marked feature, and from which the term hydrophobia derives its significance, namely, laryngeal spasm excited by the effort to drink water, and consequent apprehension in making this effort. But I suppose it to be undoubtedly true that this symptom is not invariably present in cases of rabies. While, therefore, hydrophobic manifestations would have been valuable in a diagnostic point of view, their absence is not proof that the disease was not rabies.

Lyssaphobia may certainly be excluded. The patient appeared to be resolute in the belief that he had no serious affection. There is no ground to suppose that the phenomena were hysterical.

The character of the convulsive paroxysms is of great importance with reference to the diagnosis. The point of inquiry here is, were these paroxysms due to the strychnia? From your description they were not of the character which strychnia would produce, and the doses of strychnia were not sufficient to produce convulsive movements with disturbance of respiration.

The fact of recovery aurally excites scepticism in respect of the diagnosis of rabies. I am conscious of this in my own mind. Excluding, however, lyssaphobia, hysteria, and the toxical effects of strychnia, it is difficult to say what the disease was, if it were not rabies. To say the least, the supposition that the disease was due to the viruses of rabies is not without the range of probability; and the case would, therefore, lead to the employment of the woorara in cases which admit of no doubt as to the diagnosis. Whether the disease was or was not rabies, the effect of the woorara appeared to be useful; and as a contribution to our at present limited knowledge of the therapeutic use of this remedy, the report of your case is interesting and valuable. It is hardly necessary to add, that should the woorara be found to have a curative power in rabies, you will have conferred a great benefit on medicine and on humanity by venturing upon its use, and by the publication of your report.

Very truly yours, Austin Flint.

Art. XIII. — Case of Hydrophobia; Death. Early History of the Case.

By T. J. M'Loughlin, M.D., of Jersey City, N. J.

Subsequent History, with Remarks. By J. E. Culver, M.D., Physician to St. Francis Hospital, Jersey City.

On Sunday morning, January 30, 1876, I was called to attend Lizzie M., a servant living in the family of Mr. James McC., of Jersey City. I noticed by her manner and appearance that she was quite nervous, and in an anxious frame of mind. In answer to inquiries made in regard to her previous condition, I was informed that she had been unwell for several days, but that since the day before she had been growing much worse. During this time she was known to have taken very little nourishment, but owing to the fact of her being regarded as unwell, this circumstance attracted little attention.

On the evening of Saturday, Mrs. McC., prompted by sympathy to do something to assist the girl, prepared some tea, which she wished her to take. When it was brought she showed some disinclination to drink. Being prevailed on, however, in the hope of benefiting her, she took a mouthful, swallowed it with an effort, and refused to drink any more, at the same time complaining that in the act of swallowing she had "a choking sensation in the throat," and that "it caused an oppression in her breathing." In addition I was told that she was troubled with frequent gaseous eructations, and while I was examining her, she twice or thrice
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belched up a quantity of wind, and declared that doing so afforded her relief. It was noticed also that, contrary to her usual cheerful disposition, she was at intervals quite melancholy, depressed in mind, and repeatedly sighed. The last was a constant symptom, and in the further progress of her illness was more marked. When questioned in regard to herself, she complained of pain and soreness in the portion of the precordial region corresponding to the attachment of the diaphragm, and of no inability to get her breath, but she did not attach great importance to these symptoms. In an agitated manner, and with assumed cheerfulness, she frequently declared that her ailment was merely the result of a cold, that there was nothing the matter only that she could not get her breath, and that she believed there was something the matter with her lungs. Though nothing in her case pointed to disease of the lungs, nor to render examination of these organs necessary, I proceeded to inform myself of their condition, and took hold of her hand to assist her in sitting up. She hesitated a few seconds, then grasped my hand, and, making a forced effort, she raised herself by springing to a sitting posture. Immediately after she threw up her hands, and, with eyes widely opened and manner agitated, drew a short, sighing, interrupted inspiration. This passed quickly away, and with the exception of some slight excitement and uneasiness of manner, and a constant desire to impress those about her with the idea that there was nothing of importance the matter, her condition in the mean time betrayed no marked signs of a dangerous disease. I then made a careful examination of the lungs, but, as anticipated, the result presented no evidence whatever of any abnormal state of these organs. The percussion was normal, and the breathing vesicular in quality, though slightly weakened, everywhere throughout both lungs. There was nothing peculiar about her pulse then; it was regular, perhaps a little diminished in force, and beat ninety per minute. Her throat, being inspected, appeared slightly congested. There was nothing remarkable about her eyes—no noticeable redness—but the general expression of the face was somewhat apprehensive, and a little excited.

To test the report of her difficulty in drinking fluid, and observe the symptoms attendant on the attempt of doing so, I directed a glass of water to be brought. She said, “Oh no! I don’t wish to take any now,” and by her uneasiness of manner also showed some repugnance to the liquid. The water being brought, I offered her the glass, which she took with hesitation, paused a moment, and shuddered slightly, her face betraying some anxiety. She was about to set down the glass, when I urged her to drink. Then summoning her courage by making a strong effort of the will, she, with some degree of trepidation, brought the goblet to her mouth, took a mouthful, and quickly gulped it down. Immediately her thorax and shoulders were elevated, the arms flexed and raised in attitude to allow the greatest chest capacity, all the respiratory muscles became tense, the muscles of the neck also rigid, the head turned slightly to one side, thrown back, and fixed, while at the same time the eyes were widely opened, and her face presented a picture expressive of dread and agitation. The appearance of the paroxysm strongly resembled that produced by the sudden and unexpected application of a cold shower bath. For a duration of a few seconds her breathing was interrupted, after which the symptoms passed off, leaving her a little agitated. When she recovered her breath she said to a protesting manner, “Oh! there is nothing the matter with me, only drinking the water chokes me a little, and I can’t get my breath, that’s all.”
At that visit I had no knowledge that she had been bitten by a dog or any animal, and, knowing the apprehensive disposition of the family, I avoided making inquiries on that head then, as I did not wish to have alarm created, and, it being my first visit, I wished to wait a little, to be more certain of the case, and be enabled to make a positive assertion of its character. I prescribed for her an anti-spasmodic mixture, gave some directions, and left.

During the night the male member of the family called at my office, stating that he was alarmed by the way she was behaving, that she was constantly tossing herself about in bed, and sometimes wanted to get out of it, that she was afraid to be left alone, and at times excited, and had a slight wandering delirium, so that they were obliged to stay up to care for her. I accompanied him to his house, and found her excited and restless as he described, her face wearing an expression as if, from the oppression of her chest, she dreaded being suffocated. She was easily quieted, however, by talking kindly to her, and frequently urging her to control herself and be tranquil, to do which when I was present she made an effort. Having allayed their fears as to any immediate danger, and administered a hypodermic injection of $\frac{1}{4}$ of Magendie's solution of morphia, I left for the night, my idea of the character of the case being still more confirmed by what I then learned.

Believing that in the progress of her case she might become troublesome, require to be controlled, and that the family would not be able to take care of her, I recommended her to be sent to a hospital next morning. When I arrived at nine o'clock A. M., I was informed that she was growing more restless and apprehensive, and had occasional spasms of the chest, which appeared to return more frequently and with increased severity. She had refused all liquids, and neglected even taking her medicine on account of the distress the effort of swallowing it brought on. As I entered the room she was thrown into a slight spasm, caused by the current produced by opening the door. Such attacks, I was told, occurred whenever, from any reason, she was surprised or disturbed, or the door was opened.

A constant accumulation of mucus in the throat, and an inability to get rid of it thoroughly, was a symptom that gave her much annoyance. She declared that though she made repeated efforts to expectorate it, yet some remained sticking to her throat. Success in raising it gave her much satisfaction, hoping thereby to obtain relief.

Her appearance this morning betrayed more anxiety, restlessness, and apprehension than on the previous day; but she was at no time boisterous or irritable. She could control herself in a measure, when quietly talked to, and, while in the house, always obeyed when told to do anything. I questioned her closely then, to learn if she had been bitten by a dog, cat, or other animal, but she persistently denied that she ever had, as did likewise the family. As she did not admit having been bitten, I determined to try once more if her fear of water was real. For this purpose Mrs. McC. and myself proceeded to assist her in rising up. As on the day before, she hesitated before attempting to rise; then, with a laboured effort, she sprang to a sitting posture. At the same time she spasmodically grasped our arms with considerable, almost painful force, and had a strong catch in her breathing, which lasted a few seconds, and required much effort to overcome. On ordering the water she immediately became anxious and troubled, and, with an expression of dread, begged
that we should not ask her to drink. Being pressed to overcome her aversion, and told that perhaps her fear was only imaginary, she consented to try, and the glass of water was brought. She looked at it, paused, then shuddered, turned her head away and said, "I can't; don't ask me." Mrs. McC. still further persuaded her, and she said, "I don't want to drink out of the glass; I'll drink some with the spoon." She then filled a tablespoon, and with hesitation carried it to her mouth, threw the water in, and made an attempt to swallow. Instantly her shoulders and thorax were elevated, breathing interrupted, inspiration catching, and she had a paroxysm similar to the one already described, only much more severe in character. I am of the opinion that the glottis was involved in this spasm. Interrogating her and the family yet more, I did not ascertain that she had received any injury. She had no trismus, no tension of the spinal muscles, and there were other marked distinctions between her symptoms and those of tetanus. She had no indication pointing to any disease of the brain or cervical vertebrae; was not subject to hysteria, nor would a theory of hysteria, even supposing her denial of having been bitten to be true, explain her symptoms. Moreover, it is well known that, contrary to the facts of the case, patients with rabies often deny having been bitten, and persist in such denial. There was no evidence of disease of the larynx or oesophagus, and the non-existence of any was subsequently proved (vide autopsy).

At a subsequent visit that morning, I noticed that she had marked aerophobia. Every current of air that blew on her brought on a paroxysm more or less severe. Even sudden motion in the room sufficed to induce a slight attack, and a mere touch with the hand was often all that was necessary to throw her into a transient spasm. These spasms came on at intervals, being induced by very trivial causes, and even without any appreciable one, and continued to increase very gradually in severity up to the time she was removed to the hospital. It had been intended that she should be sent to the hospital in the morning, but owing to delay in communicating with her relatives, their tardiness, and other obstacles thrown in the way, she did not arrive there till late in the afternoon.

I had no further connection with the case, and the remainder of the history will be furnished by my friend, Dr. J. E. Culver, who was on duty at the hospital on her arrival.

Subsequent History, with Remarks. By J. E. Culver, M.D., Physician to St. Francis' Hospital, Jersey City.

Lizzie M., aged 18 years, was admitted into St. Francis Hospital, January 31, 1876, just as my term of service was expiring and I was about to leave the building. Waiting in the apothecary's room to enter her name on the Hospital Record, a window-shutter was opened to admit more light, whereupon she started suddenly, with a look of terror, and in a twinkling nearly all the voluntary muscles of the body participated in convulsive movements. A start, an instant holding of the breath, and a convulsion, followed the ringing of the door-bell. Several times currents of air blowing upon the face caused convulsions. As a convulsion subsided, one of the sisters approached the agitated patient, and with words of kindness, sympathy, and encouragement, besought her to dismiss her fears, and try to control herself. While speaking, the sister caressingly passed her arm around the girl's neck, and lightly patted her cheek to soothe and assure her. Like magic, at the first touch of her hand the
paroxysm recurred, although she strove bravely to resist it with all her might.

I observed that she swallowed saliva after each paroxysm, and that deglutition was normally performed, and did not excite a renewal of the paroxysm. It was evident that the spasms did not extend to the involuntary muscles of the oesophagus. Her senses were wonderfully acute, and this hyperesthesia coexisted with no intense motor hyperesthesia, such that impressions ordinarily inappreciable and unnoticed now called forth quick, and various, and motley, and uncontrollable struggles. Even in the intervals of the paroxysms she was morbidly unquiet, and her actions were ill-coordinated, harrried, and jerky. Keenly vigilant, anxiety and fatiguia were legibly depicted in her countenance. She stated that she had not taken food or drink for more than 48 hours, and she was hungry and thirsty. By dint of extraordinary effort she could carry a glass of milk to her mouth steadily enough, but before it touched her lips the spasms always supervened and defeated her volitions. There were frequent muscle-tremblings, and sighings, and eructations. Her pulse was 118, regular; temperature estimated normal; respirations hurried, restricted in scope, and irregular, and even became arrested, confused, catching, or gasping, during the paroxysms. There was cyanosis enough to make apparent the venosity of the blood. The greatest force and duration of the spasms were expended on the respiratory muscles; and oftentimes those of expiration and inspiration were both at once rigid in a state of violent antagonism, baffling the vain struggles of the conscious girl for breath. From first to last the involuntary contractions sometimes affected more one group of muscles, and sometimes another, but in every paroxysm the respiratory muscles most of all.

The appearance of the patient indicated previous good health, intelligence, a gentle disposition, and easy manners. To my question concerning her present illness, she gave chiefly negative replies. Especially she declared, that in all her life she had never been bitten by a dog nor by any other animal. She or her aunt, who came with her, volunteered to account for her sickness as having been brought on by sleeping in an atmosphere foul with gases which escaped from a coal-burning stove having an bad flue-draught. My friend, Dr. T. J. McLaughlin, who was present with me in the hospital, and by whose advice the patient applied for admission, kindly gave me the early history of the case as already related.

I could learn nothing concerning the etiology of the disease. Her symptoms corresponded accurately to the only case of hydrophobia which I had ever seen before; but, wanting proof of the dog bite, I concluded to stand non-committal, and (partly at the suggestion of Dr. McLaughlin) to write down the diagnosis hysteria simulating hydrophobia, with the understanding that, should the dog be discovered, the first two words should be erased. The conviction that the patient was soon to die of hydrophobia deeply impressed us however, even while we were determined to withhold a decision and await the light of further developments. For we could detect no other disease, whether local or affecting the general system, by the closest scrutiny of all the phenomena observed.

She could bear the use of the tongue-depressor while we inspected the fauces, without a spasm being provoked. We therefore suspected that the glottis or epiglottis was a focus of hyperesthesia, a starting point of the convulsions which defeated deglutition, and immediately put this idea to
the crucial test by applying thoroughly to these parts a strong solntioo of silver oitrate. As soon as the strangling caused by the caustic had subsided, she took a goblet of milk in her own hand and drank it all. She promptly answered affirmatively when asked if she would have more milk, and drank a second gobletful, and then part of another. This was done not without repeated efforts, interrupted by waiting to get her breath, and once by a convulsion. She was ordered a tumblerful of milk every hour while awake; also, the following prescription, namely: B. Tr. vuler. ammon. 5j; hyoscyami, 5ij; assafetidæ, 5vj.—M. Sig.—A teaspoonful every two hours in milk. This might relieve hysteria—it could do no harm in hydrophobia so far advanced, for nothing known could at this stage overt a fatal termiootioo. It might assist to extricate os from the ominous diagnosis.

This done, I left the hospital.

For the further history of the case I am chiefly indebted to the kindness of Dr. T. J. McLoughlin, who obtained the particulars from the sister in charge.

The patient was immediately put to bed in the large female ward. She remained very restless the whole evening, and, indeed, all night. There were continual sighings, and convulsions, and eructations of gases, hat no sleep. She tossed about in bed so that it required an attendant to keep her from falling out. She protruded her tongue frequently as if to raise spats, and vomited occasionally. She could not ho prevailed on to take any drink whatever, except her medicine. She called repeatedly on those about her to close the door and stop draughts of air, because they took away her breath. Occasionally she was delirious, calling aloud the names of absent relatives and others, and conversing with them. She disturbed the other patients, and had to be removed to a private room early on Tuesday morning. She had walked to the ward last evening, but now she could not stand; her legs seemed paralyzed, and dragged along the floor as she was carried. Ever and anon she complained that she could not breathe, tossed to and fro and threw herself about, seized hold of the bedstead, begged to be slapped and rubbed between the shoulders, and for the space of three hours suffered almost continual spasms, with very brief intermissions. She could now no longer be kept in bed, and her mattress was put on the floor. After severe paroxysms she frequently raised mouthfuls of foam, with some apparent relief. About 11 o'clock A. M. she became a little quieter, and continued so until 3 o'clock P. M., at which hour she took a good drink of wine. She had to-day previously swallowed nothing—neither food nor drink—except one teaspoonful of her medicine.

Soon afterwards I saw her again a moment in company with Dr. J. F. Finn, Visiting Physician to St. Francis Hospital. The surface of her body was cool and cyanotic. Pulse irregular, intermittent, and nod rapid, but indistinct at the wrist. A slow and feeble circulation. Respirations sighing, dyspnceic, and often interrupted by the spasms. Breath cool. Had vomited and had involuntary discharges. Convulsions continue. Semiconscious at times. Moribund. At 6½ o'clock P. M. she still raved incessantly, at times in a loud voice, and fancied that a girl standing by was throwing flour in her face. She leaned on her hands for support when breathing. A powder was administered to relax the spasms. Vomited. Convulsions continue. About 8 o'clock P. M. she extended her arms in jerky, rigid spasms, threw back her head, and died immediately.

It has since come to light that she had been bitten on her legs repeatedly by a dog presumably rabid, as stated in the previous case, see p. 80, but she had been enjoined not to mention this; and in the face of death she dared not divulge the secret even to save her own life, but preferred to utter a deliberate falsehood and take the risks.
The post-mortem examination was made by Drs. J. F. Finn, B. A. Watson, and myself, Wednesday, February 2d, at 11 o'clock A. M. The external appearances of the cadaver were those of one dying in full health. A shade of cyanosis still lingered, and there were two or three ecchymoses from bruises received in her struggles. The gross appearances of the brain and its membranes, the cerebellum, and the medulla oblongata and epiaulis were normal. Sections of the medulla placed under the microscope revealed no disease-changes of structure. All the organs of the thoracic, abdominal, and pelvic cavity were examined, and the only pathological conditions found were, namely:

1. A single minute patch of necrotic tissue was seen on the serous surface of the duodenum.
2. The coats of the intestines were injected pretty extensively, and presented pinkish striae.
3. The arteries were empty, the veins everywhere were comparatively full, but not much engorged. The blood, partly in coagula, was black. Colour of muscles darkish.

The diagnosis of hydrophobia is difficult, and even its existence has from time to time been denied. Medical scientists have recognized and studied it in every age since the great medical school at Alexandria was established; but still it challenges investigation, for to-day it has no pathognomonic symptoms, no characteristic morbid anatomy, and no successful treatment.

Abscission from food and drink is one of the earliest symptoms of hydrophobia noticed in man, and undoubtedly it obtains to some degree for a few days before it is discovered. Disordered digestion attends every case of this disease in man and in animals. In Lizzie M.'s case there were constant eructations from first to last. The gases belched forth could have their source in nothing else than septic decomposition of the contents of the alimentary canal. Putrefaction of albuminoid compounds always evolves hydrogen carhde, sulphide, and phosphid, irritant poisons—which at first produce a burning sensation in the stomach and oesophagus, but ultimately deeper irritations, striations, discoloured patches, and erosions of the mucous membranes. Such lesions of the alimentary canal, especially of the small intestines, are among the most constant found in bodies dead of hydrophobia: they may vary in extent and intensity according to the quantity and quality of the matters contained in the intestines and the rapidity of decomposition. Perhaps we could avert these sufferings and dangers by a very early unloading of the bowels. One or more doses of castor oil, and enemata containing some safe antiseptic, would probably effect the object. The patient could then be nourished with liberal draughts of lactic-acid-wine-whey—adding to each ounce of the wine used in making it 3/8s to 3/4JI of lactic acid. Lactic acid is an efficient antiseptic, and lactates are always present in healthy blood.

The hyperesthesia, motor and sensorial, and the convulsions, were certainly not of centric origin in Lizzie M., any more than are the death-struggles of animals bleeding from severed jugulars. They were the con-

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comitants of a failing circulation, imperfect aeration of the blood, a lack of equable innervation, a calorification, and evaporation ill-balanced. The temperature was probably reduced. The theory of a peripheral origin of both the hyperesthesia and the convulsions may appear plausible to one who concedes due importance in the causation of involuntary contractions of voluntary muscles to the erethism of irritability which comes of incessant burning pain in the oesophagus, stomach, and intestines, the stress of impeding suffocation and want of arteriolization of the blood, the inability to satisfy a famishing hunger and thirst, and the rackling pain which attends perpetual overwork and extreme exhaustion, without the possibility of a moment of rest—torments, mental and bodily, which always augment until the conscious sufferer is thereby put to death. The convulsions were clonic. The final outstretching of the arms appeared tetanoid, as did also at times the contractions of the chest-muscles. But the spasms did not involve the involuntary muscles. The heart was not found in preternatural systole after death, neither was there any such contraction of the small intestines as occurs in tetanus and in some cases of tubercular meningitis.

The comfort of the patient demands occlusion of light by blindfolding or otherwise, all annoyances by touch or sound should be avoided; the temperature of the room should be uniform, and nearly that of the body; the atmosphere should be highly charged with moisture to retard evaporation.

The comparative emptiness of the bloodvessels, and the venosity and inspissation of the blood seen after death, are but the inevitable consequences of the early refusal of liquids, and the subsequent inability to swallow them; besides the unremitting muscular exertions accelerate evaporation, both pulmonoury and cutaneous. Herein lies imminent danger to life, which can only be met promptly by injecting into the veins, at suitable intervals of time, ood to quantities sufficient to refill the bloodvessels, water at 100° Fahrenheit—perhaps holding in solution, ammonia, chloride of sodium, and soda lactate or carbonate, slightly in excess of the proportions in which they are contained in healthy blood. With a hint from the experience of Magendie we must close. This physiologist, knowing the influence of largely substituting water for blood in the circulating system, tried the experiment in a mad dog which was in a furious state, and which instantly became tranquil, and so continued for five hours. Again, he injected one pint of water at 100° Fah. into the vein of a man's arm; directly the patient, from being highly rabid, became tranquil, the convulsive motions ceased, he drank water without difficulty, and continued to improve till the fifth day. In another case, death followed as in this; but at the moment of the experiment, there was a great and sudden change for the better. The patient lived eight days after the injection, and died, possibly from another complaint.