it, rather than to the skill of all the physicians in this city. Indeed, generally speaking, they are, I believe, honest enough to confess that they know of no remedy for the disease communicated by the bite of a mad dog.

"Shouldst thou be inclined to make public any part of this letter, make such extracts from it as thou mayst judge proper, not unnecessarily mentioning the names

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a friend of mine at Salem, (an extract of which appeared in several papers,) I now inclose you the same, with the testimony of William Coleman attached thereto, as inserted in the Evening Post. In addition to what was then communicated to the public, the following may be added.

"Samuel Wilson, a very respectable farmer, living near Croton River, West-Chester county, assures me that about twelve years ago several of his creatures were bitten by a mad dog; at the same time his neighbour, Daniel Underhill, had two hogs, Nathaniel Smith, one cow, and Edward Mead, five hogs bitten; all of which died of hydrophobia, except the hogs belonging to Mead, who sent immediately to Lewis (having faith in his prescription) and got a quantity of Scullcap, and administered it to them agreeably to Lewis's direction, by which means he saved their lives.

"Colonel Rutgers, of this city, has informed me that he had one of his family bit by a mad dog about seven years ago. One evening, the person alluded to, hearing a noise in the yard, went to the door with a view of ascertaining the cause, when a strange dog instantly attacked him, and inflicted a wound in his face. Colonel Rutgers sent immediately for Lewis, who came down and staid with the person eight or ten days; during which time he caused his patient to take some of the Scullcap-tea, each morning, fasting, and left directions for his medicine to be taken in the same manner for several weeks.

"The Colonel rewarded Lewis generously for his services, and the person continues well. One of the Colonel's dogs was also bitten at the same time, which soon after disappeared, and has not been heard of since; a strong evidence that the strange dog was actually mad.

"An unusual number of dogs went mad the last season, in various parts of the country; and frequently hearing that Dr. Vandeveer, a physician of eminence in New-Jersey, who lives on the Rariton, near Somerset old court-house, was in the habit, and had been for many years, of administering to persons bitten by mad dogs, with the tea of a certain herb, I was desirous to ascertain whether it was the same as that made use of by Lewis. For this purpose I went over to Rahway, and the result of my researches was, that the herb Dr. V. makes use of is precisely the same as that prescribed by Lewis, which I clearly ascertained by comparing it with a drawing of the Scutellaria I had with me. While there, I saw and conversed with Jacob Vail, a respectable farmer in that neighbourhood, whose dog went mad this fall, and he endeavouring to kill him received some injury. Alarmed at the circumstance, he went to Dr. Vandeveer, and received from him a handful of dried herbs, with directions to make tea of it, and drink the same every morning fasting, for twelve or fifteen days, and to refrain from strong liquors, and every thing of an inflammatory nature. Another person I met with there, observed, that several years since he was very severely bitten in

the hand by a dog, undoubtedly mad. He went immediately to Dr. V's, and received from him a handful of herbs, with the same directions as given to friend Vail. From that period he has not felt the smallest inconvenience from the wound, further than any other of an ordinary nature would have produced.

"I am informed the Doctor is averse to making any disclosure relative to the herb in question; but declares that his sons are in possession of the secret, and, after him, will continue the use of it whenever called upon. He asserts, that during his practice he has prevented upwards of 300 persons from going mad, and that he never lost but one patient, to whom his medicine had been administered. In this instance he was called upon to prescribe to a young woman living near Rahway, who had been previously under the care of a physician in that town; but the disease had so far progressed before he gave her his medicine as, in his opinion, to baffle human aid.

"The confidence of the people of the neighbourhood, where Lewis resides, in the efficacy of his medicine, is very great; and a member from that county, about six years ago, made a motion in Congress for purchasing his secret from him for public benefit.

"Lewis and Dr. Vandeveer keep considerable quantities of this herb well dried, and collected at a proper season. Two or three ounces are sufficient, in common cases, without the aid of any other medicine.

"R. B."

The following is copied from the New-York Evening Post of 23d May, 1811.

"I feel it to be my duty to inform the public on this occasion, and I hesitate not to take upon myself the responsibility of doing so, that all who may have the misfortune to be bitten by a *mad dog* may be certain of a cure by application to Mr. Jesse Lewis living in Mamaroneck, county of West-Chester; his father (who is now dead) obtained the knowledge of the remedy, from a Doctor Vandeveer, an elderly physician of New-Jersey many years since, and for a trifle made the secret known to Mr. Robert Bowne of this city. It is the plant commonly called the *Scullcap*, which if timely administered, that is, at any time before the actual appearance of the *hydrophobia*, has never been known to fail.

"The editor has the less hesitation in confidently recommending this remedy to the public, because striking instances of its success have fallen within his personal knowledge; among many others the following deserves special mention. About five years ago, if my memory serves me, a mad dog at Pelham's manor, being a small favourite and running about the house, bit no less than nine persons in one family, to these the *scullcap* was administered by Lewis without delay, and no one experienced the least inconvenience. Two hogs in the neighbourhood were also bitten by the same dog, at the same time, which were shut up, and nothing was administered, both of them went mad and died of the hydrophobia.

"THE EDITOR."

We are indebted to the laudable zeal of Mr. Coleman, editor of the Evening Post, for the following.

"*New-York, December* 21, 1811.

"Among the causes that at this moment agitate and alarm the community, that which forms the subject of this article is not the least. Hydrophobia has long been classed among the most terrible of diseases; its frightful and fatal termination has caused it to be dreaded more perhaps than any calamity to which the human species is liable. Hitherto it has baffled all the efforts of the medical profession, and quack remedies often have followed quack remedies, in endless succession, for centuries. Still candour has been compelled to allow that among them all, none hitherto discovered has proved in all cases a certain cure. At length, I firmly believe, this great desideratum has come to light; at least, it may without fear of contradiction be asserted, that the treatment observed by Mr. Jesse Lewis and his father, (who is now dead) for a great number of years, and towards a great number of patients, has never in a solitary instance failed of complete success, whether his remedy was administered to man or beast, though he was always reluctant to undertake the care of animals, considering it liable to uncertainty on various accounts. I have myself seen a convincing proof of the efficacy of his remedy. A couple of hogs in the neighbourhood in which I reside, were bitten by a mad dog, and several cattle were also bitten by the same dog, some before and

some after the biting of the hogs. Mr. Lewis was sent for and gave his preparation to the two hogs, both of which, though much wounded, recovered without any signs of madness; while every one of the cattle, having taken nothing to prevent the consequences, died of hydrophobia.

"I have this morning seen Mr. Lewis himself and obtained from him the following paper with liberty to publish it.

"We the subscribers, whose names are marked with the letter A, have ourselves been bitten by mad dogs and were cured by Jesse Lewis, of the town of Marmaroneck, county of West-Chester, and state of New-York. We, whose names are marked with the letter B, have had one or more of our families bitten by mad dogs, and they were cured by said Jesse Lewis. We, whose names are marked with the Letter C, have had one or more of our creatures bitten by mad dogs and were cured by said Jesse Lewis. We, whose names are marked with the letter D, are well acquainted with the said Jesse Lewis, and are well satisfied that he can cure the bite of a mad dog, having never heard of one, either man or beast ever running mad after he was called to them.

A. Roger Barton, 1. John Powers, 1. Jacob Drayers, 1. John Learing, 1.

B. Andrew Dean, 1. Mary Arundes, 1. Daniel Davis, 1. Mary Beyave, 1. Peter Renond, 1. David Guion, 1. David F. Pell, 9 of his family. John Appleby, 1. David Gedney, 1.

John Archer, 1. Joshua Hustis, 1. William H. Hardenbrook, 2. Isaac Williams, 1. Philip Briggs, 1.

C. Isaac Odle, 4. Reuben Lovell, 2. Isaac Williams, 2.

D. Jacob Stringham, Henry Griffin, Peter Donaldson, Arnold Bloomer, Elisha Palmer, John Carnell, Isaac Horton, Isaac Scoffield.

"Should doubts remain in the minds of the faculty, would it not be worth any trouble to put the remedy to some morally certain test?"

We have thus been gratified with Mr. Bowne's flattering account of scutellaria, and such are the proofs produced, that it might augur a perverse and incredulous temper not to admit his claim to a share of confidence. You cannot but be struck with the unparalleled success of Dr. Vandeveer, as stated by himself, in preventing upwards of three hundred persons from going mad! Incalculable advantages might indeed have resulted, had the practice of this gentleman been commensurate with the various exigencies of the community.

But by what talisman shall it be decided whether any proportion of those individuals would have become victims to hydrophobia, had not the scullcap been administered? Mr. Bowne, in fact, merits great praise and public respect, for his zealous and truly benevolent exertions on this important and interesting occasion. That his confidence in the antidotal virtues of scullcap is unbounded, and that he is actuated by the

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with Indian meal; and continued it until they were taken with rabies. One of the hogs so treated, was taken the twenty-fifth day, and died the twenty-eighth from the time he was bitten; the other was taken the twenty-ninth day from the bite and died the third day after. The first hog did not attempt to bite, but appeared to have paroxysms of increasing spasms until he died, convulsed; the other attempted to bite every thing in his way. Mr. S. observed that the hair would come off as easily soon after death as if they had been scalded; and that the flesh, although sick only three days, was extremely tender. Mr. D. a near neighbour of Mr. S. had one hog bitten at the same time, and was treated in the same manner; this hog was taken sick about the end of the fifth week from the bite, and died four days after. The two first were taken near the change, and the others near the full of the moon."

In a subsequent letter, dated 13th September, Dr. Bartlett farther informs me, that two more of the hogs bitten had died rabid, notwithstanding the use of the scullcap; one of them was attacked about six weeks, and the other about seven weeks after having been bitten. Three others wounded at the same time remained well.

It appears from the statement of Dr. Bartlett, that all the swine began to take the decoction of scutellaria from the eighth to the tenth day after the wounds were inflicted, that they continued in the use of it about ten or fifteen days, or until they became sick and refused

to eat. The quantity given, it is probable, was sufficiently large to test the efficacy of the remedy in the fairest manner, and the result is, that mortality among the swine has not been arrested. That the species of scutellaria employed on these occasions was the true scutellaria cateriflora, as described by Mr. Bowne, I have clearly ascertained by a specimen of it which Dr. Bartlett forwarded to me for inspection. No valid objection therefore can, as I conceive, be alleged against the experiments above recited, unless it be, that eight or nine days elapsed between the bite and the application of the remedy; how far that circumstance will avail in the calculation, I must leave for future experimentalists to determine, and the fate of scullcap must remain suspended on the issue. The facts offered by Dr. Bartlett, although deserving of serious consideration, are not to be accounted sufficient to countervail the copious mass of evidence from unquestionable sources, which has been exhibited: and since the plant is not known to possess properties inimical to the constitution, it merits the most persevering examination and trial in every instance either in the human subject or brute creation. Every consideration therefore conspires to urge the employment of this article, and the result of every experiment ought to be promptly promulgated; and should it be found even in a few instances to disappoint expectation, it can no longer be considered as a specific remedy, and a total abandonment of it will be fully justified.

I have probably exhausted your patience by a protracted investigation of the merit of some of the most popular specifics of the day, but have laboured to be concise and perspicuous. Such exposition must be admitted as of primary utility, and it is extremely gratifying to my feelings that I have been able thus far to accomplish my views. If we can expose to the anxious mariner an erroneous course which ought to be avoided, it may awaken his attention and excite a more diligent inquiry for accurate charts and skilful pilots to aid his arrival at the haven of safety. Physicians must either explore new ground, or relinquish all claim to a knowledge of the nature and cure of rabid hydrophobia.

LETTER XV.

METHOD OF PREVENTION AND CURE.

HAVING in my last address examined with the most scrupulous impartiality and candour, into the real merits of various fashionable specifics, the bequest of ancient family secrets, and the refuge of quackery and ignorance, I shall next resume *our* claim to the legitimate patrimony of science, that I may labour on more substantial and more profitable ground.

Mercury.

From the well known properties of this invaluable article of our Materia Medica, it has been resorted to as a prophylactic in the disease under consideration. About the middle of the last century, Mr. Desault, a French surgeon, introduced his new method of cure by mercurial frictions, and asserted that four men were bitten by the same wolf, on the same day and hour, two of whom died hydrophobic. The two others, after being attacked with some alarming symptoms, were entirely cured by rubbing upon the cicatrices, and about the whole arm, one drachm and a half of mercurial ointment for three days successively, and at intervals for some days longer. Besides this, they took every day a drachm and a half of Palmarius' powder.

From this period, mercury, internally administered and locally applied to the wounded part, immediately

after the accident, acquired an established reputation, and was deemed almost an infallible prophylactic. In a very considerable number of cases, mercury has since been exhibited internally and by external application, and there has been reason to conclude, that in some instances it has counteracted the effects of the poison and prevented the dreadful disease which we contemplate with horror. Sauvages, Desault, James, and others, concur in their testimony in favour of mercury given in small doses for a considerable time, or rubbing the ointment into the skin in the usual manner. But later experience, I regret to add, does not support the decision of these eminent writers. It is painful to stand in opposition to positive assertions made by those we hold in respect, but I must not suppress the truth, which the archives of modern medicine will reveal, that in numerous instances, although given to the point of salivation, and continued for many weeks, it has utterly failed of arresting the fatal disease. Nay, in the opinion of some upon whose judgment we may rely, it will not be extravagant to say, that mercury has failed in an equal ratio of cases with any other boasted specific. Probably it has not in all cases been employed for a sufficient length of time; for such is the uncertain period between the bite and the attack of the symptoms, that it is matter of extreme difficulty to determine, how long the system ought to be subjected to its operation, and at what precise moment it will be safe to discontinue the use of it. From these considerations, I shall not hesitate

to express my own, in unison with the opinion of respectable authorities of the present day, that a mercurial course, as preventive of the present disease, is devoid of utility, and ought to be entirely rejected.

Excision of the bitten part.

The prevention of this extraordinary disease, it is now supposed, depends altogether upon the local treatment of the wounded part, and various modes have been tried either with a view to procure the discharge or insure the destruction of the poison. The practice of cutting out the whole of the muscular parts that have suffered injury by the bite of the animal, was long since adopted, and is at the present day sanctioned and inculcated by the ablest medical authorities, as the most certain and effectual remedy that can be employed. The fact indeed is too obvious to require explanation, that if the entire substance with which the virus has been admitted to come in contact, can be speedily extirpated, the poison itself must also be completely removed, and the patient will of course be exempted from the fatal consequences which result from the constitutional infection. But however desirable may be the security to be purchased by this procedure, there are in many instances insuperable objections to the operation. The injury from the animal may be very extensive and on different parts of the body. The wounds are often inflicted deep in a muscular part, to which blood-vessels, nerves and tendons may be contiguous, or on the face, where the

knife might occasion great deformity. In addition to these obstacles, an expert surgeon may not be speedily procured, or the patient may not submit willingly to the operation. When the horrid consequences which result from the actual infection are considered, it will be admitted that even the loss of a limb would cheaply purchase security; yet since a large proportion of those bitten, are happily exempted from the disease, it will scarcely seem proper in every case to subject the patient to a painful and difficult operation, occasioning a loss of parts and future deformity. If, however, the operation is resolved on, the operator should perform his duty in the most accurate and faithful manner, examining carefully the state of the parts, regarding the depth and direction, which the teeth have penetrated, and leaving no trace of the teeth or injured part behind, as the smallest portion left might produce the disease.

A timorous surgeon, says a late author (Cooper's Dictionary of Surgery,) who should fear to cut deeply enough, or to cut a sufficient quantity of the surrounding flesh away, would be a most dangerous one for the patient. "Mr. Hunter,* in one case, removed the parts, as he thought, freely, and there was nothing on the under surface of the piece cut out that led him to suppose he had not cut beyond the bite. But on examining the surface of the wound, he found a part in the middle which was hollow underneath, which

* Transactions of a society for the improvement of Medical Knowledge.

shewed he had not gone deep enough, but had left a ridge, as it were, over part of the passage made by the dog and which could only have been discovered by examination after the operation." Dr. David Hosack, a respectable practitioner in New York, in a private letter says, "a little girl, about five years of age, was bitten some years ago, on the arm; in less than fifteen minutes after the accident, I removed, not only all the parts bitten, but beyond them so far as to embrace every possible point to which the teeth of the animal could have extended. In a very few days, however, the disease appeared." How is this mysterious phenomenon to be explained, unless it be conceived that the virus was instantaneously diffused into the system, or that the knife carried a portion of it to the bottom of the wound? Whatever may be the solution, the event must have its influence, tending to diminish our dependence upon the knife alone, to rescue the patient entirely from the effects of the poison. In every case where excision is employed, not a moment should be unnecessarily lost, after the bite is given: as it must be evident that the more speedily the parts are removed, the greater will be the chance of safety. Dr. James is of opinon, that cutting the wound would be too late to afford security, if ten minutes have elapsed from the accident. But by others we are advised to extirpate the parts though several days or weeks have intervened and after the wound be entirely healed. Nay, upon the principle of the local action of the poison, excision may be effectual at any time, betwixt

the bite and the second inflammation, or accession of the disease.

The excellent author of Zoonomia observes, that if the patient is bitten in a part which could totally be cut away, as a finger, even after the hydrophobia appears, it is probable it might cure it, as he suspects the cause still remains in the wounded tendon, and not in a diffused infection, tainting the blood. Hence there are generally uneasy sensations, as cold or numbness, in the old cicatrix, before the hydrophobia commences. (Zoonom. vol. 2. p. 50.) Upon the whole, early and complete extirpation of the wounded parts should perhaps always be considered as a mean of safety.

Cautery and Caustics.

The application of the actual or potential cautery is by some authors recommended with a view of additional security after the employment of the knife.

But there are those who prefer the operation of burning with a hot iron in every case, partly from the idea that there is in fire a property peculiarly adapted to change the constitution of the poison. If, however, by any means we destroy the organization, or remove the parts which are affected, by the immediate contact of the virus, all future effects of it must inevitably be prevented. Mr. Sabatier, a French surgeon, has been, I believe, the principal advocate of this mode of prevention; but it presents only a feeble prospect of general utility, on account of the intensity of pain

which is to be apprehended from it, and the deformity which the operation will occasion. It is scarcely to be expected that persons can reconcile to their feelings the protracted tortures of a hot iron, unless their own existence is known to depend upon the issue.

Chemical caustics offer themselves as the next resort, and of these we are furnished with ample variety. Caustics, in a liquid form particularly, are often useful in cases where the knife cannot be employed, and by some they are even held in preference to that of any other application. The lunar caustic (nitrate of silver) stands foremost on the list, and has been put to the test of practical experiment in repeated instances; it has probably sometimes succeeded, but more frequently disappointed the fairest expectations, though it is possible that the failure was owing to its not having been applied to all the infected surfaces.

"In the case of Admiral Rowley's son," says Dr. Mease, "the caustic was applied to the part immediately after the bite, and by the hand of the very judicious Mr. Hunter; the disease, nevertheless, came on, and as usual proved fatal." It has been ascertained by some late experiments that all caustics do not counteract the effects of poisons applied to the human body.

The *caustic, vegetable alkali, potassa* of our pharmacopiæ, is probably preferable to the lunar caustic, as being far more speedy and active in its effects, but so far as I can learn, it has not had a trial on these occasions. This substance, when applied in a solid form, quickly erodes and dissolves all animal substances. It

should be applied to the various surfaces of the wound, and the parts upon which it has acted and dissolved, being removed, it may again be applied and repeated, until the destruction of the parts to the necessary depth and extent be completed. The *caustic, volatile alkali*, is also worthy of trial with similar views.

The *nitric acid*, though not generally employed as a caustic, is, nevertheless, well adapted to answer the indications in the local treatment of the wound. Dr. Samuel Danforth, an eminent and much respected practitioner of Boston, has for many years confided in the application of *aqua fortis* in the cases that have fallen under his observation, and never having experienced disappointment by its failure, he has expressed to me his unlimited confidence in its efficacy, and thinks it should supersede the use of the knife, or the employment of any other caustic.

When neither of the stronger caustics above mentioned can be speedily obtained, *quick lime* will be found a valuable substitute. The powder of unslacked lime should be strewed into every opening made by the animal's teeth, and constantly repeated until the desired effect is produced, or some more powerful remedy can be procured. This, it is evident, will act on the same principle with other caustic applications, and by inducing inflammation and suppuration in the wound, will probably occasion a discharge of the virus with the pus from the bitten or ulcerated part.

Cupping, blisters, red precipitate and sublimate, with common salt, vinegar, and other irritating sub-

stances, have been recommended with a view of ulcerating and increasing the discharge from the wound, but are to be considered as of inferior efficacy, and resorted to only as auxiliaries, or on occasions when destitute of more potent remedies. But whatever may be the nature of the application, the wound should previously be so thoroughly dilated, that every cavity may be fairly exposed to the action of the remedy; this is of the most essential importance. There is another application well deserving of notice, always at hand, and in the power of every one who may require the use of it: I mean a long continued stream of cold water, poured forcibly on the wound from a considerable height, from the mouth of a tea-kettle or similar vessel. Dr. Haygarth, of Chester, in England, was the first who proposed this plan, and it has been strongly recommended by Dr. Percival and other distinguished writers.

In our own country the practice is sanctioned by Drs. Rush, Mease, Mitchell, Hosack, and others, whose opinions are universally respected. From Dr. Mease's Inaugural Dissertation, I cite the following sentiments.

"I am disposed, likewise, to entertain the most sanguine hopes from a proper use of this simple application, as none of the arguments mentioned against the use of the former applications can be applied to this; no situation of the wound or part of the body on which it is inflicted can be urged as a reason for its omission. The poison, also, we know exists in a *watery form*, and therefore, we reasonably expect that water would

be its most proper solvent." Connected with the above is a quotation of Dr. Mease from Percival's Essays.

"The preference given to cold water for the first ablution is judicious, and accords with the idea above advanced, that the nerves are the parts alone injured by the canine virus. They may thus perhaps be rendered torpid, and the virus may be greatly diluted or washed away before they recover such sensibility as to be capable of suffering from its action. When this has been sufficiently applied, warm water should be used, not only as a better solvent, but to produce a flow of blood, which coming from numberless small vessels may tend to complete the cleansing of the wound." "If the wound received be but small, and there remains any doubt respecting the possibility of the water coming sufficiently to all parts of it, a slight enlargement of it, with a scalpel or lancet, will prove useful, and this can be done so as not to create deformity; the wound also might be suffered to bleed, and a continued use of the water would then afford perfect security from the disease."

The employment of cold water in the manner here directed, will coincide with the indications according to the theory which has been advocated in my preceding addresses. If it be conceded that the rabid virus induce a local debility of the nerves or vital solids, which gives the poison activity, such applications as will tend to restore the lost tone and energy, must be the primary indication. The effusion of cold

water falling from a distance is known to be excellently calculated to effect such a purpose, and if even an exuberance of healthy action in those parts could thus be excited, it might still more conduce to the effect of resisting or throwing off the morbid poison. Instead, therefore, of being contented with a single operation, I should strongly recommend a continued use of the local cold bath from day to day during several weeks, as affording a greater chance of exemption from the dreadful disease.

Recourse may frequently be had to the affusion of cold water at the moment when other applications are not prepared. Even after the removal of the parts by the knife, careful washing is still a necessary and proper precaution to prevent, as far as in our power, the possibility of any contagious matter lurking about the wounded part.

It has been proposed of late to wash the parts with alkaline solutions, particularly with the caustic alkali, so far diluted that it may be applied with safety, and from its influence, as a solvent of animal mucus, much advantage may probably be expected from it. The method of extracting the poison from the bitten part by suction, is recommended by Dr. Fothergill and others as being safe to the operator as it is simple in itself. I am not disposed, however, to urge the adoption of a practice, which, from the disgust and prejudice attached to it, never can afford other than a delusive hope of beneficial results.

From the belief that the action of fire is one of the most powerful agents in the destruction of animal poisons, some have tried the experiment of burning with gun-powder, with the hope of preventing a fatal infection; but this when trusted to alone has not, it is said, been attended with the expected success. It would, however, appear at first view to be a mean well adapted to effect the desired purpose, as both by burning and tearing, the texture of the solid parts and the poison attached to them must be destroyed. The operation is more expeditious and less painful than either the knife or cautery, and ought perhaps to have the preference; but it must be remembered that beneficial effects are not to be expected if it be performed in a timid manner. The wound after being dilated should be filled with the finest gunpowder, and fire set to it and the process repeated if necessary. Washing the wounded parts with a strong solution of white arsenic in water has been supposed by some to have prevented the infection.

One expedient more appears to be of sufficient importance to merit attention; it is to support a proper discharge of matter from the wound for the space of several weeks, by ointment of cantharides or similar applications. Whether the wound be made by the animal's teeth or the surgeon's knife, it should in no case be suffered to heal suddenly.

Dr. Mease and others are decided, that in case the original wound heal and several weeks elapse before any remedy had been made use of, it ought to be again

opened, and kept for some considerable time in an ulcerated state. The records of medicine furnish a variety of instances, clearly demonstrating the fatal consequences in those whose wounds were suffered to heal, while others who had been subjected to equal danger were happily exempted by promoting and continuing a discharge of matter from the injured part.

The numerous particulars which I have detailed in this address, constitute a plan of local treatment, unquestionably the most eligible and promising of any which infinite wisdom has permitted the sages of the healing art to devise. And although it may be affirmed as an incontestable fact, that most of the remedies which I have described, when employed separately, have only deluded the hopes of the miserable sufferer; yet confident I am, that the judicious physician may from hence adopt a mode of procedure, by which under divine providence he may be instrumental in a large proportion of instances, in rescuing his patient from impending destruction.

Numerous are the general remedies which have been administered with the view of eliminating or counteracting the poison and obviating the constitutional affection. A large proportion of these pretended specifics are of the most trivial and ridiculous description, calculated rather to excite contempt than confidence. But in the hands of a discoverer, a medicine is commonly found to be infallible, and such are the temptations of novelty, and the charms of secrecy, that facts are often distorted for the support of certain remedies,

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ment hesitate to proclaim our joyful acquiescence in the event and our confidence in its efficacy.

Among other preventive medicines proposed by late writers, I find arsenic and belledonna; the former is an ingredient in the East India snake pill, which has some reputation, and the latter is recommended with much confidence by some German authors, who are ready to vouch for the successful employment of it in doses of from three to six grains. Med. Repos. vol. 6. p. 391.

Having examined into the merit of some articles which as secret remedies have long been the theme of encomium, and shewn that they are totally destitute of utility, and noticed others of doubtful efficacy, I have but little more to add on this topic. It yet remains to revert to our theoretical principles, and apply some further practical remarks in conclusion. The doctrine has been strenuously advocated in the foregoing pages, that a general and local debility greatly favours the disease arising from canine poison. It will, therefore, appear at first view, that this morbid state of the system is to be obviated by the employment of tonic remedies. These should consist of the most active medicines of that class, as the different preparations of copper, steel and zinc, together with the Peruvian bark. Cold bathing may be usefully conjoined, though by itself even when carried to the utmost extent, it has failed in ten instances where it has been supposed to succeed in one. Nor will it be denied that tonic medicines have disappointed expectations, but the

more powerful metallic tonics have not been sufficiently tested by practical experiment. When a tonic course is commenced, it should be persevered in for some months, and if possible beyond the period in which the disease usually makes the attack upon the system. Of the various debilitating causes which favour this disease, no one is to be regarded as more influential than the depressing passions of the mind; a long continuance of fear and apprehension will frequently effect the most astonishing changes in our system; and various examples have occurred which demonstrate its powerful operation; as when the canine seems to have usurped the attributes of the human nature, and barking, howling and biting proclaim the distempered imagination which has sometimes even counterfeited the rabid hydrophobia.

The most consolatory and soothing ideas should be assiduously encouraged, that reviving cordial, hope, must not be permitted to withdraw its cheering influence, and the patient ought to be indulged in the use of any popular medicine to which his whimsical fancy may have created a partiality.

The scutellaria lateriflora* should perhaps have the preference with the view of further trial of its antidotal powers. But let the spirits of your patient be buoyed above despair, that nature, undepressed by despondency, may be at liberty to exert her functions, and co-operate more effectually with the antidotes against the enemy that may be lurking about the system.

* This article in pages 214 and 230 was erroneously printed *Caterifiora.*

The valuable and appropriate production, which follows, was originally published in the Monthly Anthology for September, 1810. It is, I presume, to be ascribed to the pen of that medical philosopher, who, in retirement, after the most brilliant attainments in literature and science, is indulging the disposition of his heart, by an habitual exercise of virtue and benevolence.

"The recommendation of popular remedies for the bite of mad dogs may seem, in one view, an act of benevolence; for what can appear more kind, than to help our neighbours to a remedy for a calamity, which is mortal when left to itself, and which many in vain have attempted to cure? But a different opinion perhaps will arise on the subject, when it is considered that a confidence in false remedies withdraws our attention from the pursuit of such as are more efficacious; especially as these can only be expected to reach us *through the hands of medical men.* This remark comes from one who has no share in the practice of medicine for profit; and therefore it is disinterested. It seems indeed easy of belief, after the disappointments so often experienced, that nothing solid will be established on this subject, excepting by means of enlightened practitioners, who, after endeavouring to learn all which has been done by others, shall record all which has been attempted by themselves. One or several persons who have tried one method of cure, and made a fair report upon it, will either stamp a character upon it as useless,

and prevent farther loss of time and of safety by the pursuit of it; or recommend it as promising success, or at least as deserving farther trial.

"The work of Dr. Hamilton on this subject, in its last edition, and that of Dr. Mease of Philadelphia, merit the attention of every practitioner. Dr. Rush also, on the question of hydrophobia will never be passed over by those, who know the immense services which this original writer has rendered in a multitude of instances to the healing art, and consequently to man, who is the subject of it.

"But while the above writings may be procured by every medical practitioner in this country, it is proper also to turn the attention of the inhabitants of this continent to what of late years has been proposed respecting canine madness in France; especially as prizes were distributed to three writers on this subject, by the French Royal Society of Medicine, in 1782. We shall single out therefore for notice two methods, respectively proposed as new or as improved in 1784 and 1786, by two eminent anatomists and practitioners; and published in the Memoirs of the French Academy of Sciences for those years.

"On February 17, 1784, a gardener received a severe bite from a dog in his upper lip. As the dog was not ill-tempered, he became sufficiently suspected to be confined in the garden; and his food was let down to him through a window of the adjoining house. But as he was supposed to have used the food thus provided for him, and as he attended to those who called to

him, the alarm soon lessened; and a stout young man in consequence went into the garden, on the next day but one, to carry him meat and water. The dog approached in a peaceable manner upon being called, till he saw the water; but then, retreating some steps, he flew at the man, who in his turn attempted to seize him by the neck. In the struggle, the man was repeatedly bitten. At last, however, he secured the dog under him upon the ground; till the master of the house, with a cutlass, killed the dog in that situation.

"The dog had bitten both hands, a fore arm, the right shoulder, and the upper and lower part of the left leg. The wounds, in short, were many; and the scratches (especially on the belly) still more numerous: but it was hard to say whether the latter were from the bite or claw of the animal. Though in various instances the wounds were no larger than the teeth which produced them, the fore arm and shoulder were injured to some extent; and the left leg was torn for an inch and a half both in length and in breadth, so that the bone was laid bare.

"The gardener felt composed under what had happened; but not so the young man.

"The scene of the accident being near Paris, the celebrated M. *Sabatier* was sent for, and arrived in the evening. He proposed to open such parts as required it, and to cauterize the whole to some considerable depth. In consequence of the patient's consultation with his friends, (which M. Sabatier required before he would operate,) twenty-eight hours elapsed

from the time of the contest with the dog, before any thing was done; though there were twenty-five bites, and fifty considerable scratches. The anxiety of the patient made him support, with constancy, an operation of more than two hours; the bites being cauterized with liquid butter of antimony (of late called *muriated antimony*,) applied by means of little pieces of linen, wound round twigs of birch; while the scratches were burned, each a number of times, with thick needles fastened to splinters, and heated to redness by a wax taper. The caustic was applied to the bottom and sides of each wound; but no fresh opening was made by the knife in the case of the wounds; as the opening left by the bite was deemed sufficient. Every thing healed in the common manner, no attempt being made to prevent it; the wound in the leg alone continuing its suppuration for a considerable time.

"On the 14th of April (or in fifty-five days,) the gardener, who had held himself secure (from believing the dog not to be mad,) began to be ill; and on the 16th, in the evening, he expired; exhibiting various symptoms usual in cases of canine madness, and among the rest, hydrophobia.

"When the account of these incidents was read to the Academy, the young man had continued well for eight months; and no mention of an unfavourable change respecting him is made in its Memoirs of 1785, 1786, 1787, and 1788.—M. Sabatier also assures us, that no internal remedy was used; a few drops of volatile alkali having been allowed daily, merely for

form sake, to calm the mind of the patient; for M. Sabatier says, that he had himself, in other cases, proved the want of efficacy in this medicine.

"M. Sabatier, who thought that he might cite other examples in confirmation of the propriety of the treatment which he pursued, gives us the following theory of his practice. He compares the bite of a mad animal to a case of inoculation, where the poison (as he supposes) remains for a time inactive; and he conceives that the cautery destroyed the organization of the parts, or at least changed the constitution of the poison; and in particular, he considers the failure of operations of this description in the hands of others, as the consequence of their having designed to procure a mere discharge of humours from the part, or a simple suppuration.

"M. *Portal*, our second French author, recommends mercurial frictions so as to salivate, with antispasmodics given internally, and a local treatment of the wound by means of leeches and blisters. He relates the escape of four patients under this mode of proceeding; though the dog which had bitten them is said to have communicated madness to two other dogs. One patient appears to have had even the commencement of hydrophobia; and he considers all of them as having had some mark or other of infection.

"Admitting M. Portal's position, that mercurial salivation should be combined with applications to the wound itself, the question is, whether his own applications to the parts were sufficiently powerful; and

whether externally, it is not better to depend on caustics, or on the destruction of the part by mechanical means, than on leeches or blisters. Perhaps the actual cautery is better than the potential cautery; as fire will more *rapidly* and effectually destroy both the parts and the poison, than common chemical caustics. Those who please, may make chemical means follow the use of fire; and fire, acting alone, or thus assisted, may be held safer than the knife alone. Fire may be employed by any dexterous neighbour in an instant; and will in general be applied with safety, and without being immediately followed by hemorrhages; since fire in former times was often employed for closing blood-vessels. The use of the knife, on the other hand, is less safe as to the principal object, and more dangerous as to the operation itself, since a serious loss of blood may arise in some cases, on the extensive plan commonly recommended for the knife on these occasions.

"With respect, however, to M. Sabatier's cases, perfect confidence is not to be placed in the result of them. On the one hand, the *gardener* was bitten on the lip; and bites in the face are held more dangerous than bites in other parts. On the other hand, the *young man* experienced no symptoms of madness; and the instances are not unfrequent, where bites from mad animals through the *naked* skin (notwithstanding foam has been left upon the wound,) have failed in communicating madness; just as the variolous, vaccine, venereal, and febrile infections are sometimes

without effect upon the general constitution, and indeed without any effect whatever.

"As these recitals are merely designed to convey intimations on the subject of canine madness, the following hints may be admitted among the rest:

"1. Let the person bitten (or at least let the *part* bitten) remain at *rest*, till measures shall have been taken to remove the poison from the wound; as motion may serve to introduce the poison more certainly and quickly into the system.

"2. Let *heat* also be avoided; as enlarging the size, and probably the action, of the receiving vessels.

"3. Let the foam, the blood, and every thing *liquid*, be wiped from the part as soon as possible, by means of something DRY, soft, and likely to leave no fragment of itself behind. We may thus reduce the virus or poison to the *smallest possible quantity*, before we take other measures. It is upon the same principle, that every loose *fragment of flesh*, &c. may be quietly removed.

"4. Now will be the time to *wash* the wound, if washing be thought advisable; but the water applied should be cold, particularly in the first instance, lest the vessels should be enlarged, and the actions of the part be increased. *Suction* must be attended not only wth moisture, but with warmth, with motion, and with pressure; and it may also endanger the person who sucks the wound; and by creating delusive

hopes, the adoption of more vigorous measures may be prevented. Suction is therefore to be omitted.

"5. A *red-hot iron* is likely to be more useful in destroying what we want to destroy, and no more than any other application; and it ought to have place as early as possible after the *cleansing* of the wound has been attended to. If difficulties occur in pursuing the operation, as far as it is necessary to be pursued, in order to make it complete, the medical practitioner (who ought always to be immediately called in) will finish what remains to be done under this head.

"6. The medical practitioner will now, if he thinks fit, employ *chemical caustics* in addition to fire, to ensure success.

"7. Ligatures to stop the progress of the poison cannot be applied to the body and head; and are dangerous as to the neck from several causes. Their effect also is doubtful as to the limbs, because we have to guard in this case against the progress of *infection*, which may be rendered more easy by the accumulation of fluids produced by ligatures. Did the poison only operate by *moving within the vessels*, ligaments might have a temporary benefit (see Fontana in the London Phil. Trans. for 1780;) but we are yet uncertain in what quarter the infection establishes itself; whether in the skin, blood-vessels, nerves, glands, or other solid parts, or in the blood, lymph, or other fluids.

"These particulars seem to merit attention under every mode of internal treatment. But as no practi-

tioner is likely to have many cases under his care, and this dreadful malady has in general for many ages baffled human skill, every patient ought to be considered as an object ultimately belonging *to the whole profession for the benefit of the whole race.* Every case therefore ought to be minutely and candidly recorded; not forgetting the mention of errors in the treatment, if any have occurred. By this means, each method may successively and *fully* experience a trial; and what has sufficiently been tried, need not be tried again; but new methods may be proceeded upon. Thus the measures of one practitioner being communicated to all, knowledge will be multiplied in the hands of each: and hence, if Providence designs that we shall arrive at a cure of this dreadful malady, the progress towards this event will necessarily be quickened, since the treatment of each case which occurs will point to a general object, and no effort be lost.

"If madness is to be considered as one among other diseases originating from without, and not as an affliction communicated upon peculiar principles, Dr. Rush's observations on hydrophobia will then merit peculiar attention. Indeed the perusal of those observations will probably increase the persuasion, that canine madness is a disease, and probably admits of cure. At the same time it must be a case which admits of deception; since sometimes we may think that a cure has occurred, where there has been no infection; and in some instances the infection may only have operated imperfectly. It will be no small

acquisition to have it ascertained that the disease has a *crisis*, after it is once formed. We already know that patients may die from the excess of several of its symptoms, without knowing perhaps wherein lies the distinctive quality of the disease itself.

"As to the *prevention* of this calamity, it is in some degree in the hands of the civil magistrate; particularly if it be true, that dogs sometimes become mad from eating the putrid carcases of animals which have remained publicly exposed. The disease in certain grain called *ergot* having been found to produce disease in our own race, other diseases may readily be supposed to arise in animals from putrid food.

"In inquiring after a cure for canine madness, it may be useful to know when, and where this madness occurs most frequently, *Cold* is no sufficient check to it; for in winter dogs and cats are found to be mad, and their bites to be infectious. Nor is it true, as some have thought, that mad animals are unknown in tropical countries, where winter also is unknown; for though dogs, for example, may suffer in tropical countries as a race, both in their form, and in some of their qualities (as their snarl and barking,) and though their madness is less frequent than in mixed or temperate climates, yet it is now understood, that dogs have been seen mad in the West Indies.

"It is not perhaps certainly known to how many races of animals *canine* madness, (as it has been called) may extend itself; yet it seems sufficiently ascertained that dogs, cats, wolves, swine, and some other quadrupeds, may become martyrs to it, as well as

man; and that its infection may be *propagated* by the three first named species, if not by every species which is itself liable to *receive* it. Whether this species of madness may not be materially different in its symptoms, if not in the methods requisite for its cure, perhaps is not sufficiently known; *rabid* animals being *hitherto* in general classed under one name.

"*District of Maine, August* 13, 1810.

"P. S. The method above recommended for destroying an infected portion of flesh, by fire or other artificial means, may be applied not only to the case of bites from mad animals, but to other infections; since infection, even from the small-pox, it is said, can be checked by this means.

"There is, in particular, a source of infection which may often call for this, as a remedy; namely, that of wounds received from knives and sewing needles during certain operations, or during the dissection of a morbid body. The generous ardour of medical men on these occasions produces hazards, which require that this easy antidote should constantly be borne in mind; since fire or the knife may instantly be applied to prevent a mortifying wound or putrid fever, &c. each of which may occasion speedy death. In consequence of the want of due information, the public does not render sufficient justice to medical practitioners for their zeal on this and many other occasions. The havock made among this useful body of men by the yellow fever of Philadelphia, the spotted fever (improperly so called) of New England, and the

plague at Marseilles and other places, and the frequent deaths from infections caught by wounds at dissections, with very many other examples, prove that there are occasionally moments, when war is scarcely more dangerous to the combatant, than the healing profession itself is to the spirited practitioner. The fault however will be his *own* in the case of dissections and of certain operations, if the practitioner should hereafter reject the simple and apparently efficacious precaution here suggested.

"As cases which are recent are apt to make most impression, the following articles taken from a newspaper called the *Globe*, printed in London in June last, may prove interesting; and they will seem the more remarkable, as they are all taken from the same number; following one another, with the interruption of only three lines, under the usual head of deaths.

'*Died*, on Tuesday last, Mr. James Ridgway, surgeon, the son of the late Tristram Ridgway, surgeon, of *Ashton-under-Line*, of a mortification in the arm, in consequence of opening the body of a man who died of the *same* complaint. He was a young man universally respected; and in knowledge of the science of anatomy and surgery, few were his rivals.

'On Monday last, Mr. Charles Cave, surgeon, of *Petersfield;* the circumstance of whose death must excite respect for his memory, much sympathy for his loss, as well as *caution to the profession.*—On the Saturday se'nnight previous to his death, a seafaring man, who had been ill for a few days preceding, was attacked, whilst at Petersfield, with a *violent inflam-*

mation on the lungs ; and after being attended several times during the day by Messrs. Cave and Whicher, he died the next morning. The surgeons being of various opinions, as to the real cause of his death, agreed to open the body ; which they did on Monday morning, and found the lungs in a complete state of putrefaction. They afterwards sewed up the body, in doing which they pricked their fingers ; and *in the evening*, both of them were seized with violent pains in the arm, which soon extended to nearly the whole of the body. Mr. Cave, after enduring the most excruciating pains, died on the following Monday.—Mr. Whicher is still alive, though suffering extreme pain : but his hand and arm have been opened by several of the most skilful surgeons of the neighbourhood, and from the metropolis, and a discharge being obtained from the wounds, it is hoped his life will be saved. The death of Mr. Cave is the cause of universal regret ; for he was not more respected for his abilities and general demeanor, than he was for his humanity.'—*Globe, June* 1810."

LETTER XVI.

OF THOSE REMEDIES WHICH, SECONDLY, ARE INTENDED TO COUNTERACT, OR OVERCOME THE EFFECTS OF THE POISON, AFTER THE DISEASE HAS ACTUALLY APPEARED.

I HAVE to present to your view the formidable disease whose character we have been contemplating, when it has assumed its power over the human system, and gives defiance to the efforts of nature, and the collected wisdom of our art. The various periods of attack and the melancholy train of symptoms, have been described, and the different means of prevention enumerated. The prognosis is in general exceedingly fatal, death in its most awful forms closing the scene on the third, fourth, or fifth day after the attack of hydrophobia; but we sacrifice the dignity of science, and insult the laws of humanity, if, in despair, we yield without a contest, as we forfeit the blessings of heaven, if, by ingratitude, we render ourselves undeserving of them.

The Boerhaavian theory of inflammation, as applied to this disease, and the depleting practice which resulted from it, have been slightly considered in a former address, but it is deemed of high importance that the theme be again resumed, in order, that, by a more ample discussion, the merit or demerit of the system, may be fairly decided. It was probably from the apparent strength and vigour exhibited by the

sufferer, that Boerhaave, the great systematic, was induced to pronounce the disease to be wholly of an inflammatory nature, and that Van Swieten, his laborious commentator, and the pupils of their school acquiesced in, and rigidly enforced the doctrine.

The antiphlogistic plan in its full extent, was adopted and inculcated by those eminent authorities, and to doubt the truth of their theory, would have been deemed an attempt to undermine the whole fabric of medicine. Bleeding, purging and low diet were invariably persisted in, not with a sparing hand, but in a most copious manner; and "although the uniform failure of the remedy, and the constant subsequent increase of the spasms and diminution of the pulse, pointed out the absurdity of the practice," these tended only to confirm the idea of the singular obstinacy of the disease, and to encourage a rigid perseverance in the procedure. It must have been an unaccountable infatuation that prevented the lancet from being sheathed, during a considerable period, when it was so evident, that by diminishing the activity of the vital power, the most injurious consequences were resulting from the employment of it. The only plausible ground of justification, is found in the few equivocal examples of the disease having yielded to this mode of treatment; but it should be considered, that facts are sometimes distorted to support a theory, and a bias in its favour often obscures the merit of attentive observation. The cases alluded to, have been brought into particular examination, and reviewed by various writers of discernment, and different causes

are assigned for their origin. The case reported by Dr. Nugent of a woman cured by bleeding and mercury, was the first that attracted notice, and for a time, it had considerable influence among medical practitioners; but both Dr. Hamilton and Dr. Mease agree in the opinion, that the canine virus had no connexion in the case, but it was probably the effect of an hysteric paroxysm aggravated by fear and apprehension. Dr. Tilton's supposed case has also been shewn to be a violent hysteria, bordering on mania. And many others reported, as arising from canine poison, have been found, on examination, to have originated from causes of a very different nature.

The Boerhaavian system progressed to its meridian and had long been on rapid decline when Professor Rush published his new view of the pathology of the disease, which he now terms "a malignant state of fever." In his observations on hydrophobia (Med. Inqui. and Obser.) the learned Professor says, "The reader will perceive here that I have deserted an opinion which I formerly held upon the cause and cure of tetanus. I supposed the hydrophobia to depend upon debility. This debility I have since been led to consider as partial, depending upon abstraction of excitement from some, and a morbid accumulation of it in other parts of the body. The preternatural excitement predominates so far, in most cases of hydrophobia, over debility, that depleting remedies promise more speedily and safely to equalize, and render it natural, than medicines of an opposite character."

Instruments of blood were again sharpened and rallied for the contest with the destroyer of our race in its new character, but alas! defeat, disappointment and death have followed in train, and the champion of American medicine seems at length disposed to withdraw his confidence from a practice which he had revived with sanguine hopes of success. Dr. Mease has directed his inquiries to the subject of the depleting practice, and, with indefatigable industry, has collected a mass of evidence amply sufficient to enforce conviction of its entire inefficacy. He asserts that Dr. Hamilton has collected no less than twenty-two cases of this disease, in which bleeding had been used in various degrees and without success; some of the remarks of Dr. Mease I have already introduced, and some additional paragraphs, from his observations on Dr. Burton's supposed case of hydrophobia, will now be cited. (Case 9.)

"If I required any other objection than those I have already advanced to convince me that the case, recorded by Dr. Burton, was not in the least connected with the canine poison, the remedy by which the cure was effected, would furnish one;" and, speaking of the learned Boerhaave, he says, "his instructions with regard to the treatment of the disease, even surpassed the practice of the bloody Botallus, and the fidelity with which they were executed, could not be exceeded; but alas! the consequences were not such as the sanguine theorist expected; Death, wide spreading death, followed the steps of the Leyden disciples in every part of the globe! one of these,

Professor Rutherford, with a candour highly honourable, openly denounced his error in the clinical ward of the Edinburgh hospital, and this fact alone ought to satisfy the unprejudiced on the subject; for, in the case he relates, bleeding was tried under circumstances peculiarly favourable to success, and carried as far as the situation of the patient permitted." The case referred to was related by Dr. James Johnson, (Medical Society, London, vol. 1;) two days after the reception of the bite, he lost sixteen ounces of blood; and when the disease commenced, he was again ordered bleeding, and sixty-six ounces at four bleedings were taken away in twenty-four hours, yet the disease continued to advance until death closed the scene.

The case of Samuel York, related by Dr. Physic, (Case 3.) was attended by circumstances too well adapted to the views of Dr. Mease to pass unnoticed, and to his remarks formerly quoted, he adds, "But in the present case the remedy was prescribed by a physician who is accustomed to view the welfare of a patient as the only object of consideration; and if ever a case of the disease in question occurred in which the plan was justified by the mode of attack, and by the symptoms, that of York was one. The disease made its attack in the form of fever: the pulse in particular, was "full, hard and preternaturally frequent, and the skin hot and dry." "On the afternoon of the third day, when I saw him, his tongue was white and furred, his pulse beat eighty in a minute by my watch, and was tense and full; and yet the

blood which he lost had no effect in diminishing the violence of the symptoms. He lost sixty-two ounces at four bleedings, in the course of twenty-four hours." Dr. Mease in another place says, "*death* and *destruction* have followed as *surely* and *invariably* in every case where it was employed, as from a stab in the heart with a small sword. I defy a single instance of the real disease to be produced where either a symptom was relieved or a cure effected by it." And finally he queries, "will any one believe that if the disease were inflammatory, it would not have *once* been cured by bleeding? and if in those cases, where from the actual madness of the dog being ascertained, and the strongly marked symptoms, no doubt could remain of the true disease, it has *never* yet succeeded; can the theory upon which such practice is grounded be admitted as correct?"

Dr. James Currie, of Liverpool, the justly celebrated author of Medical Reports on the effects of water, witnessed five fatal cases of hydrophobia, an unusual number for one physician within a few years. In none of these was there any increase of animal heat, and he is decided in his opinion against the inflammatory nature of "this most singular and affecting disease."

I may be permitted to mention one authority more, Dr. Pearson of London, in a letter to Dr. Mitchell, informs, that the plan of bleeding has had the fairest trial in every stage of the disease, and is found not to answer expectations.

It would seem impossible that more substantial evidence resulting from practical experiment, should be required to demonstrate in the most satisfactory manner, that the depleting system is altogether inadmissible. I am not, however, prepared to declare that venesection is in no case allowable, but considered on the general scale, you may sheath your lancet in rust, unless it can boast of more beneficial effects, than when employed in a contest with rabid hydrophobia.

Very considerable dependance has been placed on the antispasmodic powers of *opium* to counteract the effects of the canine virus upon the nervous system, and, from analogy, it would appear peculiarly adapted to the relief or cure of all the symptoms of hydrophobia. In a large proportion of cases, therefore, that have occurred, this medicine was considered indispensibly necessary to answer various indications. It has, perhaps, more than any other medicine been tested by practical experiment, and its inadequate powers are unequivocally ascertained.

Many examples are on record, where opium was given to the quantity of one hundred and eighty grains in the short space of fifteen hours, without even mitigating the violence of spasms. Dr. D. Hosack,* of New York, gave to a girl of five years old, opium in every possible form, as much as two grains of the solid drug every two hours, also laudanum in clysters, and applied a plaister of opium to the throat, but all to no purpose in counteracting the irritations of the dis-

* Med. and Philo. Register.

ease; nor had she a moment of sleep in three days and nights, the time she lived after hydrophobia first appeared." "It has," says Dr. Hunter, "in various shapes and forms had the most full and ample trial, and has been found to do no good; and it is evident that, however much might have been expected originally from opium, there are at present few articles in the catalogue of medicines that have not a better chance of curing hydrophobia." We must now in fact conclude, that, as opium will not afford the prospect even of palliative relief in this disease, any further trial of it should be considered as a loss of time, and trifling with the life of the miserable patient. In the same predicament I am disposed to place the article of *musk*, which either alone or conjoined with cinnabar, forming the celebrated Tonquin medicine, may be set aside as undeserving of the least consideration, unless indeed it be given to an immense extent hitherto unknown. One hundred and fifty grains of musk have been given in the space of twelve hours, to a young girl, thirteen years old, affected with an incipient tetanus; but no salutary effect on the disorder was produced. (Cooper's Dictionary of Surgery.)

The *warm bath* has been employed by various practitioners, and, in the opinion of some, it has effected temporary relief from the distressing symptoms; in other instances, however, no benefit was derived from it. The essential utility of the remedy must therefore remain extremely doubtful.

In regard to the efficacy of the cold bath in the form of affusion, it would appear calculated to diminish the morbid sensibility of the system, and to allay the violence of spasm, as it has sometimes been found to do in tetanus; but experience has not confirmed its utility, and Case seventh, narrated by Dr. Coxe, and the observations by him subjoined, furnish particulars only, for further consideration. From the great terror and distress which the forcible and long continued immersion of the body in cold water never fails to occasion, I should, on no acconnt, expect important advantages from the use of that agent, and if we cannot minister to the comfort and relief of our patient, let us, as far as in our power, shield him from aggravated horrors.

Alkaline salts have been proposed as promising beneficial effects in the present disease, but Dr. Rogers, (Case 6,) had recourse to the remedy without furnishing the smallest encouragement for a repetition of it.

I may perhaps by this time have subjected myself to the imputation of having not only wrested the *magic wand* from the bold hand of empiricism, but disarmed the learned physician of the implements of his power, and left him destitute of all physical means of encountering the most formidable of maladies.

But it is my professed object to pioneer among the rubbish, and to throw off the obstacles which have so long obstructed our views and impeded our advances towards a more profitable investigation of the subject.

Unless you are apprised of what has been attempted, and with what success, much time must be lost, and perhaps, lives sacrificed in useless trials and fruitless repetitions. In fact, it is to be ascribed, in a great measure, to the want of preconcerted order and method among medical practitioners, that so little progress has been made towards an improved mode of treatment. From a consideration of the uniform failure of all the curative remedies hitherto employed, we should abandon the usual immethodical course of practise, and the whole of the old catalogue of medicines, except the few hereafter to be mentioned. The system of practice to be adopted, should be energetic yet simple, instead of a confused farrago; our prescriptions should consist of a few principal medicines only. The attending physician ought seldom to absent himself from the patient, but make every occurrence of symptoms or effect of medicine, the object of his keenest attention. But above all, we ought to realize the importance of anticipating, if practicable, the approach of the symptoms, and of administering remedies promptly and speedily, and in quantities proportioned to the magnitude of the evil and the short period of its duration. As we seldom have in this disease more than from forty-eight to seventy-two hours to try our skill, it should be a primary object to preoccupy the ground, by subjecting the system to the impression of some active agent, that will supersede the establishment of the morbid action of the poison.

There is a peculiarity observable in this disease somewhat paradoxical; the ner vous system is rendered extremely susceptible of impressions from external causes, while the internal viscera, as the stomach and intestines, are frequently reduced to a state of absolute torpor. A recurrence to the fact, that the canine virus lies dormant in the bitten part for a length of time, as yet unascertained, will lead us to search with the eye of suspicion, lest the enemy remain concealed in ambush; and it may be well worthy of trial to determine how far it is practicable to procure relief by the application of remedies to the local part. Dr. Darwin expresses an opinion that the cause still remains in the wounded part resembling tetanus or locked jaw, in its tendency to convulsions from a distant wound, and effects some other parts by association. He advises excision or a caustic on the scar even after the appearance of hydrophobia, but he observes, "if the diseased tendon, could be inflamed without cutting it out, as by cupping, or caustic, or blister, after cupping, or the application of spirit of turpentine; and this in the old wound long since healed it might prevent the spasms about the throat."

He also and other authors recommend a tight bandage on the limb above the scar of the old wound to benumb the pained tendon. In case of a puncture or wound in a nervous part, a locked jaw is frequently prevented by stimulating local applications; and there is an acknowledged affinity between the two diseases.

Modern medicine has introduced the *caustic, volatile alkali,* as a valuable antidote against the animal poisons, but more especially, that of venomous serpents: The poison from the bite of the cobra de capello, of the East Indies, a serpent of the most venomous kind, is said to produce symptoms very similar to those arising from rabid animals. The public are favoured with an account by J. Williams Esq. (Asiatic Researches) of the surprising efficacy of aqua ammonia pura, as a remedy against the deleterious effects of the bite of that serpent. It is, therefore, considered by Dr. Thomas, (Modern Practice,) and Dr. Mease, as worthy of trial in hydrophobia. The wound, whether in its recent state or after being opened afresh, must be frequently washed with the undiluted volatile spirit. But, as liquids will be refused during hydrophobia, the volitile alkali may be given in the form of a pill or bolus with bread crumb to a considerable extent.

Another article meriting notice as a new remedy in this disease, is *arsenic.* Dr. Hamilton, and many others, appear to have borrowed great confidence in the efficacy of this mineral, as it is the principal ingredient in the East India snake pill, which is generally employed by the Hindoo physicians, as an antidote to hydrophobia.

The successful employment of arsenic in some cases of epilepsy, and in the cure of ague, afford other grounds for encouraging the internal use of it, as a metallic tonic in the present disease. Much confi-

dence was formerly reposed in *mercury*, as a remedy in hydrophobia, accordingly we find it has been administered in numerous instances and in various forms, but unfortunately we have not a solitary well attested example in favour of its efficacy, and in the opinion of some writers, it should no longer claim our attention. But when we consider the remarkable powers which mercury is capable of exerting on the human system, when properly administered, it will be difficult to relinquish all hopes in its beneficial effects in the present disease. Instead, however, of prescribing it in doses of a few grains in a day, or a small quantity of the ointment applied as in ordinary cases of syphilis, I should exhibit the medicine in the most liberal manner, suited to the magnitude of the evil, and very limited period of its existence. Of calomel, I should direct doses of not less than twenty or thirty grains, to be repeated at short intervals, until relief be obtained, or it be ascertained that the symptoms will not yield to its powers. I should rely more on its primary and peculiar action on the stomach, than its uncertain effects on the salivary secretions. But of all the modes of exhibiting mercury with the view of its speedy operation on the salivary glands, that suggested by Dr. Darwin, strikes me as incomparably the most eligible. "There is," says this author, "a curious paper by Mr. Addington, of East Bromwich, in the contributions of medical knowledge, published by Dr. Beddoes, on the cure of gonorrhæa virulenta by large doses of corrosive sublimate. Three grains are dissolved in one ounce of rectified spirit of

wine; half of this is taken undiluted at going to bed; it produces a copius salivation for an hour and a half, or longer, during which the patient spits a quart. Some Glauber's salts are to be taken on the second day after this operation, and on the evening of that day he is to repeat the draught, and the salts on the day but one following. And Mr. Addington witnessed that three or four such doses frequently cured a venereal gonorrhæa in so short a time without any disagreeable consequences, and was informed that hundreds had been cured by it." (Zoono, vol. 2. p. 233.) In another part of his work Dr. Darwin urges the trial in hydrophobia, of one grain and a half of corrosive sublimate of mercury dissolved in half an ounce of rectified spirit of wine, to be given undiluted as above directed, and to be repeated according to its operation. The mercurial ointment might be productive of beneficial effects, if rubbed in large quantities on the throat and neck, and also into the wounded part. Not less than half an ounce of the strong ointment, Dr. Mease thinks should be rubbed three times in a day in the throat, as the part more immediately affected; by this application the morbid sensibility will be considerably diminished. The bold exhibition of calomel, however, by its direct operation on the stomach, would probably prove of superior efficacy. It is a curious fact, worthy of inquiry for explanation, that calomel, when given in doses of thirty grains or upwards, does not evacuate the intestines more severely than in doses of a few grains only. Should an opportunity present, I would test

the one or other method above suggested, by fair experiment, uncombined with other medicine, and if the calomel given as above, or a salivation so rapidly excited by the sublimate, should not prove eminently beneficial, we might utterly despair of the powers of mercury, in any form, and in every stage of this dreadful malady. I feel it however as a duty to mention, that in one instance, in the hands of Dr. J. S. Stringham, (Med. Repos. vol. 6. p. 325.) the experiment suggested by Dr. Darwin, evinced at once the violence and inefficacy of this mode of treating gonorrhæa. The night after taking the fourth dose of the sublimate, a profuse salivation came on, with violent retchings, griping pains in the bowels and great uneasiness in the head and throat, attended with delirium. The patient continued in this situation during the whole of the night; the same remedies were prescribed as though he had been poisoned by corrosive sublimate. These symptoms in a few days disappeared, and the gonorrhæa was finally cured by the common remedies.

Among the mineral preparations, those of zinc and copper have been proposed, as well adapted to the cure of the present disease. The cuprum ammoniacum, in doses of two grains, conjoined with opium, was given to a child eight years of age, without effect. I should, nevertheless, repose considerable confidence in the powers of copper judiciously directed. This with calomel was the active material in the remedy of Mr. Crous, and, according to his statement on oath, his usual quantity was one scruple of verdigrise, and

when hydrophobia has come on, he directs 180 *grains of the same medicine mixed with half an ounce of calomel for one dose.** It is not from the authority of Mr. Crous, but from the very active properties which copper is known to possess, and from its successful employment in epilepsy, chorea, and many other diseases of the nervous system, that I am solicitous to witness its effects on the constitution while labouring under the distressing symptoms from canine poison. Some embarrassment would probably be experienced on account of the precise dose, but that must be determined by the effects and other circumstances. Dr. Mease appears sanguine in his opinion that this disease may be cured by means of a *strangury*, excited by the internal exhibition of *cantharides*. The principle, he observes, of the animal œconomy, first unfolded by J. Hunter, of one irritation curing another, is daily and amply confirmed in practice, and its application in the present disease seems highly probable. In confirmation of this sentiment, Dr. Mease brings into view the history of a desperate case of tetanus in which a cure was happily effected by the use of cantharides. The case is related, (Med. Repos. vol. 4. p. 337.) by Dr. S. Brown of Lexington, Kentucky, of a lady who was attacked with tetanus from a wound in her heal, and after various appropriate remedies had failed to afford relief, Dr. Brown exhibited fifteen drops of tincture of cantharides every hour until one and a half drachm was taken, when it excited such a

* See the Remedy of Crous, page 208.

degree of inflammation in the stomach and bowels, and a slight strangury, as to forbid any further use of the medicine. The happiest effects, however, resulted from this bold practice; every symptom of tetanus and spasm immediately yielded to the new disease thus created, and no recurrence of them was afterwards experienced. From the striking analogy of the two diseases, we are advised by Dr. Mease to adopt a similar practice in hydrophobia. In order to give the tincture of cantharides a faithful and decided experiment, it should be exhibited speedily, largely, and repeated often, and uncombined with any thing but the vehicle in which it is taken. Nor should any other medicine be administered to interrupt or modify its action, until the course of the experiment is completed. The most vigilant attention will be requisite to ascertain the effect, and as soon as symptoms of inflammation of the alimentary canal or the bladder become manifest, the intention is thus far accomplished, and the medicine should be discontinued. Mucilaginous and diluting drinks, with oily clysters, and a proper quantity of laudanum must now be exhibited, and these with the warm bath, will probably soon procure the desired relief. As the strangury, and inflammation of the stomach, are justly considered as violent and alarming affections, it will be proper to apprize the friends of your patient of the alternative, and state to them your views and intentions; and though the experiment is not wholly free from danger, it is incomparably less to be feared than hydrophobia,

and it may afford the only chance for life. A severe strangury is frequently induced by the application of blisters, but no very serious consequences have been known to follow. Should the patient be unable to swallow the tincture with liquids, two grains of the powdered cantharides or American blistering flies, may be substituted in the form of bolus or pills. Some additional authority in favour of the practice of exciting a strangury, as a cure for the present disease, is adduced by Dr. Mease. In a paper by Mr. Andry, in the first volume of the Memoirs of the Academy of Medicine of Paris, several authenticated cases are related of the efficacy of cantharides, and of other species of insects of the melœ tribe, even when given after the disease appeared to be far advanced. But it must not be concealed, that some instances have since occurred, in which attempts to cure tetanus with tincture of cantharides has either failed, or that a strangury could not be effected by its use.* *Stramonium*, or thorn apple, is another medicine, which, on the suggestion of Dr. Mease, ought to have a trial in the disease in question. It is an article of active powers, and, besides my own experience, I can adduce the most creditable attestations of its utility in curing epilepsy, and alleviating many distressing symptoms attending nervous affection. In doses of two grains of the powdered leaves or extract, Dr. Cooper, who experimented with it, found the pulse increased in frequency at first, and that it afterwards became full

* See Med. Museum, vol. 1. and Med. Repos. hex. 2. vol. 3. p. 253.

and quick, and produced giddiness, *warm skin*, moist hands and sleepiness. "A defect of due energy in the heart," says Dr. Mease, "wakefulness and cold skin are symptoms that constantly attend the disease, and the two last are sources of much distress. Hitherto no remedy has had the least effect in removing them. Their cure will greatly assist toward the removal of the whole complaint. This may be effected, in my opinion, by the *stramonium*, if given early in the disease. It should be exhibited in such doses as will *powerfully affect the system*, and repeated as often as a previous dose has ceased to act." The *atropa belladonna*, or deadly nightshade, is supposed by some German authors to possess properties eminently adapted to the cure of hydrophobia. The plant, it is well known, is a virulent poison; but the real difference between a poison and a medicine, consists merely in the dose and manner of administration. Besides a remarkable narcotic power, belladonna is said to be particularly useful in promoting the secretions by sweat, urine, and also by saliva. It is sufficiently probable, therefore, that it may prove of real efficacy in the present disease. It will be seen in a letter from Dr. J. G. Knauff to Dr. Mitchell, (Med. Repos. vol. 6. p. 391.) by whose authority belladonna is confidently recommended, and you will there find also the proportionate doses from three to six grains precisely detailed. The above proposition may derive considerable importance from an article lately published in the Eclectic Repertory at Philadelphia, vol. 1. p. 512.

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oil is accompanied with friction, a copious perspiration is often produced.

The fact is fully established, that olive oil has frequently been employed with complete success as an antidote to the poison of the viper, rattle-snake, and other venomous serpents. Several deplorable instances of this description, with an interesting account of the cures effected by the free use of olive oil, both internally and externally applied, have been published in the Medical Repository, vol. 2. p. 253. "We have likewise been assured," says Dr. Thomas, (Modern Practice) "that anointing the body freely with sweet oil, and pouring repeated draughts of it forcibly down the throat, has lately been discovered to be a successful remedy in hydrophobia."

It will be perceived by Cases 3 and 8, that Dr. Physic has proposed, and Dr. Rush encouraged us with the most flattering prospect of success, from the operation of tracheotomy.

From an opinion that death in hydrophobia results from a spasmodic closure of the glottis, an artificial opening into the windpipe, it is rational to suppose, would obviate suffocation, and give time for the employment of other remedies, with the hope of effecting a radical cure. But, however well grounded might be their hopes, the expedient has unfortunately been resorted to in England without success. (Case 13.) *Should* the difficulty of swallowing be so excessive, as to prevent the possibility of taking a sufficient quantity of nourishment, the flexible tube suggested by Dr.

Coxe, or the eel-skin as practised by Dr. Hunter, and described by Dr. Thomas, (Modern Practice, p. 321.) may be introduced through the œsophagus, by which means liquid food may be conveyed into the stomach. Clysters of animal broth and other nutriment, should also be frequently injected; and to assuage intolerable thirst, wine or other liquids might be poured down the throat from the spout of a tea-pot.

Every attempt to swallow food in such forms as may be found practicable, ought to be encouraged. Wine, either alone or impregnated with aromatics, and perhaps with ardent spirits, may subserve the purpose of rousing the stomach, &c. from its state of torpor. But the use of *cinchona* and steel under certain circumstances, must be considered as of great importance. After the spasmodic paroxysms have been in some measure subdued by any of the foregoing means, or otherwise, during their remissions, a bold administration of the Peruvian bark may impart such tone and vigour to the system, as to prevent a recurrence of them. This medicine may be given in the form of electuary, and also thrown up by clysters in very large quantities. In Dr. Hunter's communication to the Society for promotion of Medical and Surgical Knowledge, he relates the following remarkable circumstance: "Among the cases collected by the society, there are two in which the relief obtained by running was very remarkable; in one, the amendment was so considerable, that the patient did not look like the same person, after running about a quarter of a mile. This

suggests an experiment which might easily be tried. It would probably be made to the best advantage in the open air, in a quiet, retired and shaded place. It would soon appear, whether it were better to run briskly for a short time, with frequent stops between, or to take a slower pace that could be continued for a greater length of time. If the patient found relief, there would be no difficulty in getting him to persevere."

With regard to the requisite precaution against the dangerous consequences resulting from a bite, or contact of saliva while in attendance on the patient, I have already adduced the recent disaster experienced by Dr. Childs (see Case 14) verifying the hazard by some heretofore apprehended from the saliva of hydrophobous patients.

Great precaution, therefore, will be deemed justifiable, and should danger become apparent during the furious stage of the disease, the patient ought to be so confined, either by a strait waistcoat, or other means, as to prevent injury to himself or attendants. It would also be particularly proper to avoid the saliva coming in contact with any part of the body, and with a view of annihilating every source of apprehension, it would be advisable to bury in the earth all such clothes as have been in use, and are contaminated with the saliva, as a small quantity of it applied to a part where the skin is broken, might be productive of disastrous consequences.

I have now concluded a series of essays relative to one of the most tremendous and formidable of all human maladies. Its real nature and character is without

a parallel, and the mode of cure, it is feared, will long continue to be enveloped in impenetrable clouds of darkness. Inexpressibly grateful would be my reflections could my mind be inspired with a portion of that wisdom which would enable me to shed a ray of essential light upon this most intricate subject. It is for me, however, to enjoy only the satisfaction of producing a faithful and minute detail of facts; many of which will be new to you, and on a subject so imperfectly understood, even unwelcome truths may have their use, as tending to diminish unreasonable confidence, and inciting to a more sedulous search after new and more successful means of cure. To new and infallible remedies I have no pretensions; it must suffice for my purpose, that I have designated the negative character of some, and adverted to the probable utility of others, which we have long been in possession of for practical experiment. And, finally, although you are presented with a choice among an ample catalogue of remedies, yet it must be acknowledged, that the grounds for selecting one in preference to another are merely those of hypothesis and speculation.

It would be truly honourable to the profession of medicine, were physicians to turn their attention to inquiries respecting this awful disease in all its properties and forms, but no point is more essential, than a decided judgment as to the plan of cure which is to be preferred; that when a case of hydrophobia falls under observation, not a moment may be lost in contemplation, nor embarrassment from neutralized opinion permitted. But, avoiding that feeble practice

which is too frequently the result of consultations, the practitioner should proceed with boldness upon the course to be pursued, and no occurrence in the disease should be suffered to escape his critical observation, and whatever may be the event, the medical public should be considered as having an undoubted claim upon all the information which the most faithful and correct narrative of the case is calculated to afford.

LETTER XVII.

SYMPTOMS AND METHOD OF TREATMENT BEST ADAPTED TO THE BRUTE CREATION.

THE theory and practice of veterinary medicine, although of great importance, have not progressed to any degree of perfection in our country; and we remain destitute of any rational or correct system of practice adapted to the cure of the various diseases, which frequently prevail among the most valuable species of our domestic animals.

In Europe, the diseases of cattle were long since deemed of sufficient consequence to arrest the particular attention of men of science, and in many of their universities, professorships are instituted for the express purpose of investigating the nature and treatment of the diseases peculiar to the brute creation. The great utility derived from such establishments, should encourage those of a similar nature, in the various colleges in the United States. In the year 1757, great devastation was experienced, by a wide spreading epidemic, among the horned cattle in England. No regular method of cure was known, until Dr. D. P. Layard, an eminent physician, humanely undertook the investigation of the malady, by visiting, personally, the diseased animals, and, at length, devised a new mode of prevention and cure, by which the terrible epidemic was happily arrested. The pres-

ervation of the herds and flocks of our farmers, is a national concern, and both interest and humanity ought to impel physicians to devote a share of their attention to the subject. While the medical faculty deem it derogatory to their profession to labour in this ample field, we shall remain stationary in our limited knowledge of the physical œconomy, and of the prevalent diseases of cattle. Every point of theoretical or practical information, should be recorded, and faithfully promulgated through the medium of some public channel, by which means, a stock of knowledge, of the first importance to the agriculture of our country, may be acquired.

The ravages made by rabid animals among the brute species, are often extremely alarming, and at some periods, so extensive, as to deprive our farmers of a considerable portion of their most valuable live stock. Animals are, in general, more susceptible of this infection than the human species, and it is with them equally fatal in its consequences. Preventive means may have succeeded in some instances, but no remedy, it is presumed, has ever effected a radical cure of the genuine disease.

The period of attack is variable; but it is seldom earlier than ten, nor protracted beyond thirty or forty days after the bite has been inflicted. There were six cows bitten, not long since, belonging to a gentleman of Dedham, all of which were seized with the fatal disease, within twenty-four days after the accident. All domestic animals, as horses, horned cattle, swine and sheep, with the feathered tribe, are the sub-

jects of this malady in consequence of a bite from rabid animals. Whether every creature labouring under the infection, is capable of infecting others, or whether there is any race of animals exempted from its effects, we are unable to determine. The symptoms which distinguish this terrible disease are various, but there is constantly a remarkable departure from the natural manners and habits of the animal. In general they appear dull and heavy, loathing their usual food and drink, and froth at the mouth. Horned cattle soon become furious, and exhibit an indescribable wildness of their eyes, and rage in their countenance; they run at and tear with their horns, every object in their way; pawing the earth with their feet, rubbing their mouths in the dust, and rending the air with a tremendous roar and bellowing. In their paroxysms of spasm and convulsion, their whole bodies are thrown into dreadful disorder, and slaver runs continually from their mouths. During the early stage of the disease, their natural strength and activity appears augmented; a mad cow has been seen to leap a fence more than six feet in height, with astonishing agility. In some instances, cows have manifested peculiar indications of salacity, accompanied with frequent painful emissions of urine in small quantity. They discover no horror at water, but are seldom able to swallow. Their strength gradually diminishes, and in three or four days from the attack of the symptoms, they expire. The horse, when labouring under this disease, exhibits a spectacle not less formidable. During the agony of his parox-

ysms, he has been known to gnaw a considerable portion of flesh from his body, and to chew entirely in pieces a pail which contained his food. Even the meek and harmless temper of sheep, is, by this disease, excited into frightful rage, and assuming the manners of the dog, they in their turn, become the objects of terror. They gnaw every substance within their reach, even the skin from their own legs; and attempt to bite or attack with violence all who approach them, sending forth an unnatural bellowing and foaming at their mouths. Swine frequently discover a disposition to bite, and would probably occasion considerable mischief if not restrained, though it seems not yet to have been ascertained, whether the disease has ever been imparted from one infected animal to another, except from the canine species. It is, nevertheless, advisable to separate diseased animals from those that are in health. Some doubts have been expressed whether the milk of rabid animals, is not impregnated with deleterious qualities, but I have the fullest assurance, that it is perfectly harmless. The infected female suckles her young without the least ill consequence, and no person has been known to suffer from the use of the milk, even at the last stage of their disorder. The flesh of mad animals is not supposed to be poisonous; it has sometimes been eaten with impunity, but the disgustful practice ought not to be encouraged. The following singular fact is of sufficient importance to claim attention, and it may be relied on as incontestable. At a certain sea-

son, a few years since, when canine madness was epidemical among foxes, the crows in the vicinity, who had undoubtedly eaten their carcases, were observed to be affected with the same disease. They were seen to exhibit odd gestures when on the wing, and when standing on their feet, making a singular and unnatural noise, and suffering people to approach near them as if divested of fear. A considerable number of these fowls were afterwards found dead.

Reasoning from analogy, it might be imagined that these birds received the infection by the bite, and it offers a curious subject for speculation, whether a crow was first bitten by a fox, and the infection imparted to other crows by its bite, or whether the whole of them imbibed the poison by eating the carrion.

Another fact will seem calculated to strengthen the probability of the latter supposition. Hens have been known to contract the disease by eating corn which dropped from the mouths of mad hogs. Their very ludicrous actions and speedy death, were such as to leave no doubt on the minds of the beholders as to the real nature of the disorder. The above mentioned facts would suggest the inquiry whether the ingluvies, or crop of the feathered tribe is furnished with a gastrice juice capable of decomposing or destroying animal poison?

It is to be regretted, that no rational method of preventing the effects of canine poison among animals, has prevailed. Every farmer resorts to such remedies as his own fancy, or the reports of an ignorant

neighbour may suggest; although constant experience evinces, that such random and desultory practice, is exceedingly precarious, and seldom attended with the desired success. Let this irregular and inadequate procedure be entirely abandoned, and the following more rational and more hopeful method be substituted. As speedily as possible, after the bite is given, the whole of the injured substance and a proper portion of the contiguous parts should be carefully cut away, and the wounded parts ought to be particularly examined and searched, for the various openings and directions, to which the animal's teeth may have penetrated.

Unless you remove every fragment of flesh to which the poison is attached, no benefit is to be expected from the operation, for the smallest quantity of the virus may communicate the disease. Such is my confidence in the efficacy of this operation, when judiciously performed, that I should urge the owner of the creature bitten, to have recourse to it at any period, between the bite and the usual time of the constitutional affection; and from its importance, I would suggest the expediency of making application to an expert surgeon for the purpose. The animal ought to be secured in such position, as to afford the fairest opportunity of performing the operation with facility and without danger. Should the wound be situated near a large artery or vein, or on any of the large tendons of the legs, instead of cutting the parts, a proper portion of them may be carefully removed by burning with a hot iron, or by the judicious applica-

tion of some caustic. In preference, however, to either of these, I should have recourse to the operation of burning with gun-powder. I am not insensible that this method has failed when practised on the human subject, but it is fairly presumable that the process was not conducted in the most judicious manner. A timid operator is seldom successful. Of all actual cauteries, the burning with gun-powder is without question the most expeditious and the least painful; and besides burning, it tears open and destroys the texture of the parts so as to supersede the use of the knife. If the original wound should be small it ought to be dilated, when a small quantity of gun-powder must be strewed into it and set on fire, and if necessary the process may be repeated. A strong solution of white arsenic in water is another remedy with which the wound may be washed with a fair prospect of counteracting the effects of the poison. The cold water is a remedy which must not be neglected, either before or after the employment of the knife. It should be poured forcibly into the wound, and continued for a length of time. Among the caustics to be employed on these occasions, the lunar caustic does not appear to be endued with the necessary activity and power, and the expense of it will also be an objection to its use. Those to be preferred are the caustic vegetable alkali, and the nitric and sulphuric acids. But one of the most eligible applications for cattle, and which every farmer may easily procure, is pure potash, either alone or mixed with a small portion of quicklime; let these

in fine powder be mixed together and strewed freely into the wound, or it may be made into a paste with a little hard soap, and applied in that form. If equal parts of potash and lime be dissolved in warm water, and strained through a fine cloth, it will form a liquid caustic of very considerable powers, and well adapted to the purpose intended. It must be kept in bottles closely stopped, and it should be recollected, that when liquid caustics are employed, much care is requisite to prevent their spreading and corroding the hair and skin beyond the necessary extent. Caustics may be advantageously employed in some cases after the operation with the knife; but when excision is dispensed, with the wound occasioned by the bite should be properly dilated, and the powder of lime or potash, or both combined, should be applied in such manner as to reach the bottom in every direction, and the process repeated as often as necessary, until the parts are destroyed to a proper depth and extent. This application will produce considerable inflammation and suppuration, by which the canine poison will probably be effectually discharged.

Whether the ulcer be produced by the knife or caustics, it is indispensibly necessary to keep up the purulent discharge for several weeks, and if disposed to heal, it must be prevented by the application of stimulating ointment, containing the powder of blistering flies. It is to be observed, that the wound should, by a proper covering, be secured from the air and from the tongue of the animal, lest he lick off the caustic applications. It has long been the practice

to apply salt and vinegar to the bitten part, but I do not conceive that either of these possess the properties of a counter-poison, and should therefore prefer the washing with cold water.

Having enumerated particularly the various means of prevention, some of which I have the fullest confidence would effectually obviate the fatal infection, it must be left to the judgment of the practitioner to adopt that mode, which under the attending circumstances of the case may be deemed most eligible.

In regard to internal preventive medicines, it has been shewn that numerous articles of that description have at different periods obtained celebrity for their supposed virtues, and although it may be difficult to select the most promising, yet a perseverance in the use of some of them is still to be encouraged. If a choice is to be made among the most efficacious, I would mention the scutellaria lateriflora or scull cap, as meriting at least to be more particularly tested by practical experiment. The proofs adduced of its efficacy still preponderates, and it is by repeated trials only that its antidotal powers can be ascertained. With this laudable view it is extremely desirable that it be employed on every proper occasion, and the result in every instance, whether successful or otherwise, should be faithfully recorded and promulgated.

When the remedies employed have not been crowned with the desired success, and the animal is seized with the constitutional affection, its condition may then be considered as absolutely desperate, and no medicine with which we are acquainted, can be

administered with a prospect of effecting a cure. In this situation the animal becomes a proper subject for experiment, from which some advantage may possibly be derived. If the cutting out of the bitten parts and the application of caustics, were omitted in the first instance, those remedies might now be employed with the hope of ascertaining what effect they may produce in the last stage of the malady. It might satisfy curiosity also, to try the effect of mercury given internally. Two drachms of calomel made into a bolus or ball, or four grains of corrosive sublimate dissolved in one ounce of rectified spirit of wine, for one dose, if the beast be a horse or an ox, and this or a smaller dose might be repeated, until the effect can be ascertained.

Arsenic and verdigrise might also have a trial; one grain or more of the former and three drachms of the latter, repeated at proper intervals. Stramonium, in repeated doses of eight or ten grains or more of the seeds, or dried leaves, might have the effect of mitigating the symptoms. The lobelia inflata, or Indian tobacco, in decoction, or the nicotiana or common tobacco, in the same form, appear to be well deserving of trial, with the laudable view of ascertaining their properties and effects. Should any one still adhere to the opinion, that the disease arising from canine poison, is of an inflammatory nature, let him now put his theory to the test of practical experiment, by opening the jugular veins and depleting the blood vessels to his full satisfaction.

CONCLUSION.

It is to be remarked, as a singular and astonishing fact, that a disease more awful in its nature, and more enveloped in mystery and darkness than any other, and which never has been known to yield to medical skill, should become the common subject of quackery and the sport of illiterate pretenders. Is it consistent with the ordinary course of rational pursuits, that those who never have devoted an hour to the acquirement of medical knowledge, should be deemed the most capable of devising a remedy against this dreadful disease? Such unwarrantable usurpation ill accords with the pride and dignity of medical science, and should no longer be countenanced by a culpable acquiescence. But I hope not to incur the imputation of arrogance, being truly sensible, that while we contemn that reproachful credulity, which amounts to an implicit contempt of reason, we ought equally to disdain an imperious and unmanly pride, which bespeaks a degree of scepticism, no less prejudicial to the genuine interest of science. I cheerfully concede to the position, that we are indebted to the bold practice of empirics, for a knowledge of some of the most active and valuable articles of our Materia Medica. Nothing, however, can be more glaringly absurd and fallacious, than the numerous popular nostrums, and secret remedies applied in the present disease, consisting not only in materials of the most

trivial nature, but frequently in such as possess opposite properties; yet all are intended to effectuate the same salutary purpose, and are eulogized for their supposed superior virtues. Who that consults the cool dictates of reason, will have the credulity to believe, that a few leaves of a simple plant, of which one might eat a basket full with impunity, can possess powers capable of producing such a change in our system, as to eliminate or counteract the effects of canine poison? Such faith is not compatible with that commendable scepticism of mature reflection, which calmly inquires and cautiously tries before it decides.

The declarations of an interested proprietor, that his remedy has been attended with general success, is far from being satisfactory; for the same assertion may be made with equal truth respecting many different methods of treatment, and, moreover, numerous instances of exemptions have occurred among those who neglected all means of prevention. Of about twenty persons, whose cases came to my notice during the last twelve months, some resorted to frivolous remedies which often have been known to fail; others employed the scullcap, caustics, and the affusion of cold water, while a few unconcernedly abstained from all remedies whatever.

The sequel is, that not one of those persons were affected with the constitutional disease, although bites from some of the same dogs proved fatal to a considerable number of the brute species. I am by no means disposed to implicate and censure all indis-

criminately, as fraudulent, who may possess or administer empirical remedies, as it is notorious that persons frequently assume the duties of professional men from the purest motives, but in the ardour of their zeal and self confidence, they frequently do irreparable injury to the cause which they honestly espouse. Contemplating the human mind more, than in former times accessible to truth and reason, and adverting to the experimental inquiries, concerning poisons and other branches of medical science, to be found in the rich records of modern medicine, we need not despair of ascertaining more perfectly the properties of canine poison, and of attaining ultimately to a rational and successful method of treatment of hydrophobia. It is not, however, from vague speculation or conjecture, but from experimental facts, and analogical reasoning, that such an acquisition can be derived.

But it is in vain that you combine facts, unless they have an affinity with each other, and are made to present themselves under an unequivocal form. For lessons of wisdom in this respect, let us resort to the example of the indefatigable Fontana, whose zeal prompted him to execute more than 6000 experiments with the venom of the viper and other poisons, many of which were attended with imminent danger and almost insurmountable difficulties, but his perseverance and ultimate success have immortalized his name.

The nature of the canine poison is probably the same in its essential effects either in the human or

brute constitution, and it would be both a curious and useful fact to decide, whether the disease is capable of being repropagated from the human subject to the brute creation. Small and harmless animals, as rabbits, pigeons and hens, might be employed as proper subjects for experiment with the human saliva or the canine poison. They might be made to swallow corn, or other food impregnated with it, or it might be inserted into their flesh by incision, and if it have a fatal effect, a trial should be made with the saliva after being combined with proper chemical substances, to determine whether the poison can be decomposed and rendered inert. The substances to be preferred are the volatile alkali, potash, nitrate of silver, arsenic, and the mineral acids.

Experiments made upon the canine poison in brutes, might be considered as an arduous and hazardous undertaking, but it is not to be deemed altogether impracticable, and I will suggest the following project for the purpose. In the first place, dogs when affected with madness, instead of being killed, should be confined and secured, that the disease may run its course, and for the ascertainment of many useful facts connected with its several stages. If experiments on dogs should be deemed too hazardous, let other animals of little value be selected, provided a sufficient number can be procured. Having provided for their security in some proper enclosure, let them be inoculated with the saliva of the mad dog by the point of a lancet, which would undoubtedly prove as effectual as the dog's teeth. The animals thus in-

fected, are to be the subjects of various experiments and the most attentive observation. With some, the inoculated part might be cut out, at different stages, to ascertain the latest period in which it may be done successfully. To others, various counter-poisons and specific remedies might be applied to the wound and administered internally. In fact, it would be difficult to determine, a priori, the extent of the advantages of this novel plan, if judiciously conducted. You may smile at my project, but however chimerical and visionary it may appear, I should rejoice to be the *Jenner* of the proposed institution; though I might fail in realizing my thousands, I could pride myself in being the candidate for the honour, and the author of an attempt to mitigate the horrors attending one of the greatest of all human calamities.

POSTSCRIPT.

The subject of canine madness has ever been considered of sufficient importance to demand the interposition of legislative authority. Laws have frequently been enacted with the view of preventing the evil consequences resulting from this terrible calamity, but the event evinces the extreme difficulty of devising such as will be adequate to this desirable purpose.

While no cause for alarm is known to exist, precautionary measures are considered altogether inexpedient, and the laws will neither be respected nor executed. The rabid disease is well known to be more prevalent among dogs at particular periods or seasons, and frequently its ravages do not extend beyond a limited district. From these considerations it may be inferred that the existing laws of our Commonwealth are susceptible of such modification as to apply immediately to the particular exigence. Were the authority of the laws vested in the several District Courts, or the magistrates of counties, they might be enforced at the commencement of the malady or on any alarming emergency, as circumstances may imperiously demand, either by ordering a general slaughter or restraining the animals from running at large.

The dangerous practice of suffering dogs to run at large after they are known to have been bitten by one affected with madness ought to be prohibited by the severest penalty.