Thesis

on

Hydrophobia

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Hydrophobia

Definition and Derivation of the term. This terrible malady belonging Essentially to the nervous system, characterized by great restlessness, and irritability of the mind, dread of, and difficulty in swallowing fluids, accompanied by clonic Spasm of the Pharynx, Spasmodic constriction of the muscles of the chest, and preternatural sensibility of the Special senses to External impressions. With regard to the nomenclature of this disease, Hydrophobia. (ὕδωρ water φόβος fear) assumed as a name for the whole diversified phenomena, which constitute the affection resulting from the bite of rabid animals, denoting as it does the Chief symptom — though not invariably — by which it is demonstrated in the human being is, notwithstanding the numerous attempts which have been made to introduce one more expressive of the disease, still that by which it is known in the common language of the inhabitants of France and England, and under forms more or less translated amongst all the nations which inhabit Europe.

Of the Synonyms which have from time to time appeared I may notice the following. Hydrophobia (ὕδρος moist. φόβος fear) Rhabdophobia (φόβος fear ῥάβδος stick) Rhempydros (φεύγω to avoid ὕδωρ water) Brachypodia (βραχύς short πούς foot) Canis Rabidi Morsus, have been its denominations among the Greeks and Latins. Among the French writers it has been termed; Rabies Canina, Rabies — La Rage; while

with ourselves the term Dyscatapotia (δυς with difficulty καταποσις swallowing) has been proposed by Dr Mead. Entasia Lyssa (λυσσα canine madness) by Dr Good

History. The records of Medicine have from the earliest time borne evidence of the existence of Hydrophobia as a disease communicated from the Dog to Man For we find it described exquisitely graphic and surprisingly faithfull, though with the phenomena exaggerated in their ~~tendency~~ intensity and rendered more formidable than as presented to us at the present-day; as little amenable to treatment, and as dire in their termination then as now, by Dioscorides, Galen, Celsus, and Aurelianus. We must think that the disease originated in the canine race - particularly the Dog - and it may be surmised from the friendships and communion which have ever existed between Dog and Man that at no long date after its accession it was transmitted from that animal to Man. Some countries have enjoyed comparative immunity from while others, on the contrary, have been particularly obnoxious to this disease, among the former we notice the Island of Jamaica for a period of 50 years prior to 1798 and in South America. Egypt Syria and Barbary it is indeed scarcely known. Among the latter we remark Prussia, Crete and some other of the Grecian islands with St Domingo. The British Isles may be considered as ranging between the extremes, for the Annals of medicine prove it has never since its first observation been

free nor has the disease ever assumed that almost Epidemic character as in some countries

Symptoms I shall consider these as observed not only in man but with a slight notice of them in other members of the animal kingdom, in whom the disease has occurred, and shall after the manner of the able paper by Dr Brunel divide them into pre-monitory symptoms and those which constitute the attack

1 Premonitory Symptoms considering the disease as arising from the bite of a rabid animal these symptoms usually commence with a peculiar sensation at the cicatrix; torpor, stiffness, tingling heat or coldness, though it may be at a distance, removed in some instances to the proximate joint, amounting frequently to actual pain, various in character, often simulating that of Rheumatism, and sometimes attended with itching. the course of the pain is that of the nerves, sometimes shooting from the affected limb to the region of the heart, and occasionally darting pains are complained of in various parts of the body. Most accurate observers have remarked that these pains never irritate or produce inflamation in the absorbent vessels or glands, and I find all cases to which I have referred since the date of these remarks to agree in this particular, but with two Exceptions (the one occurring to Dr Ranking in India the other which I regret I cannot give my authority for at present, but I know that in both cases the wound is reported as having degenerated into

an ulcer and was such at the period of the premonitory symptoms which in both cases were ushered in by buboes, in the groin in one and the axilla the other, the bites having been received on the leg and arm respectively; on these I shall make some further remarks when considering the action of the Virus). The cicatrix at the same time swells and becomes red or livid, ~~and~~ and occasionally reopens, discharging an ichorous matter.

These local symptoms are often accompanied by desire of solitude silence, and dull despair, with general mental depression, the intellectual faculties remain unaltered. frequently indeed the imagination is more fertile the memory stronger the conversation animated, indeed both the mental and bodily powers possessing unusual activity. On the contrary in some cases there may be intolerance of light with dilatation of the pupil, contracted eye-brows, and tumid face, with wandering pains in the neck, trunk, or limbs, pain or heaviness in the head, restlessness, drowsiness, and disturbed sleep, occasionally sighing, momentary flushes, and rigors, slight febrile symptoms loathing of food, loss of appetite, nausea, vomiting, constipation, abdominal pains &c

These symptoms not peculiar to or following any order which can indicate an approaching attack of Hydrophobia rarely all present in one patient, while every one of them have been absent in certain cases, when present varying in their duration from two to six days ere the disease take on its well marked

characters. their accession being frequently ushered in by some general and secondary Excitation of the System, as, after a debauch, or strong mental shock, or Emotion.

2 Symptoms of the Disease a The difficulty of breathing and Swall-owing depend on Spasms of the Muscles of the Larynx and Pharynx. The first of the actual symptoms of the confirmed disease are stiffness of the neck extending to the root of the tongue and thyroid cartilages, and soreness of the throat with severe Spasmodic pain at the Epigastrium. The patient experiences difficulty in swallowing, particularly fluids, and any attempts to accomplish this are prevented by sobbing, or deep sighs: these Symptoms usually of short duration so impress the mind of the patient with a continual dread of fluids, and of the action of deglutition, that any reference to the same induces the Suffocative Spasm. Deglutition becoming more and more difficult, every attempt to swallow induces violent Spasm of the Muscles of the Larynx and Pharynx, the patient struggling most violently to expel the air confined in the chest through the closure of the glottis, and occasionally those of the face As the disease advances the paroxysms occur in increased frequency and force, either spontaneously, or, such is the morbid sensibility, excited by the slightest noise, touch, or ray of light. Though the Spasms are generally confined to a limited number of muscles occasionally the whole Muscular System is affected, simulating for the time the phenomena of Tetanus

The patients countenance at the same time exhibits a terrible aspect, expressive of the utmost anxiety and alarm. the eyebrows contracted, the eyes staring, and glassy, the angles of the mouth drawn upwards, approaching in effect that of the "risus Sardonicus". These also excite intolerance of light and sounds, the tone of the voice is altered, reduced in some cases to a whisper, and rendered hoarse, and repeated attempts to eject the saliva, which tow ards the termination of the disease becomes very thick and viscid, and ultimately runs uncontrolled over the patients face & chin, produce reiterated noise, which have been likened to the bark of a dog. The speech also is rendered rapid and abrupt

b <u>Irritability of the surface of the body</u> is next to the spasm the most prominent symptom, the slightest impression on the surface, in some cases even the merest touch of the skin of the head, will suffice to produce the much dreaded convulsions. The patient perceives smells, and hears sounds from the excessive sensibility of the respective organs, which though real are unappreciable by the bystanders, in one instance recorded by Magendie a dumb patient heard distinctly during the hydrophobic spasms

c <u>The state of the mind</u> was remarked among the premonitory symptoms that the mental faculties may be depressed, demonstrated by dull despair and an incapacity for all comfort and consolation, here they are generally observed to be altered, and we have

evident mental excitement manifested by increased loquacity unusual and uncalled for from the patient; as though he attempted to relieve or hide his sufferings by ceaseless conversation, a certain amount of suspicion also exists with great liability to take alarm at the most trivial causes. Furious delirium is rarely present and then only during the paroxysms and towards the termination of the disease, but there often exists even soon after the commencement of the symptoms, some slight hallucination of the mind, but from this the patient can be roused when spoken to. It occasionally happens that one of an originally strong and resolute mind may preserve his composure throughout and be to the last endued with sufficient courage to attempt drinking in spite of the horrors of impending suffocation, more than one patient having expired while making a vigorous effort to swallow the prescribed draught.

The whole of the above symptoms may establish themselves in a few hours after their commencement, though in general not fully developed before the second day, and death most usually occurs on this and the third day sometimes within 24 or 36 hours. rarely prolonged beyond the 5th day though in some few instances as late as the 9th day after the accession of the hydrophobic symptoms. Death occurring generally from Asthenia.

I must now take into consideration the anomalities observed with respect to The Pulse. The Secretions & Excretions

The pulse varies extremely, but is generally quick and has been counted as high as 150 it is seldom strong sometimes strong and hard, fluctuating considerably during the course of the disease. The alvine secretion, perspiration, and urine seem generally to continue in a natural state. but occasionally there is obstinate constipation, relaxing however towards the termination of the disease. In some instances the skin ~~however~~ is hot and dry, in others parched, but these like the constipation generally give place towards the termination and we may then have a moist skin, a profuse perspiration The character of the urine is little changed, in some instances it has been remarked as scanty, of a greenish, and in others of a pale lemon colour. The secretion from the salivary glands is considerably increased, more particularly towards the latter part of the disease, and at the same time is more viscid, thick, and tenacious. The tongue is sometimes moist and more or less furred, Nausea is also present and not unfrequently a yellow, greenish, glairy, or coffee like fluid succeeds the Eructations. Severe thirst often accompanied with hunger, and a burning sensation in the Oesophagus, materially increase the poor patients sufferings in the later stages. Such is the more general progress of the disease but there are many varieties observed to occur in different individuals as among the premonitory symptoms, indeed the most

marked symptom in the disease may at times be absent though others may be present which sufficiently characterize the disease, as in some instances where the patient has been able to take water and in others where though the patient objected to the latter with the strongest aversion, yet readily took iced wine or broth. Again Hydrophobia may intermit, but these intermissions have no distinct effect in rendering the disease less fatal, merely prolonging its duration. Still they admit a favorable opportunity for the administration of such remedies as cannot be accepted while the spasms are predominant or easily excited.

Having I think now fully considered the symptoms as they are presented to our notice in man I shall take a short review of those observed in the lower animals.

In the Dog the disease is said to be of two forms. The first is characterized by augmented activity of the sensorial and locomotive functions, continued and peculiar barking "commencing as a perfect bark, ending in a howl a fifth or sixth or eighth higher than at first; it is the rapid succession of the one upon the other that constitutes the diagnostic howl." and a strong disposition to bite. The affection commences with some alteration in the peculiar habits and disposition of the animal, who as the case may be is more irritable, more tractable, more lively or more sluggish than usual; or these several conditions may alternate in one

and the same animal. An early symptom consists in an inclination to lick or carry in the mouth inedible substances particularly such as are cold. The animal after a time pets restless; snaps in the air, as if at flies, frequently leaves the house, but soon returns, and is obedient and seems attached to his master. According to Blaines - Canine pathology, constipation usually exists. There is generally complete loss of appetite; but the animal seems to suffer from thirst drinking eagerly until indeed as usually occurs the mouth and tongue become swollen. The eyes are red and particularly bright, lasting two or three days, then dull, and wasted, and a dimness steals over the conjunctiva changing to a yellow tinge and in twenty four hours from that, the eye becomes one disorganized mass. The skin of the forehead is also wrinkled which gives a peculiar aspect to the animal's countenance, the nose, tongue, and throat, soon become, usually, swollen and the coat appears rough and staring. According to Hertwig the mouth becomes, generally, dry; but Blaine has constantly observed a flow of thin saliva. Youatt remarks that the increase of saliva is one of the first symptoms in the dog and that it gradually becomes more viscid. After sometime the gait becomes unsteady and staggering, and finally the extremities are paralysed. The tail in this form of the disease is not carried between the legs

and the head is held erect, the nose being pointed upwards.
A disposition to bite generally occurs sooner a later in the course of the disease it is not however always present, nor permanent when present, but usually occurs periodically and is then directed against both animate and inanimate objects most especially towards the cat, less so towards other animals, and least of all towards man. When the animal bites, he does not previously bark or fly at the object of his attack but approaches in a quiet or even friendly manner and makes a sudden snap.
The second form of the disease, is distinguished by inactivity and depression; there is no disposition to bite - probably from the lower jaw being paralysed, nor is there any inclination for change of locality manifested.
The first symptoms are usually inquietude, and depression of spirits. The voice is entirely changed as it is also in the foregoing variety, but there is much less disposition to bark or howl. The mouth is open the lower jaw hanging as if paralysed, and is raised only under the influence of strong excitement; there is also a constant flow of saliva from the mouth, the animal either does not drink at all or does so with considerable difficulty, but manifests no fear of water, and on the contrary, willingly immerses the nose in that fluid. The tongue is almost constantly

protruded from the mouth, The animal rarely survives beyond the sixth day. Thus we perceive that insanity of the dog and dread of water, are but subjective Errors in connexion with this disease, Some animals indeed trained to certain duties, as pointers, have performed these in the rabid state quite as efficiently as when in health. The most invariable symptom is the rough harsh bark ending in the peculiar howl, which is very characteristic In the Cat that this disease has occurred to the cat and from them been communicated to the human being is well authenticated by the cases upon record, that it does originate in this animal I should think very doubtfull when we consider the natural Enmity which exists between the Canine and feline races and the discouragement which all must be sorry to observe is devoted, among a certain class of the inhabitants of populous districts to the propagation of the existing animosity, by training and exciting the former to worry and destroy the latter species, and which is rendered particularly available by the characteristic predatory disposition of the latter which consequently frequently carries them into the mouths of their Enemies. The symptoms in the cat resemble in all respects those in the dog, their premonitory symptoms being invariably of the sullen character, and their decided symptoms being fa

more exhibited towards the human race than in the Dog, their natural disposition to scratch being augmented by an inclination to bite, besides carrying with it far more of the truly rabid character than is ever exhibited in the Dog. Verily a mad cat must be a terrible antagonist!

The Wolf We must believe that the disease exists and indeed is also originated "de novo" in this animal both from the fact, also, that he is of the canine family, but that so many well authenticated instances of decided Hydrophobia communicated to man by wounds have been recorded, indeed that is one reason for the prevalence of the disease in Persia where in some provinces these animals abound in considerable numbers - The symptoms there has never been any fair opportunity of observing in these animals, and the examination of their bodies after death has led to no satisfactory conclusions

In the Fox The disease is comparatively rare in these animals but there exists undoubted evidence that it has been observed in them and that man has died hydrophobic after a wound from the same

In the Jackall We learn from Mr Hewitt account that the disease exists in this animal, materially increasing his malicious propensities, and from the sad mortality in the cattle reported by him evidently communicable

to man. In the Badger the disease has existed in this animal and according to Continental Records has been communicated from it to man

In the Horse the symptoms of the disease, when it occurs in the noble animal, are various. They usually however commence rather suddenly by some signs of uneasiness and sudden breaking out into profuse sweats, when attacked while at labour he continues alternately to draw his load and to stop distressed, and impatient; in a few hours however he becomes completely unruly he stamps and paws violently, attempting to disengage himself from the halter. And though madness be a complete misnomer in the dog it is not so in the horse. The thirst is excessive and the act of swallowing is accompanied with a distinct gulping effort. Animal shewing increased disposition to bite when he has that tendency naturally.

In some cases excessive sensibility of the surface and in one case confined to the side on which the animal had received the bite: Pulse is increased in frequency

In the Sheep this harmless and inoffending animal is changed into so ferocious a creature as to bait at his own shadow reflected by the Sun or any adjacent wall

In the Ox and Swine decided phrenitic symptoms are present, while in some instances there exists a difficulty

of swallowing yet true hydrophobia is rarely present though in one instance in which a guinea pig was inoculated - at the Middlesex Hospital, decided hydrophobic spasms were induced on sprinkling the animal with water. In a fowl Blincke reports an inoculation of this bird and its death, ten weeks afterwards under peculiar symptoms.

Latent Period or stage of Incubation, In respect to the length of time elapsing between the infliction of the wound and the accession of the premonitory symptoms there exists much difference of opinion, and considerable doubt is thrown on the authenticity and true nature of the hydrophobic symptoms when they occur beyond a recognised latent period, which to me appears rather derogatory when we consider the uncertainty which pertains to deciding the limits of this period in several other contagious diseases, in particular I may notice the poisons of Syphilis and Gonorrhoea, not only in the secondary forms of these two but also in their primary demonstrations.

With regard to the symptoms observed during this period in man, little has been satisfactorily observed a few individuals have become retired, gloomy, and melancholy the countenance expressing considerable anxiety, but as the pulse, skin, and other indexes of the functions continue normal, it seems.

impossible to affirm that these signs of depression are such the sole offspring of mental anxiety regarding the hazard in which they in general know but too well their life is placed by the accident. Other symptoms attributed by some authors to this stage seem purely accidental. And as corroborative evidence among the lower animals, who recognise nothing of so serious a nature in their future career, no peculiar change is observable in their manner

There appears to be no determinate period at which the disorder makes its attack after the bite but it is calculated that the symptoms most frequently commence between the 30th and 40th day and after that period the chances of escape. Of 15 patients whose cases came under the observation of Trolliet seven were attached between the 14th and 30th day, five between the 30th and 40th day; two a little beyond that period and one after the expiration of 14 weeks

In 1784 - 14 persons were bitten by a rabid wolf near Brive of whom ten were attacked by hydrophobia - viz on the 15th - 18th 19th 28th 30th - 33d 35th 44th 52nd and 68th day after the bite, one on each respective day. Out of a table of 131 persons bitten by rabid animals none of the patients were affected before the 11th day and only three before the 18th.

Of the cases in which the latent period has been particularly extended one is recorded, in which the most careful enquiries

tended to prove that the patient had never suffered the least injury from any animal except the bite inflicted twelve years previously to the commencement of the hydrophobia by a dog apparently rabid, by Dr Bardsley, who thinks that two years constitute the limit. Another after the lapse of seven years occurred in the practice of Dr Burne. Dr J Hunter considers 17 months and Dr Hamilton 19 months as the limit of this period, while on the other hand some have extended their belief to an interval of 18. 20 and even 30 years

In the Dog the disease never appears in less than two weeks the average duration of this stage being 5 or 6 weeks, in 3 months animal may be considered tolerably safe, though in one instance Mr Gowatt knew it extended to 5 and in another 6 months. he thinks that the quality and quantity of virus may with a predisposition in the animal affect the duration of this period. In the bitch the development of the disease awaits the completion of pregnancy.

Causes These I shall consider under the different heads of Predisposing. Exciting. and Proximate

Predisposing with respect to these we have nothing but the most loose analogies persons of the nervous temperament, of a weak habit of body, and melancholic, and irritable individuals, are occasionally liable to obstructions of the great functions of the throat, breathing, and deglutition and these impediments appear universally to be of the spasmodic kind, superveining suddenly from almost any Exciting cause operating on this class of persons, more particularly mental emotions, gastric irritation, and dyspepsia. But these merely evanescent accidents have no right to be considered as having the same origin with the terrible spasms of human hydrophobia, On the contrary we have already seen that the hydrophobia of man occurs in every possible temperament, age, and habit consequently we cannot infer anything in common in their origin. Indeed the Excitement which produces the spasms in question produces the same effects in the most robust, sedate, and fixed of human constitutions, and who can tell the measure of force Exerted by the Cause of hydrophobia or that there Exists in the human body an irritability too small in degree for it to produce its effects? Therefore the notion of a nervous temperament, or melancholic

tendency predisposing to human hydrophobia, admitedly the result of a specific virus, is an Ex post facto observation, drawn from what is seen in the Symptoms after the disease is formed, and not a previous clinical remark recorded in the latent stages, and confirmed by comparison of cases.

The other causes, being those which have been observed as producing the non rabid hydrophobia, will be disposed of in the diagnosis and may well be allowed to remain in the class of the Exciting causes of that distinct Species till they have been well demonstrated to act as predisposing causes of rabid hydrophobia of which at present there does not Exist one instance upon record.

Neither does it appear decided that any distinctly predisposing cause Exists at any time among the lower Animals even Youatt does not seem to have any very settled opinion on this subject but he remarks that the disease is more general among the Cur, Lurcher and Fighting dog than the pointed or house dog, not from any predisposition being more likely to Exist in the former, but from the fact that their Education, and the slight care taken of, with less control Exercised over them places them more in the way of contagion and further propagation than will happen in the more secluded lives of the latter.

Sr Bardsley however makes a contrary assertion

Exciting Causes Here our information acquires a more satisfactory character. That the bite of a dog labouring under a particular form of madness is often succeeded in man by the symptoms already described, and in animals by a disease remarkably analagous, and equally fatal, is a fact confirmed by the testimony of all ages and nations. From what other animals may this disease be communicable? Undoubtedly from the Cat and from other animals closely allied to the Dog and Cat by natural characters as the Wolf, Jackall, and Hyaena, for the cases of distinct Hydrophobia on record communicated to man and other animals from the bite of above mentioned animals, when in a [illegible]bid condition; as in some instances confirmed by a post mortem Examination, when morbid appearances were observed analagous to those seen in the Dog, decidedly proves this. Maybe in these the disease originates "de novo" though the ~~existing~~ enmity which is maintained between the Dog and these animals renders it difficult to determine, particularly with respect to the Cat, in how far the disease may originate in either of these, and the Exciting cause in them is equally obscure for with regard to the Dog the only one decidedly under our control and supervision and in whom the disease is allowed by many to originate "de novo" — though Mr Youatt contends that in this animal

it is invariably communicated by inoculation – we find that on exposing him to what have been from time to time inferred by various opinions to be the exciting cause of the disease Hydrophobia has never been induced.

It appears pretty nigh settled that herbivorous animals cannot communicate the disease, the Experiment is too doubtfull to admit on man, but from the numerous Enquiries on the subject at Veterinary Schools, on the Continent, ~~and~~ conducted by able Experimenters, I think the question can scarcely remain in doubt. Many attempts were lately made in vain to communicate the Distemper to several kinds of animals by inoculating them with the Saliva of human beings who had perished of the disease, both in this Country and in France the whole of the trials furnishing only negative results but one which from the character and talents of the operators tends to establish the contrary, Magendie & Breschet inoculated with the Saliva of a Man who died a few minutes afterwards, ~~two died~~ of Hydrophobia two healthy dogs. One of the dogs became rabid in little more than a month and bit two others, one of which was attacked with rabies on the Expiration of another Month. The many failures in the foregoing Experiments on with the Saliva of man affected with Rabies, on other animals might tend to maintain the doubt which may exist as to the ~~probability~~ possibility of propagating the

disease by the saliva of herbivorous animals, but that the greater number of Experiments and their invariable failure in the latter case cannot lead me to believe with Mr Gowatt "That every animal laboring under the disease is capable of communicating it."

The disease has not yet been decided as communicable from one human being to another, though the forementioned Experiment of Magendie's renders it very suspicious and great care should accordingly be taken that the saliva and mucous of a hydrophobic patient should not be suffered to come in contact with an abrasion in a second party. The disease has not been determined to be propagated by the breath, or other secretions, neither by consumption of the flesh of a rabid animal, or injection of its blood into the veins of one in health, but by the salivary and mucous secretions, emitted by the mouth, alone. What then is the nature and mode of action of the virus? As doubts exist as to the particular seat of the virus whether eliminated from the mucous membranes of the air passages or secreted by the salivary glands its intimate admixture with those secretions, and in all probability its inefficient quantity will perchance ever render its chemical constitution a mystery, and though writers have hoped that from the more correct information we should obtain respecting

the manner in which the disease affects the animal results from the frequent and carefull performance of Experiments with the virus itself we should obtain more intimate acquaintance with the nature of the poison, we are still involved in profound obscurity, indeed it is doubtfull whether such a discovery would assist towards a successfull treatment of this terrible disorder, or of the other animal poisons which materially endanger human life.

It is necessary for the action of the poison that it should be introduced through a wound or abrasion, whether it be applied to the skin or mucous surfaces, its absorption has most assuredly been interrupted by the interception of clothes, linen and wool. Yet its contagion by fomites has been so well authenticated in one instance that nothing can be wanting, but further proofs, to determine this mode of contagion, though it is distinctly denied by so supreme an authority as Mr Youatt, for in Mr Travers's kennels, though repeatedly washed and painted still rabies appeared and destroyed successive packs until the flags and Earth were removed, when the disease disappeared. Is the virus absorbed into the System or does it remain in the Wound? The oldest opinion of the action of the virus after being received into the wound was that it became absorbed and mixed with the circula-

ting fluids, thus, effecting general infection of the solids of the human body - A subsequent theory referred it to effect produced at a given point, and a propagation of the lesion through the whole nervous system. And another intimates that the virus lies altogether dormant until the condition of the habit be adequately predisposed to its action. This latter is founded principally on the commencement of the symptoms at the wounded point with the frequent reulceration of the cicatrix.

That the fluids and liquids are affected generally by this poison is disproved by numerous experiments and observations. And the local effects of the injury bear no proportion to the subsequent constitutional disorder so as to furnish argument in favour of opinion that it arises from propagation of local impression. With regard to the theory which conjecture that it lies dormant in the tissue with which it first came in contact for a considerable but uncertain period, absorbents removing everything around but leaving the virus unchanged, not entering the circulation for then it would be modified or rejected and that at length the tissue becomes sensible and assimilating to itself certain elements, the absorbents at the same time taking on more powerful action attack virus carrying it into the circulation there it assimilates other secretions to

its own nature, or determines to one, so altering the character of the secretion that it acquires the property of propagating the disease. But this implies that it is for a time as a foreign body – a bullet for example – which I think most improbable when we take into consideration that it is a fluid impalpable and invisible poison; but that on the contrary, it is within a short period absorbed by the capillaries of the tissue adjacent to the wound and carried direct into the circulation, there to produce as we shall shortly endeavour to demonstrate those changes in the nervous structure which occasion the several serious and fatal phenomena, constituting Hydrophobia

With regard to the two cases which I mentioned where buboes occurred on the accession of the premonitory symptoms, the wounds in both cases having degenerated into unhealthy ulcers, we may view the lymphatic derangement as dependent on absorption of matter from the wound or merely as sympathetic and dependent on irritation of the wound, and not on the absorption of any specific virus, but as one case recovered under the external application and internal exhibition of Iodine, the therapeutic action of which has in another case proved unsuccessful I think there is every reason to doubt that it was decided Hydrophobia, but as no detail of the case is given I cannot refute it on any other grounds

With respect to what some men of high standing in the profession have considered as the exciting causes of true Hydrophobia some asserting that the Hydrophobic symptoms have been in every case induced by fear, and disbelieving altogether in any specific virus, and others again referring the phenomena to the effect produced on the nervous system by the inflamatory changes observed after death instead of viewing these changes as dependent on the nervous lesion, or to the form of the wound, or as an Epidemic affection, commencing with inflamation of the mucous surfaces in the line of the nose, extending thence through the cribiform plate of the Ethmoid bone to the meninges of the brain, and inducing the peculiar train of symptoms which we, who believe in the Existence of such a disease, term Hydrophobia. None of them believing the production and propagation of a characteristic disease, and specific virus.

This however beyond dispute and generally recognised as truth among the profession, even for a series of ages that the bite of a rabid animal will occasion Hydrophobia for the same phenomena have been known to follow the bite of such an animal from the remotest times, and we have a similarity of symptoms in persons who have been bitten by the same animal the disease also more frequently occurs when parts are protected by clothing as the hands or face have received the wound, and lastly

the introduction of the saliva of the rabid animal into the system of a healthy quadruped will produce the disease Nevertheless it is incontestibly proved that other causes are capable of producing hydrophobic symptoms similar to those attending the bite of a rabid animal, and independent of hysteric, Epileptic, or Tetanic complications

Proximate causes or Theory of Hydrophobia Having already shewn beyond all rational contradiction that hydrophobia is the result of a morbid poison introduced into the system of the animal which it affects; I come to the consideration of the modus operandi of the Exciting cause. The essential symptoms of this disorder are sufficient to demonstrate that it is dependent on a pathological condition of the nervous system and in what this consists it is difficult to determine. Some as I have mentioned have considered the nervous derangement as a consequence of the changes which are found in the pharynx and oesophagus, others to inflamation or congestion of the membranes of the brain, while a third party have viewed it as dependent on Spinal irritation

I think that the morbid virus absorbed into the system so modifies the nutrition of the nervous centres, perhaps more particularly of the medulla oblongata, constituting, on the occurrence of, at any date, some general shock or disturbance of the nervous system a source of centric irritation of the nervous system, demonstrated

through the considerable portion of some parts, principally the Medulla oblongata, affecting especially the nerves originating from or in connexion with that part of the sensorium - The same excitement extending also to the whole centre of sensation, which fully I think accounts for the phenomena exhibited. The proximate cause of the development of this state of the nervous centres we are at present unable to account for indeed we cannot state how slight an amount of change or irritation of the system at large, or any part in particular shall excite influence so as to develope or prove the ultimate exciting cause of latent alterations. But in many cases we can trace this in Hydrophobia in one instance a man is imprisoned, in another a youth witnesses the capital punishment of a fellow creature, another again is frightened by the pranks of his playmates, a fourth is thrown out of Employment while a wife and children are dependent on him for support, all of these have we know an effect upon the nervous system which may be either exciting or depressing, for in one case a man indulged in extraordinary potations. All these I affirm are sufficient in some individuals to develop latent lesions of the nervous centres ~~and~~ which might perchance never have developed, [illegible], at least not until other changes occurred, but for these effects

The first sensations are generally experienced in the wounded part or cicatrix, which I believe to be easily accounted for by the regeneration of the nervous fibres implicated in the wound, from the affected blood, then on the development of the centric lesion the recrudescence is first perceptible at this part of the periphery, by transmission from the affected sensorium, maybe because it received the prior impression and from the fact that newly built up tissues are the most prone to take on morbid actions forming an index of what shortly shall, in most instances, affect the whole periphery.

On the same ground also I account for the frequent reopening of the cicatrix by the lowered vitality effected through the nervous tissues, of newly generated structures.

In many instances I think the morbid phenomena found within the brain on dissection may have been primary and not dependant on the disease and have caused the development of this peculiar and latent nervous lesion

Anatomical Characters In these no uniform appearances have been present after death. The brain frequently presents signs of congestion. The vessels and sinuses of the membranes are frequently injected, and more or less effusion of serum into the cavities of the ventricles, and those of the arachnoid and subarachnoid. The surface of the cerebrum has also been observed studded with scarlet points and the plexus

In [illegible] cases [illegible]
of cervical nerves oesophagus
& pharynx

chorsides of a brown colour, and gorged with blood, and in some cases there existed a plexus of vessels surrounding the origin of the optic and pneumogastric nerves, blood also has been found extravasated in large quantities at the base of the brain. Sometimes the substance of the organ has been softened in others rather indurated. Bony deposites have been met with in the ~~brain and~~ dura mater. In other cases no alterations have been observed in either the cranium or The Spinal cord has been found congested, in one case covered with blood, in some instances considerably inflamed. Sometimes with collections of serum within the spinal canal Bony deposits have been found in the arachnoid of the cord occasionally in parts it has been found softened. On the other hand no alteration whatever has been present in the spinal canal or its contents. In the pharynx and Oesophagus marks of inflamation have been most generally observed in some cases deposit of lymph, acquiring the characters of a false membrane have been observed, in others no morbid change has been met with; these parts being covered only by a frothy mucous. The mucous membrane of the Stomach and small intestine have been found considerably inflamed sometimes almost gangrenous. The salivary glands occasionally large and vascular. The lungs have often presented a deep red appearance and engorged with blood.

The Larynx Trachea and Bronchia have presented traces of inflamatory action, and in most instances lined with a thick white frothy Mucous. Heart sometimes containing Air All of these appearances may be present in the same body in others some only may be found, in others again no alteration has been observed either in the Nervous, Circulatory, Respiratory, or digestive ~~Syst~~ organs.

In the lower animals similar Morbid lesions are frequently observed - particularly traces of inflamation in the Pharynx and oesophagus - frequently also, Extending to the Stomach

That these Lesions are not Essential to the existence of the disease is proved by the fact that in many cases they are entirely wanting when present they - particularly in the trunk - must be admitted as the consequences not the causes of the disorder. Some of them no doubt ~~accompanied~~ produced by the violence of the Convulsive Movements which accompany this disease, others depending particularly on the development of the Morbid action being demonstrated chiefly through the deranged functions of the Eighth pair of Nerves

Diagnosis Hydrophobia when perfectly developed presents peculiarities which distinguish it from all other diseases. Except in the commencement of the disease when the rabid impregnation is suspected it may be mistaken for Phrenitis, Mania, Fever or Tetanus, and in the incipient stage for Melancholy, Hypochondriasis, or Hysteria, particularly in cases where no recollection of any wound exists, which very loss of recollection is decidedly in contradiction to the theory which holds the disease to be one of the imagination alone, but only for a few hours from the commencement. Hysteria and Hypochondriasis advance by slow degrees, rarely have fever, tenderness of skin or increased salivation, Melancholy is altogether a chronic disease never has convulsions, spasms of the throat or dread of water difficult respiration and vomiting among its Symptoms Certainly in Phrenitis we have suspicious fears, tenderness of skin, convulsions and difficult swallowing, Lockjaw is no affection of the respiratory apparatus or Salivary secretion. From Mania it is distinguished as soon as the difficulty of swallowing, spasms, and salivation appear.

Fever in many cases actually supervenes on Hydrophobia but where it does occur it is rarely a primary Symptom Tetanus is the disease with which it is most apt to be confounded, yet the differences are sufficiently marked. The spasm of the muscles is more continued in Tetanus; less disturbing and

never intermitting. The jaw is usually much in motion in Hydrophobia, in frequent attempts to close the mouth and throat from the peculiar tenacious mucous; in Tetanus it is fixed. Tetanus is rarely attended with aversion to liquids, on the contrary the taste is grateful: but are the tetanic spasms increased by the sight, sound or touch of fluids. Also Tetanus makes its appearance much earlier after the infliction of the injury. Physiologically while Tetanus is a disease of the true spinal system. Hydrophobia involves the brain also as evinced by the disorder of intellectual function and special sense, even early in the disease. While in Tetanus, the stimulus which excites the paroxysm operates through the true spinal cord in Hydrophobia it is often conducted from the ganglia of special sense or even from the brain: so that the sight or sound of fluids or even the idea of them occasions, equally with their contact, or with that of a current of air, the most distressing convulsions. Further the two diseases differ greatly in their mode of induction. Tetanus is caused by irritation of a nerve in the traumatic cases, by disease of the spinal marrow in those which are idiopathic. Hydrophobia is the result of a specific poison introduced into the circulation and thence affecting the nervous system

Treatment this is plainly divisible into the Prophylactic and Curative. Prophylactic in consequence of the little control which medicine has over this disease when once fully established, the prevention of the disease is therefore the principal means of escaping the extreme suffering and dreadfull death which Hydrophobia in general occasions. Of all the methods which have been proposed for prevention the complete excision of the bitten part and the immediate application of a powerfull caustic to the raw surface is that which undoubtedly merit the greatest confidence. Previous to which, in case of delay in procuring instruments and applications, the wound should be perseveringly washed with lukewarm water, a continued stream as from the spout of a kettle may be directed on it. Excision must be had recourse to as soon as possible and every care taken that it is efficiently performed and that no part which may have been in contact with the contaminated tooth be allowed to remain. Various writers think that caustic alone is sufficient to insure destruction of the virus, and many remedies of this class have been recommended viz the actual cautery, Nitric, Sulphuric and Hydrochloric acids Potassa fusa Nitrate of Silver Butter of Antimony &c. Mr Youatt prefers the nitrate of silver as it produces a hard dry and insoluble eschar. Whereas most of the other produce a soft, or fluid mass in

which the virus is suspended from which Inoculation may be effected. He considers that Lunar Caustic also when dissolved to a point may be introduced with all certainty into every recess and sinuosity, recommending also that after the application the wound be healed speedily in the mildest manner. In this respect he is opposed by several continental authorities who by the application of stimulating substances keep up suppuration for some time or even apply a blister on the wound afterwards dressing it with an ointment or powder of Lytta.
Some again make deep scarifications of the wound and employ also general bleeding. In Russian practice those unfortunate enough to have been bitten by a rabid animal are exposed, for an hour with the wound uncovered, to the temperature of 122° Fahr: while in the bath Decoct: Sarzp: and Guiacum are administered. The baths are repeated every other day, during the second week every third day, and afterwards twice weekly until the expiration of two months from the beginning of the treatment, the wound at the same time being rubbed with Unguent Hydrargyri and kept open by irritating ointments. Dr Marochetti recommends opening and cauterization of characteristic pustules, which he asserts appear under the tongue by the side of the frenum, where he believes the rabid virus to appear, but these pustules

recommended long ago by Celsus

This too strong—
Belladonna Scutellaria

have been sought for in vain by many, their existence and specific character is doubtfull and when observed and cauterized the extraordinary average of exemption from the decided symptoms of Hydrophobia has resulted

The application of a small cupping glass over the wound has been recommended by Dr Barry - Dr Good advises the application of a tight ligature above the laceration - Experience has sufficiently proved that all internal remedies with a view to preventing the accession of the disease are unworthy of confidence. With regard to the prophylactic local treatment, so long as the great majority of individuals bitten escape without remedies of any kind considerable doubts will exist as to its utility yet everyone will be happy to avail himself of it, in some form or other, in the hope of exemption from the terrible and intractable sequela and it is the duty of the medical attendant to propose, may almost insist upon the local prophylactic treatment. Of the varieties doubtless excision and cauterisation may be the most reasonably chosen, both as is the practice of most medical men of the present day with all due care that each is efficiently performed. The excision, amounting often to amputation in the case of a severely lacerated wound complicated with injury of the smaller bones, and even to excision of the clavicle at a late period after the bite for thoroughness may

not believe that the poison is latent in the wound, still our patient may have that idea and doubtless much mental anxiety and distress would be relieved by the procedure indeed cases are reported in which excision and cauterization have stayed the hydrophobic symptoms, after their decided accession and recovery occurred. Cauterization after the extensive experience and favorable results in Mr Goyatts hands, of the Nitrate of Silver it is generally admitted as sufficiently effective, however it would be advisable should he be in a favorable situation to apply a ligature above the bitten part until further measures are resorted to. It is also requisite that the patients mind should be relieved as much as possible by change of scenery, occupation, &c and no allusions made to the subject in his presence.

Treatment on the accession of Hydrophobic Symptoms

As yet we have no remedy which with any certainty or dependence we can expect to stay or even defer the almost invariably fatal termination of this destructive malady Still cases are not wanting in which recovery has occurred but the remedies which were judged to have proved available in those few instances, have been decidedly inert in innumerable other cases, Before introducing any views of my own with respect to the remedial measures to be

employed it will be well to revert to the various therapeutic remedies proposed through an extensive period, and in various countries by the most experienced and sagacious physicians. Sedatives have been tried both on the continent and in this country with a view of overcoming the nervous excitement, but without success, as much as 180 grains of opium having been administered within twelve hours, the injection of the same has likewise proved unavailable, and from the endermoid application of Morphia, along the blistered surface of the spine, slight transient relief but no permanent benefit has been obtained, the same result was attained on an injection of its solution into the cephalic vein

Belladonna, Tobacco, The cold affusion Chamouniem, Warm Baths, Acetate of Lead, have for a time alleviated some of the symptoms but nothing further has resulted from their use

Stimulant and Tonics have been administered with a view of supporting the patient until an anticipated and hoped for crisis should occur, after which he might recover; with these may be classed Electricity and Galvanism but from all, nothing but a temporary benefit has accrued

Mercury, Arsenic, and numerous other powerfull metallic preparations have been prescribed with a like want of success

Sudorifics, Diaphoretics & Purgatives there is scarcely time for full operation of the two former, the latter should be a decisive

tered to produce the necessary Excretion but cannot be viewed as an efficient Remedy. Numerous other Remedies have from time to time been recommended, but with no ultimate benefit Injection into the veins has been recommended and employed in one case comparative benefit was the result.

Tracheotomy has been recommended by Mr Mayo but I think with little hope of success from it alone, for it cannot relieve the Excessive nervous irritability and the patient surely dies Asphyxiated but more generally during an interval of quiescence and relieved from the spasms, sinking ultimately from extreme Exhaustion. Bloodletting has many advocates having been performed to a great Extent with occasional success, indeed, it is the remedy which has been most constant in inducing a favourable termination, I cannot help thinking that this is in all rationality the only curative treatment which has yet been attempted in which we can place any hope, all other sedatives of the nervous system have been adopted with little or no success and I believe that up to this date the Repetition of Venesection short of syncope, to avoid reaction or if such should occur, there is greater hope of the action of sedatives to subdue such reaction proving Available after depletion, though they may have been ineffectual prior to it, along with this I would recommend the Endermoid application of Morphia or Atropia in the course of the spinal column

Chloroform since the boon conferred upon Society at large and our profession in particular by the discovery and disclosure of the valuable anæsthetic powers of that therapeutic agent by our learned and talented Professor of Midwifery. Dr Simpson, its adaptation to the treatment of diseases has been and is now extending. That its employment in Hydrophobia has been followed with but transient relief, I am aware, but I have yet to learn that it has had a fair trial, from it I should anticipate Every thing we could desire namely quiescence of the nervous system until the crisis should occur, and the patient awake to a new existence, for I think with Dr Good we may be hoping for a crisis. Though as yet one has scarce ever supervened, but by the sedative action of copious venesection with its consequent serious prostration and consecutive debility - With respect to the benefits already derived from the use of Chloroform in this disease they may be classed with the others as but transient - But instead of its occasional we must employ its continuous inhalation the latter I could not expect to be available in the later periods of the disease for there the copious secretion of saliva, & mucous, not only from the mouth but from the mucous surfaces of the air tubes, would by requiring a repeated evacuation of saliva, would decidedly contraindicate its exhib-

tions for with those conditions we could expect nothing
less than suffocation, still we might employ it in the
above mentioned manner in the earlier stages of the decided
symptoms and Even the secretion of saliva has become so
excessive and tormenting to the patient, its inhalation
could be suspended on the occurrence of any serious
symptoms from its use. The date of the disease how-
ever when I think its employment might be most advanta-
geous is during the premonitory symptoms, commencing on
the accession of well marked ones, and continuing for any
period with a hope of putting off the more dreaded accession
of true hydrophobic symptoms, with them accompanying
convulsions, allowing the patient to wake up seldom
and for nourishment alone. I think we might look
forward to this treatment with some hope of success
and of allowing the nervous system to recover itself during
the period of dormant anæsthetic existence in which the
increased action of the nervous system is allayed while the
vegetative action of reparation and nutrition proceeds
Wourali Poison The Woorara This poison, a deadly
narcotic, with which the Indians of Guiana arm the points
of their arrows (formed of numerous ingredients among
them occurs an undetermined species of strychnos obtained
by making an extract from the bark) and first proposed

by Professor Sewell of the London Veterinary College as a
remedy for Hydrophobia, with the aid of artificial respiration
Its action examined and detailed by Sir B Brodie from which it appears a deadly narcotic instantaneously suspending conscious nerve, voluntary motion, and respiration, acting directly on the functions of the brain It was procured in a pretty large quantity by Charles Waterton Esq^re the enterprising traveller, at some trouble and risk from the native tribes — Macoushi Indians — by whom it is chiefly prepared. and has been advanced both by himself and Dr J Silson of London as a last resource in Hydrophobia - From communications received from these two Gentlemen I learn that numerous applications have been made to them for aid in expectancy of the disease, or on its accession. If has been appealed to the application has been too late to allow them reaching the patient ere death occurred. It is also proposed to use this poison as a remedy in hopeless Tetanus with the aid of artificial respiration. In two experiments on animals affected with that disorder, it was employed and they under the use of artificial respiration recovered free from the disease. With respect to bringing this Experiment on the human subject by introduction of the poison by a puncture, or injection into the vein, I find no reference to it in works touching on, or treating of the subject - Hydrophobia — How do the profession shew any great

anxiety to test its effects on their fellow creatures, why I cannot say, it surely would not injure the patient though he returned to consciousness still hydrophobic, and would be of material benefit to after generations should the attempt prove successful. Certainly it is almost worse than useless to administer the ordinary remedies and in the usual manner for some of them have yet proved effectual and every effort to swallow the drug brings on a recurrence of the much dreaded and terrific spasm.

In the lower Animals no great benefit has yet accrued from the treatment of the decided symptoms in these poor things, Mr Gonatti believed in the good effects of prophylactic treatment in the Dog, by medicines during the stage of incubation, I have been informed that the Woorali has been used, but without success on the lower animals affected with hydrophobia but I can find no record of it. Surely if it has not it should be attempted on them.

Tom Smith Hewitt