On the pathology of delirium tremens, and its treatment without stimulants or opiates / by Alexander Peddie.

ON

THE PATHOLOGY

OF

DELIRIUM TREMENS;

AND ITS

TREATMENT WITHOUT STIMULANTS OR OPIATES.

BY

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PREFACE.

At the suggestion of several professional friends, I have been induced to reprint and publish the following paper, which lately appeared in the *Monthly Journal of Medical Science;* but, in order further to illustrate the opinions therein advanced, three additional cases of Delirium Tremens are now detailed: and I have introduced also the result of inquiries made at the Medical Officers of some of our Prison Establishments, in regard to their experience of the effects produced by the sudden withdrawal of wonted stimulants, in the case of civil and criminal prisoners, of known intemperate habits.

The only other additions of any importance which I have now made are references to the opinions given by Dr Craigie, in his very able Dissertation on Delirium Tremens (Methystic Brain Fever, Practice of Physic, vol. ii., p. 50, etc.); and I take this opportunity of expressing regret that I had not seen that paper previous to the publication of my own views, both on account of the similarity of opinions held on some points, and the very full and learned notice given by him of the literature of the disease. It will be seen, however, by any one acquainted with his observations, that we differ materially on many points connected with the phenomena, pathology, and treatment of the disease; and that what he has merely hinted at in regard to the affection, as being attributable partly to the cerebral vessels loaded with imperfectly aerated, spirit-charged, or alcoholized blood (pp. 77 and 81), I have more fully stated, and endeavoured to explain and illustrate, as a peculiar toxicological result.

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Edinburgh, 15, Rutland Street,
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ON DELIRIUM TREMENS.

BEFORE attempting to explain the following views of the pathology and treatment of delirium tremens, I think it necessary to state what are considered to be the symptoms of the disease in its genuine and uncomplicated form; for it appears to me that the opinions generally received and acted on in regard to this affection are erroneous, and have resulted from a loose and partial observation of its phenomena, and inattention to the history of individual cases. In consequence of this, the disease is frequently confounded with very dissimilar affections, or its usual features lost sight of under the effects of injurious treatment, and its true nature, therefore, misunderstood.

The most characteristic symptoms of delirium tremens are general muscular tremors—more especially of the hands, and of the tongue when protruded—along with complete sleeplessness, and delirium of a muttering, sight-seeing, bustling, abrupt, anxious, apprehensive kind. The affected has not ability to follow out a train of thought, to explain fully an illusion or perverted sensation, or to perform any act correctly; because he may be one moment rational and the next incoherent; now conscious of his real condition and of surrounding realities, and then again suddenly excited by the most ridiculous fancies—principally of a spectral kind—such as strange visitors in the shape of human beings, devils, cats, rats, snakes, etc.; or by alarming occurrences, such as robberies, fires, pursuit for crimes, and the like. He is easily pleased and satisfied by gentleness and indulgence, and much fretted and agitated by restraint and opposition. The face is generally of a pale dirty colour, and wearing an anxious expression; eyes startled but lustreless, sometimes considerably suf-

fused, and the pupils not contracted unless considerable doses of opium have been administered, or very decided arachnitic symptoms have supervened; skin warm and moist, often perspiring copiously; tongue sometimes loaded but generally pale and moist, occasionally remarkably clean; appetite small, but the patient will often take whatever is presented to him; thirst by no means urgent, and seldom or never any craving for spirituous liquors; urine scanty and high coloured, and in some cases which I have tested, containing a large quantity of albumen, which, however, disappears immediately after the paroxysm is over;[1] alvine evacuations bilious and offensive; and the pulse usually ranges from 90 to 120, generally soft, but of various degrees of fulness and smallness, according to the strength of the patient and the stage of the affection. The precursory symptoms are by no means peculiar or pathognomonic, but common to many febrile affections implicating the sensorium in the way of sleepless and restless nights, with, perhaps, more of a hurried and agitated manner than usual for some days previously. The paroxysm, which is distinguished by the phenomena above described—occurring with remarkable uniformity, independently of age and constitution,[2]—usually runs its course, if uncomplicated and pro-

[1] Probably albumen is always present. In the thirtieth volume of the Transactions of the Medico-Chirurgical Society of London, Dr Bence Jones has endeavoured to prove, from three cases of this disease, compared with three of phrenitis, that the phosphates are found in much smaller proportion in the urine of the former than in the latter, and that thus a new diagnostic mark is presented of the nervous and non-inflammatory nature of delirium tremens. His observations, however, are not sufficiently numerous to be conclusive, and there are many probable sources of error. In the only two instances (Cases VII. and IX.), in which I have examined the urine, there were present in the one a great many, and in the other a considerable number of beautiful phosphatic stellæ; and I have no doubt that these will often be found in abundance in the most genuine cases of the affection.

[2] The age at which delirium tremens most commonly occurs, seems to be between 35 and 50; the constitution is the irritable, excitable, and somewhat weakly; and what is interesting, it is very uncommon in the female, although from what cause I cannot explain, for the number affected does not bear any relative proportion to the number of dram-drinkers. I have seen several cases of the delirium ebriosum, but no instance of delirium tremens in the female sex. Rayer observed the disease in 7 women out of 176 cases; Bang in 10 out of 456 cases; and Dr Hoegh-Guldberg of Copenhagen (*Commentatio de Delirio Tremente*), in 1 out of 173 cases. Dr Gibson of Glasgow, however, informs me that out of 57 cases treated in the prison of that city during 10 years, 8 were females.

perly treated, on the second or third day, though sometimes earlier, and it seldom extends beyond the fifth day. It then terminates in a profound natural sleep, which may continue for many hours, and from which, if it even lasts for six hours, the patient awakes quite coherent, although weak and languid, but from which state, considering the severity of the symptoms, he is restored with singular rapidity to physical strength and mental soundness. The casualties of the disease are convulsions or coma, which, if not immediately fatal, are apt to leave the unfortunate sufferer a wreck for the remainder of life.

The paroxysmal phenomena may occur variously modified in the progress of pneumonia, bronchitis, fever, erysipelas, and other diseases affecting the habitual drunkard, or after he has received a personal injury which occasions a severe shock to the system. I need scarcely add, that delirium tremens thus complicated, is frequently fatal under any mode of treatment; and the remarks about to be offered are not meant to apply to such instances. It may also be observed, that the foregoing account of the phenomena of the paroxysm is descriptive of the disease when running its ordinary course without being interfered with or obscured by the action of stimulants, opiates, or other treatment.

There is a form of *mania* which is sometimes mistaken for delirium tremens, but which must not be confounded with it, although characterised by very considerable muscular tremor. It is nothing more nor less than a severe and protracted form of intoxication,—an affection of the brain and membranes, in which there is great vascular excitement, resulting from the direct or immediate action of alcoholic liquors. Even so careful and discriminating a physician as Dr Watson, has noticed two cases[1] as instances of delirium tremens, the first of which partakes more, and the last entirely of the character of the affection which I am now about to describe. It has been styled by Darwin the *Delirium Ebriosum*. It originates from a single fit of intoxication, or at least from a short course of intemperance (in vulgar phrase, "a boose," or "a ramble") engaged in by persons of a peculiar mental constitution and temperament, and which is most commonly induced by some depressing emotion. It is marked by an uncontrollable desire for more drink, which, when gratified, excites to further imperious demands, begetting indecorous conduct, and engendering passions so wild and vicious, that when

[1] Principles and Practice of Physic, vol. i. pp. 394, 395.

the hereditary mental constitution is imperfect, and the previous moral habits loose or depraved, not unfrequently lead to the perpetration of violent and criminal acts. The other symptoms and circumstances characterising the paroxysm, are dry heat of skin, particularly of the scalp; sometimes considerable muscular tremor; flushed countenance; a sullen, determined, or fierce aspect; red, ferrety eyes—as in the cases of Dr Watson already noticed—; dry tongue; strong, quick pulse; and loss of appetite for everything but liquor—and that of the strongest kind—although in some instances, beastly ravenousness for anything or everything eatable which comes in the way, until the affection has attained its height, when loathing, sickness, and free vomiting take place, after which occurrence, recovery begins. This state may be brought on once in a lifetime, from some accidental circumstance leading to an act of intoxication; or it may be induced at particular periods—distant, perhaps, months or years—as in the case of those unfortunate individuals to whom the name of *dipsomaniacs*, or *oinomaniacs*, has been applied. The attack is in general easily overcome by the immediate withdrawal of all stimulants, confinement under the care of one or two firm minded and strong attendants, and the administration of emetics and purgatives. All who have witnessed the various forms of disease affecting the drunkard, will readily distinguish genuine cases of delirium tremens from this or other affections attended with delirium, as its character is so well marked.

The substance of the opinions generally held regarding the essential nature of delirium tremens may be stated to be—that it is a disease of exhaustion or irritation of nervous power, and that it has the habitual abuse of intoxicating liquors for its predisposing cause, and abstinence from, or the abstraction of, an accustomed stimulus for its exciting cause.

The first part of this definition, namely, that delirium tremens is a disease of exhaustion or irritation of nervous power, appears to me to be vague, and not easily explainable, either on the principles of physiology or pathology. Various authors,[1] in the most arbitrary manner, make use of the terms exhaustion and irritation, separately or together, as it seems to suit their purpose. One can understand what the term nervous irritation, or what that of nervous exhaustion

[1] Blake, On Delirium Tremens. Copland, Dict. Pract. Med., p. 497. Watson, Pract. of Physic, vol. i. pp. 400, 401. Carpenter, On the use and abuse of alcoholic liquors in health and disease, pp. 28, 29, 30; and others.

may mean, and also how the latter state may succeed to the former; but that these two conditions—so opposite in their nature, and standing more properly in the relation of cause and effect—should coexist in this disease, is not so easily comprehensible; and consequently I believe that the idea of exhaustion—as interpreted according to the common sense acceptation of the word, namely, weakness, has led to much error in the treatment of delirium tremens. The more that the history and phenomena of genuine cases of this malady are considered, the more numerous do the difficulties surrounding the above explanation become. It seems to be forgotten that the disease is not occasioned by a fit of drunkenness, but that it is the result of the long-continued excessive use of stimulants, and therefore on the ordinary and well understood physiological law that exhaustion succeeds excitement in an almost invariable ratio, this affection ought rather to follow the cessation of an out-and-out debauch, than a course of systematic imbibition. The affection is, I consider, quite specific and peculiar. It is something more than simple "nervous irritation" or "nervous irritability:" it is essentially a form of nervous poisoning, which, in every instance—whatever be the state of the constitution, or however combined or associated with other diseases—is distinguished by a very remarkable uniformity of phenomena. In every instance of delirium tremens, the stimulus or alcoholic principle, a powerful narcotico-acrid agent, in whatever way atomically combined or chemically changed after its introduction into the system, acts slowly on the nervous pulp through the medium of the circulation, poisons its substance and sets up at last what may be termed an alcoholic erythism, or, if I may be allowed the expression, an alcoholism.[1] This in turn, no doubt,

[1] Since writing the above, my attention has been drawn to the work of Dr Huss of Stockholm (see an able analysis in the Brit. and For. Med. Rev., No. XIII., 1851), on what he calls "Alcoholismus chronicus," or "the chronic alcohol disease." Delirium tremens, however, is not recognised under this appellation; and does not appear to be viewed as an alcoholism at all by this author. The term is applied solely to a group of affections of the nervous system occurring in those long addicted to the abuse of spirituous liquors. These are distinguished by tremors and jerkings of the voluntary muscles, and diminished or increased sensibilities of surface to a greater or less extent; they are of gradual development; and terminate very frequently in paralysis, epilepsy, or idiocy, without any notable pathological alterations of structure. Such symptoms and results, variously modified by and combined with organic disease, are by no means uncommon in this country, but they appear to be

produces a certain amount and kind of debility in the cerebral functions, but combined with over-action of the circulation through the membranes of the brain, constituting a decided form of irritation, the tendency of which, if not allayed by judicious treatment, is to inflammatory action, and serious encephalic mischief.[1] Scipio Pinel

much more frequent, and earlier developed in Sweden and the northern parts of Germany, owing, it is supposed, to the very pernicious composition of the alcoholic liquors in general use. "With but few exceptions the symptoms have been caused by the potato brandy, which is served out over the counter of the spirit shops to the lower classes of this metropolis. Spirit from grain is not common, and the distilled spirit freed from the volatile oil (finkelolja) does not suit the palled taste of the habitual spirit drinker. The presence or absence of this oil must be carefully borne in mind in estimating the causes of the disorder."—P. 34, *Dr Huss's work*. It further appears that these potatoes, skins and all, are generally diseased or decayed; that mildewed grain is also used, and various poisonous vegetable products, such as spurred rye, *lolium* (frequently mixed with bad barley), and the seeds of the *raphania raphanistrum*—which latter was by Linnæus himself thought to be the cause of this disease; and this poisonous mixture is likewise favoured by preparation in copper vessels.—*Review*, pp. 56, 57. While Dr Huss acknowledges that all this must greatly increase and confirm the maladies described by him, he regards the alcoholic principle as the chief cause. On the other hand, the reviewer expresses a doubt (p. 59) "whether the *alcoholismus chronicus* be really dependent even chiefly upon alcohol," and considers it probable "that its phenomena result from the habitual use of alcoholic drinks holding various (narcotic and acrid-narcotic) poisons in solution in different amounts, and differing in their nature and action, but all having in common, that they exercise a highly deleterious influence, especially on the *nervous* system." Besides the probability that the various maladies described by Dr Huss are not altogether owing to a condition of *alcoholism*, it must be borne in mind that there is a great want of uniformity in the character and course of the attending phenomena, that there is nothing in fact to point out a peculiar physiological action such as may be attributed solely to alcohol. It appears to me therefore that they must be regarded simply as bad effects from drinking habits on the cerebro-spinal system in particular, through the general impairment of the nutrition of the body; and be placed on the same footing as those diseases of the heart, arteries, liver, kidneys, and other organs with their respective functions, also resulting from intemperance, and with which the so-called alcoholismus chronicus is more or less associated. The application of the term *alcoholism* to such affections as these, appears to me to be inappropriate—that given by Romberg (*Dis. of Nervous System*), namely, *tremor potatorum*, is preferable; and in the following pages, I trust it will be apparent that if there is one disease more than another arising from habitual excess in alcoholic drinks, in which *a peculiar toxicological effect* is manifested, it is delirium tremens.

[1] Watson, Prac. of Phys., pp. 400, 401.

considered delirium tremens to be "a first degree of paralytic cerebritis;"[1] Dr Abercrombie appears to have considered it as "a dangerous form of meningitis;"[2] Dr Bright actually includes it among his cases of "arachnitis;"[3] Dr Hoegh-Guldberg[4] also views it as a febrile affection, indeed a species of arachnitis; and Frank, Speranza, Andreae, and several other writers, have entertained similar opinions.[5] Such opinions, I think, come nearer the truth in regard to the nature of the disease than those generally received; and they obtain strength from its symptoms, the injurious effect of stimulating treatment, and the appearances observed in fatal cases. The post-mortem cerebral changes in so far as regards paleness of tissue and shrunken convolutions, steatomatous and other alterations of the coats of the vessels, and to some extent also thickenings and opacity of the arachnoid, along with a large amount of subarachnoid and intraventricular serous effusion, are most likely to be found in those who have had several attacks of the disease, and who have long been noted dram-drinkers. But even after first attacks the membranes generally present great vascular fulness, the arachnoid is thickened, and under it, throughout the brain, and within the ventricles, there is very considerable serous effusion. Dr Craigie's opinion of the pathology of the affection—which he terms *Meningitis phantasmatophora*, or methystic brain fever (*μεθνω ebrius sum*)[6]—is the following:—

"In the early and incipient stage of methystic brain fever, the symptoms depend on irritation of the brain. That is to say, the meningeal veins are loaded with an unusual quantity of venous blood, and the arteries with imperfectly aerated arterial blood, both charged with spirituous particles; and as this circulates slowly, it irritates the brain, and disorders the cerebral functions, *first* of sensation and perception; *secondly*, of memory; *thirdly*, of fancy; and *fourthly*, of judgment. The cerebral irritation thus induced is the great cause of the sleeplessness and restlessness, as well as of the fantastic delirium and hallucinations. In this stage of the disease, which is the *erethismus cerebri abdominalis* of Töpken, the *delirium erethicum* of Hufeland, and the *encephalopathia* of Leveillé, the symptoms may subside spontaneously, or under the use of ap-

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[1] Traité de Pathologie le Cérébrale, par Scipion Pinel, p. 400.

[2] Diseases of the Brain and Spinal Cord, p. 63.

[3] Medical Reports, vol. ii. p. 10.

[4] Commentatio de delirio tremente, quoted in Brit. and For. Med. Review, vol. vi. p. 328.

[5] Referred to by Dr Craigie, Pract. of Physic, vol. ii. p. 66, 67.

[6] Op. cit., p. 53.

propriate remedies, by the poisonous blood being eliminated in the manner of excretions during sleep.

"If, however, the irritative action do not thus subside, if the vessels be not unloaded, and the circulation re-established, it is liable to become fixed in the form of inflammatory congestion, and to give rise to effusion of serum and other morbid products. This seems to be the *encephalitis* of Frank and Hildenbrand, and the Hirnentzündung of Andreae. Even without effusion of serum, the fatal termination may take place; but this result is much more frequent in consequence of effusion, sub-arachnoid, cerebral, and intraventricular. The disorder, therefore, though merely irritative in the early stage, from the unhealthy state of the blood sent to, and retained within the cerebral vessels, becomes at least in the latter stage congestive, and perhaps even inflammatory."[1]

To get rid of the difficulties which the above considerations raise up against the favourite theory regarding the essential nature of delirium tremens, some have spoken of it as occurring in two forms —asthenic or sthenic, congestive or inflammatory; but such distinctions, while presenting a fine hair-splitting diagnostic aspect, really serve a bad purpose, by originating perplexing doubts and difficulties. Like plumbism, mercurialism, ergotism, or narcotism, alcoholism is, manifestly, specific in its nature. Lead, mercury, and other agents, may affect individuals in different degrees from difference of age, constitution, continuance of exposure, etc.; or the effect—like that of the virus of small-pox—though the same in kind, may be modified in one case more than another. When alcoholic liquors have been long abused, the active principle appears to affect the system, by accumulation, like some other poisons. It has been supposed that the gastro-enteritic disorder, from long continued drinking, originates an attack of delirium tremens, through the medium of the solar or coeliac plexus, and affects the brain only in a secondary or sympathetic manner;[2] but although disorder of the stomach, liver, and other organs of disgestion is an ordinary result of drinking habits, yet thousands of individuals are affected in this way, and die in consequence, without ever suffering from delirium tremens. There is something more required to occasion this disease, the first manifestations of which are shown rather in disturbance of the organic functions by transmitted influence *from* the brain and nervous system to the digestive organs. The effect is brought about after the manner of a cumulative poison, the action of which is on the nervous centres. The experiments and observations of Dr

[1] Op. cit., pp. 81, 82.

[2] Göeden of Berlin, as quoted by Dr Craigie, op. cit., pp. 67, 68.

Percy[1] prove that alcohol has a peculiar favour for cerebral matter, fixing at once on it, by a sort of elective affinity; and indeed in fatal cases from direct intoxication, its actual presence in the substance of the brain is demonstrated. Now, in the longer continued abuse of alcoholic liquors, is it probable that the selection of the agent will be different? Its accumulation may be slow, and the change in chemical constitution may be considerable, but it is not the less sure. Every additional drop imbibed brings the grey matter of the brain into that state which assists in the development of the alcoholic erythism; and thereafter, while disturbing the functions of digestion, etc., occasions those relative changes in the sanguiferous system of the encephalon, the tendency of which is, as I have already affirmed, to pass from irritation, or abnormal activity of circulation and functions, to inflammatory action, according to the severity of the attack, and other circumstances. It therefore does appear strange that physicians while describing delirium tremens as a disease of exhausted or irritated nervous power caused by intemperance, should recommend and practise as a remedy the very agent which occasioned it, or another, namely, opium, which, although unable of itself to produce it—as I shall afterwards show,—greatly assists and hastens the affection in those who habitually indulge in intoxicating liquors; and moreover an agent, the physiological action of which is to occasion engorgement of the vessels of the brain—vessels already too highly charged with blood containing a poisonous ingredient. This is truly acting, to a certain extent, in the spirit of the homœopathic dogma—"*similia similibus curantur!*"[2] But of this more hereafter, for I am now brought to the consideration of the second position, which assumes in explanation of this affection, that while the abuse of intoxicating liquors is its predisposing, the abstraction of, or abstinence from an accustomed stimulus, is its exciting cause.

With the first part of this proposition I quite agree; but the opinion that the privation of a usual stimulus must be regarded as

[1] Experimental inquiry concerning the presence of alcohol in the ventricles of the brain.—*Prize Thesis*, Edin. 1839.

[2] Hahnemann, however, and his disciples, do not recognize alcohol as a curative agent; and, strangely inconsistent with the dogmas of their creed, say, (*Organon*, § CCLXXXVI., p. 329), "it is only the most simple of all excitants, wine and alcohol, that have their heating and intoxicating action *diminished* by dilution"! Opium is homœopathically recommended in delirium tremens, not on account of its sleep-giving power, but because its effects are supposed to resemble the symptoms of that malady!

the exciting cause of the malady, I consider to be entirely erroneous. Analogy, certainly, will not bear out the theory. Mercurial fumes, or the oxides of mercury, when long inhaled or absorbed into the body, as in the case of gilders, quicksilver-miners, and others, in the course of time produce an attack of shaking paralysis—the *tremblement mercurial* of the French pathologists; but will it be averred that the workmen long exposed are more likely to be affected with tremors, if removed from this poisonous atmosphere and occupation, than if they continued at their work? The reverse is well known to be the fact, not only in the case of such artizans, but of those also who are beginning to suffer in a somewhat similar way from lead poisoning. In both affections, when the symptoms are recent, a cure can only be effected by removal from the injurious occupation; otherwise the symptoms deepen with hourly increasing rapidity, until tremors are succeeded by sleeplessness, delirium, and, ultimately, coma.

But, then, even granting it possible that the privation of a wonted stimulus may be the exciting cause of delirium tremens, is it a fact that it is so?

The supporters of the theory now under discussion, with the exception of Dr Blake,[1] do not make a positive assertion on this point. They speak of the disease as "commonly resulting from the abstraction of the accustomed stimuli after a habitual or continued indulgence in it, or after a protracted fit of ebriety;"[2] or as, "chiefly when sobriety has followed a protracted debauch."[3] Again, "This disease most frequently occurs in habitual drunkards, and especially when after repeated fits of intoxication, they suddenly lessen, or leave off their ordinary stimulus for a time."[4] "Delirium tremens occurs more frequently when the accustomed stimulus is withheld."[5] "The disorder frequently does not show itself until the accustomed stimulus has been withdrawn for a certain period."[6] "Very frequently, from some cause or other, this habitual stimulus has been taken away."[7] The stimulus "has been, in general, suddenly withdrawn before the disease distinctly shows itself."[8] From these quotations it is apparent that some instances of the disease are admitted

[1] Op. cit., p. 23. [2] Copland, Dict. Pract. Med., p. 498, sect. 9.
[3] Ibid. sect. 10. [4] Armstrong, Practical Illustrations of Fever, 1819, p. 493.
[5] Carpenter, sect. 27. [6] Taylor, Med. Jurisprudence, p. 613.
[7] Watson, Practice of Physic, vol. i. p. 398.
[8] Alison, Path. and Pract. of Med., p. 734.

to occur without *any* privation of accustomed stimulants; and Dr Watson honestly says, "Sometimes it comes on in men who are perpetually fuddled, even although they have not intermitted their usual allowance of drink." It happened thus in several of the cases which I shall give at length in the present communication; and I could mention many other instances, in which there was no diminution in the quantity of liquor consumed—and some even in which there was a decided increase—up to the moment of seizure.

Since, then, intoxicating liquors may be, or rather often are, the directly exciting, as well as the predisposing cause, of delirium tremens, the second position in the theory—stated with all the precision of a law, and which, as such, ought to be invariable—is untenable; and as the idea expressed in the first part of the theory, that, namely, of exhaustion of nervous power, has been formed on the supposed correctness of the second proposition, the whole structure must be abandoned as without foundation. To me it is apparent, that habitual excess in the use of stimulants is alike the exciting and the predisposing cause of delirium tremens; and that if a suspension or diminution of habitual supplies be at any time attended by symptoms of the disease, these are not to be regarded as resulting from change in the quantity consumed, but as occurring in spite of such change, and because the peculiar constitutional effect has already been induced, and the premonitory stage of the affection already begun. I feel persuaded, that every practitioner who has seen much of this disease must, on an impartial review and consideration of his cases, confirm this remark. For my own part, I can affirm, that in a very considerable number of instances the patients were drinking freely up to the period when the disease was developed, there being no interval, and no diminution of quantity; and where there really was some diminution from the amount of previous supplies, it was on account of the system having already been brought into the condition of alcoholism, and a less quantity now produced a greater or equal effect, compared with that of the larger quantity taken formerly. There are, in some instances, no doubt, an entire cessation from the use of stimulants, or very nearly so, at the time when the symptoms of delirium tremens are in the course of development, but this is because no more can be taken by such individuals:—they are already saturated, as it were, with the alcoholic poison. From overlooking these circumstances, I believe all the statements in regard to the supposed effects of diminution, suspension, or abstraction of an accustomed stimulus

have originated. The error is a popular one, and has arisen from imperfect inquiry into the history of individual cases, and incorrect observation regarding the circumstances connected with the supposed reduction or abstraction. When called to see a case of delirium tremens, on inquiry as to the habits of the patient, we are frequently informed by his friends, that for a long time large quantities of spirits, or wine, or malt, or of all of these—and perhaps, in addition, morphia or opium—had been systematically consumed, but that for some time—a few weeks perhaps—much less had been taken, and within the last few days little or none; and then the inference is drawn for us, that the unfortunate patient has actually brought on the attack by meritorious efforts to free himself from a habit of which he had begun to be ashamed. Now all this is very plausible, but not in accordance with the strict facts of the case, as the individual himself, if put on his word of honour, will probably confess. The statement ought to be, that he was formerly in the habit of consuming large quantities of his favourite stimulant, until he found that a much less dose began to affect the system; that then he reduced the amount still further, but experienced an equal, if not greater, constitutional effect therefrom; and thus, from day to day, reduction was forced on him by his own sensations of gastric irritation, nervous excitement, and muscular debility,—these feelings having been, in fact, neither more nor less than the premonitory symptoms of the attack of delirium tremens, and just what might have been expected if—as I have ventured to assert—the alcoholic principle is to be viewed as a cumulative poison.

The habitual and excessive use of intoxicating liquor, however, does not affect all individuals alike. Some drinkers are early cut off by diseases of the liver, heart, or other organs, to which they may have a hereditary or constitutional liability; others in fevers or inflammations, which they have no stamina to contend against; others by apoplexy or paralysis, from the direct effects of a debauch; and some from hereditary predisposition, or otherwise, are early doomed to spend the remaining years of a miserable existence in mania, idiocy, or in a general paralytic condition of the system.[1] Some few drinkers, again, by reason of extraordinary constitutional vigour, escape all these ills, and live on to old age; but the greater number who are not early removed from society by the diseases enumerated, suffer more

[1] This comprehends the group of affections described by Huss under the name of the Chronic Alcohol Disease, and which has already been referred to.

or less from the attacks of delirium tremens. There appears to be a certain peculiarity of constitution which predisposes the individual to this malady—provided drink has been systematically indulged in,—that, namely, in which there is a highly sanguine temperament, and a nervous, irritable disposition. And I consider also, that the readiness with which the disease occurs, and the mode in which it is developed, are well explained by other individual peculiarities and circumstances. While one is attacked suddenly, without any diminution of the quantity, or change in the kind of stimulant, another is more slowly and gradually affected, and it may be, after very considerable reduction in the supply of liquor. In these respects, however, the effects of the stimulant are simply analogous to those of various other potent medicinal agents. For example, some constitutions are easily affected with mercury, others with difficulty. Salivation may all at once be displayed in one individual, who has taken the drug for a long time in very full doses, while in another it is produced by very gradual degrees, although with an equal amount of the mineral. But in both instances, after the constitutional effect is once produced, it may be kept up and increased to an excessive and serious extent by very small quantities of the mercury; and in the latter circumstances it would be very absurd to aver, that salivation was owing entirely to the more recent and smaller doses of the drug; or, still more absurd, if the mercury was altogether withdrawn, to say that the increase or continuance of salivation depended upon the abstraction. In like manner, when the nervous tissue of the brain has become charged with the alcoholic poison beyond a certain point, the effect it produces is kept up, and even increased, notwithstanding very considerable reduction in the amount consumed; and we are thus enabled to explain why diminution is almost universally supposed to be the cause of the malady, when, in fact, the indisposition to take more is itself one of the precursory symptoms of alcoholism. In the delirium ebriosum, there is urgent desire for drink during the violent stage of the affection, until a paroxysm of sickness occurs, which induces exhaustion, and then sleep; but in the delirium tremens, there is seldom any desire for it, even at the beginning of the attack, and certainly none when the affection is developed. Illustrations of the tendency to accumulation might be drawn from the effect of other medicinal agents, each acting in its own peculiar way, and on particular organs or functions. This, however, appears

unnecessary, for I think it has been clearly shown, that the alcoholic principle—imbibed systematically—passing through the channel of the blood, in whatever way atomically combined or chemically changed, has its influence concentrated on the nervous pulp of the brain, accomplishes its work on the perceptive, sensory, and motor powers,—in one case quickly, in another, if not soon, at last suddenly; or, by disturbing the varied functions of the economy, it induces such a condition of the system, that a smaller quantity taken will ultimately produce a more intense and lasting effect.

These views of the subject, to my apprehension, help to explain why delirium tremens is so readily brought on in dram-drinkers, when subjected to external injuries, or when seized with any kind of inflammation or fever. The sudden shock to the system in the one case, and the altered balance of the circulation and disorder of nutrition in the other, brings, I conceive, the individual at once into the condition of susceptibility to this disease, which would not otherwise perhaps have been so early accomplished. The effect is somewhat similar in the case of those who possess the gouty diathesis, for an injury of a limb is extremely apt to precipitate an attack of gout, which, in the ordinary course of events, would probably not have taken place for a considerable period of time. There is, apparently, in the habitual drinker of a nervous temperament, a tendency to delirium tremens, as there is in the *bon vivant* of a certain temperament to gout, and as there is in the epileptical or hysterical subject, to epilepsy and hysteria, although in each instance there is great dissimilarity as regards condition, cause, and effect; and any sudden excitement, shock, or severe malady which powerfully affects and disturbs the vascular and nervous systems in individuals so predisposed, may greatly aid in bringing on a characteristic attack or paroxysm. It is in this irritable state of the habitual drunkard's constitution, although he may not be on the verge of delirium tremens, that alcohol, by its presence in the blood—in whatever way combined—and its interference with the nutrition of the brain and nervous system, will superinduce on the receipt of an injury—say a gunshot wound, a severe burn, or a fracture—a febrile attack, attended by delirium presenting somewhat of the appearance of that disease, but which in reality has more of a typhoid character. This affection has been named by Dupuytren "*Delirium nervosum s. traumaticum;*"[1] and although some writers have considered it iden-

[1] "Annuaire Médico-Chirurgical des Hôpitaux."

tical with delirium tremens, it only similates it, being a symptom of the sympathetic fever which occurs under the circumstances above noticed. But whether delirium of this character, with some degree of tremor, takes place under these circumstances, or whether an attack of pure delirium tremens immediately supervenes on the receipt of the local injury or disease from that state of the constitution, and the previous habits of the individual, already explained, it is quite erroneous to suppose, in either case, that the affection originates from the suspension of the stimulants to which he had been previously accustomed, however plausible the theory may be which thus accounts for its production.

The idea, that bad consequences result from a sudden abstraction of stimulants, having got possession of the minds of many able writers on this malady, all their views of its nature have been perverted, and they have misled the profession into a dangerous system of treatment. Dr Blake, for example, who has been much quoted as an authority on delirium tremens, says: "It is purely idiopathic, arising *invariably* from the same cause, namely, the sudden cessation from, or a material diminution of, intemperate habits;"[1] and he goes so far as to assert that at "almost any time he *could have* brought on an attack of delirium tremens in the habitual drinker, by simply taking him into hospital for three or four days, and keeping him on spoon diet."[2] He does not appear, however, to have tried this experiment. It is an assumption from a theory supposed to be true, and has appeared plausible from the fact already admitted and explained, that the disease sometimes occurs in those taken into hospital on account of sudden or severe shocks to the nervous system from injuries and other maladies, but who have had the alcoholic erythism strongly developed, and who are, in fact, already on the verge of an attack of delirium tremens. The gourmand would feel equally weak and miserable, and his general tone be for a time depressed by the abstraction of good living; but however strongly the gouty diathesis was in such a case, this deprivation of good things would not occasion an attack of gout, although an injury of any kind, nay, a scratch, might. So I hesitate not to say, that the dram-drinker, in whom the delirium tremens diathesis is not yet fully established, and who is not already under the precursory symptoms of the disease, could not be subjected to a paroxysm by such treatment. From the sudden change on his circulation, he would doubtless experience

[1] Op. cit., p. 23. [2] Op. cit., p. 18.

much mental disquietude and physical discomfort, and be made "shaky," according to common phraseology, for a time; but this would soon pass off, without the occurrence of the usual pathognomonic signs of delirium tremens, more especially without those spectral illusions or phantasms which are common to poisonings, with several other agents of the narcotico-acrid class.

The opinion of Dr Craigie on this point is so decided, that I cannot resist quoting it. He says:—

"Without positively denying that the disease may come on in this manner, I can only say that I never witnessed an instance of this mode of development; and, after perusing all the published cases extant, I cannot perceive that any of them, excepting the one recorded by Dr Armstrong, in the 9th vol. of the 'Edinburgh Medical and Surgical Journal' (p. 146), afford satisfactory evidence that the disease is induced in consequence of the sudden abstraction of the use of spirituous liquors; and even that case, I think, may be explained without having recourse to the supposition now mentioned. I have, on the contrary, never observed that the sudden and complete abstraction of these liquors aggravated the symptoms of the disease. I find further, that neither Berndt, Toepkin, Hufeland, Andreae, Göeden, Sieburgundi, nor any other foreign physician by whom the disease has been observed, admit that it is produced in this manner; and in all the cases recorded by them, the symptoms were developed after a continuance, more or less protracted, of stimulation by spirituous liquors." [1]

In order to obtain some additional evidence on this disputed point, I submitted some queries to Drs Simson and Gibson, the medical officers of the large prison establishments of this city and of Glasgow, and to Mr Page and Dr Scott, surgeons to the county gaols of Carlisle and Dumfries; and the following information has been kindly furnished by them, as to the effect of the sudden withdrawal of all stimulants from civil and criminal prisoners known or presumed to be of intemperate habits, and the immediate substitution of prison fare, which is well known not to be of the most generous description.

As regards the prison of Carlisle, it appears that, although the annual number of commitments during the last fifteen years has been about 600; and that, although three-fourths of these are considered to have been, in one way or another, the consequences of drunkenness, Mr Page states emphatically he has never yet seen any ill "result from the sudden abstraction of stimulants from

[1] Op. cit., 57.

habitual drunkards, who had been drinking to excess up to the time of being placed on prison fare." Mr Page had also, during nine years' experience in connection with the Carlisle County Pauper Lunatic Asylum, observed the same impunity with which all stimulants could be at once withdrawn. (*Letters, 9th and 21st June* 1854.)

Of the gaol of Dumfries, it is stated by Dr Scott (*Letters, 12th and 21st June* 1854) that, during the last fifteen years, the number of civil and criminal prisoners have amounted to 5539; that of this number he supposes about two-thirds were committed for crimes resulting from intemperate habits; that he believes a very large number to have been habitual drunkards; and that, although all of these, of course, were deprived of their usual libations, and at once put on prison allowance, only five cases of delirium tremens are found on the register of disease, and that all of these patients but one were admitted to the prison with the disease on them; and that in regard to that one, although entered as under delirium tremens on the day after admission, there is every probability for believing that *she* had had the disease on her when admitted, although not reported to be ill. Dr Scott also notices, as an important fact, that during the time the railways were being constructed in the county of Dumfries, a very large number of navvies were committed to prison, who had led a very dissipated life for many months, and although deprived of liquor from the moment of apprehension, not a single case of delirium tremens occurred.

Then, as regards the prison of Glasgow, in which the annual commitments amount to upwards of 4000, the experience of the year 1850 is adduced by Dr Gibson (*Letter of 16th June* 1854), as affording an approximation to the facts wished to be elicited. A calculation made in that year showed that, while 4122 were imprisoned, the number of assaults, with few exceptions, committed under the influence of liquor, and "the drunk and disorderly," amounted to 1519; and of this number only three cases of delirium tremens occurred—a very small proportion indeed, especially when it is considered that the debtors, who are almost all habitual drunkards, and drinking up to the moment of incarceration, are not included in this list. Many hundreds more, therefore, may be considered to have belonged to the drunken population of the gaol. The average of the last ten years, however, is greater (5·7), there having been fifty-seven cases altogether during that period, but, after

all, this is a very small proportion to the number of dissipated and drunken characters gathered together there, and at once broken off from intemperate habits. Dr Gibson, however, states that he does not altogether enter into my views as to the proximate cause of delirium tremens, although he admits that "it does not so frequently occur as the advocates of the theory, which attributes it to the total withdrawal of accustomed stimuli, such as Blake and others are inclined to suppose;" and he mentions, in proof of his objection, that he had never seen it occur in less than twenty-four or beyond seventy-two hours after apprehension, which necessarily put a stop to dram-drinking. As I have already explained, however, and as the cases given at the conclusion of this paper will show, there is always, whether the individual is drinking much or little, more or less of a premonitory stage present in this affection, distinguished by digestive derangement, nervous irritability, restlessness, and sleeplessness, before much tremor is displayed, or any illusions manifested; and it is easy to suppose that these might not be brought immediately under the notice of the medical officer of a large criminal establishment, such as the Glasgow prison. But even granting that no incipient symptoms of the disease were observed, and that this proportion of the habitual drunkards were not quite on the verge of being affected with it, it is quite in accordance with the views already advanced to suppose that, when there was a certain amount of alcoholization existing, the disease might be hurried on more speedily than otherwise would have been the case in individuals of a nervous and excitable temperament, by the agitation or shock of apprehension, and the deprivation of liberty. But, further, I should suppose it a very just, nay moderate calculation, to assume that out of a population of 2000 confirmed drunkards belonging to any class of society, although enjoying unrestrained liberty and uninterrupted opportunities for indulgence to excess, at least from three to six instances of delirium tremens would annually occur.

But, in fine, on this point, the evidence communicated by Dr Simson, the medical officer to the prison board of this city (*Letter, 4th July* 1854), is sufficiently satisfactory; for while the number of civil and criminal prisoners, committed during the last year, was 5864 (which may be assumed as a sample of the previous fourteen years, over which Dr Simson's experience extends), only four cases of delirium tremens occurred within the last eighteen months. The average number of cases during former years, Dr S. states as from

2 to 3 per annum. Dr S. considers that, at least one-half of the whole prisoners may be assumed as dissipated characters, and that at the very lowest computation, 500 must have been regular, systematic drunkards, from whom all drink was suddenly abstracted; and he goes on to state as his decided opinion, that "the sudden taking away of spirits, etc., does not produce delirium tremens. In *every* case, the prisoner had symptoms of the disease on him when admitted—that is, they were all restless, irritable, etc.; and I have, no doubt, but that in many instances the crimes committed were the effects of this disease. I do not remember a single case of delirium tremens occurring when the prisoner was quite well when received into prison. There is not the least doubt that a peculiarity of constitution predisposes to delirium tremens," etc.

Here then, it has been shown, that hundreds of individuals among the public at large, and of the criminals committed to our gaols, leave off or are suddenly deprived of the stimulants to which they had been previously addicted, without being seized with delirium tremens, or anything approaching to it.[1] On the other hand, also, it is unquestionable that numerous instances of the disease do occur in which there has been no suspension either voluntarily or by compulsion of the amount of liquor consumed, nay, even an increased excess in drinking up to the very moment of seizure.[2] The assumption, consequently, that this disease is produced invariably, or chiefly, or even occasionally, by the diminution or abstraction of an accustomed stimulus, is not supported by facts. Any cases, therefore, noticed as occurring under these circumstances, are simply of an exceptional character, but which in my apprehension, fall quite short of proof from the considerations already so fully explained.

Some even, borne away by the theory that delirium tremens is a disease simply of "exhausted nervous power," and refining on the idea, have gone so far as to aver that it may occur independently of the use of intoxicating liquors altogether. Thus it has been alleged to have been produced by the use and disuse of opium and of tobacco;

[1] Dr Scott has mentioned to me the case of a debtor who, although up to the hour of his incarceration in the Dumfries gaol, was in the practice of taking on an average, one bottle of spirits, and upwards of three ounces of laudanum daily, yet had every drop withdrawn without experiencing any bad symptom. This individual, too, it is interesting to know, had been twice previously the subject of delirium tremens.

[2] Cases II. III. VII. and X. are instances of this.

to have been resulted from protracted mental application, from excessive depletions or evacuations, from rheumatism, from exposure to extreme cold, from hunger, etc., when no liquor of any kind had been indulged in. In all such instances there must have been some mistake or misapprehension. I can suppose that the continued use of inordinate quantities of laudanum might occasion delirium tremens, as has been reported, from the amount of alcohol necessarily consumed, which of itself would be sufficient to occasion it, and more especially when combined with opium, which, as shall afterwards be shown, has a great influence in hastening its development; but that opium alone ever produced the disease I do not believe. I have never seen it; and when it has been supposed the cause, there must undoubtedly have existed some misapprehension of the history of the case, or some concealment as to the previous habits of the individual, for nothing is more common than for an opium eater to indulge also in some stimulating beverage. Opium, when habitually taken by itself, may, in the course of time, break down mental and physical energies, giving the aspect of premature old age, if not occasioning actual imbecility or paralysis, but it will not produce delirium tremens; and when left off suddenly, the poor victim of the enslaving habit will for a time feel very wretched and feeble, but will not manifest the pathognomonic symptoms of delirium tremens, and will have the best chance of regaining to some extent his constitutional vigour. In regard to any influence which the disuse of tobacco may have in occasioning this malady, I would say that it is quite out of the question, and that any attack occurring in the case of the recent smoker, must have been owing to the conjoined habit of drinking. As an illustration of the erroneous notions prevailing in regard to the matter, and to the disease generally, I will give one of the last published instances of delirium tremens—a good example of a mistaken cause, and a misunderstood effect—wrong theory, and wrong practice. It is entitled "*Delirium Tremens produced by Abstinence from Tobacco.*"[1] The italics are introduced to draw attention to some points of importance.

"Delirium tremens, and its twin sister, traumatic delirium, are now so well understood to be dependent on *asthenic irritability of the nervous system*, that but one opinion prevails as to the principles which should regulate their treatment. *Sudden disuse of accustomed stimulants* is always to be deprecated, and

[1] Medical Times and Gazette, No. 163, Aug. 13, 1853.

in the event of a patient of known intemperate habits coming under surgical treatment, especially on account of an accident, care should always be taken that he is not deprived of his wonted allowance of alcohol. There is, however, another very potent drug in but too common use among the lower orders, the probable effects of suddenly relinquishing which, have, we suspect, been too little considered, and respecting which, the notes of a case lately under the care of Mr Curling, appear to offer a valuable hint to the practical surgeon. A withered old woman, *a gin drinker*, and a habitual smoker, was admitted on account of *a severe burn*. *Stimulants were from the first freely allowed her, and opiates administered*, but in spite of them she continued extremely restless, wandering at times, and quite unable to sleep. Her manner and aspect indeed *much resembled those of delirium tremens*. At this juncture, *several days after admission*, Mr C. ordered that she should be permitted to smoke. The salutary influence of the permission was at once apparent, the woman became quiet and tranquil, and on the next night slept fairly. All tendency to delirium disappeared, and she afterwards progressed steadily to recovery."

Now this was nothing but a mild case of delirium tremens, from habitual gin-drinking, precipitated by the severe burn, and aided by the stimulants and opiates so freely given; and in consequence of these combined circumstances—not in spite of them—the restlessness, etc., continued. The absence of the tobacco had nothing to do with this state of matters, but the disease originated from its ordinary cause, and was running its ordinary course of a few days. Convalescence was in all probability begun when the tobacco was allowed, but if not, no doubt its effect would be good, for it would act, not as a stimulant or a narcotic, but as a sedative—soothing and depressing the cerebral excitement—and sleep would follow as a natural consequence. It would not be surprising if tobacco alone, given in other cases, proved beneficial.

Then as regards the other causes, independently of alcoholic liquors, said to produce delirium tremens, the kind of delirium differs in each case, or partakes more of the characters of insanity; and there is also a corresponding diversity in the nature of the wakefulness, the muscular tremors and other symptoms, all of which circumstances, if space permitted, could be explained on very different grounds. But the mental phenomena of true delirium tremens, distinguished by a quick, eager, busy, apprehensive, spectral character, viewed in conjunction with the peculiar tremors, and sleeplessness, and with the uniform course and character of the other general symptoms, are surely sufficiently diagnostic. The term delirium tremens is, no doubt, pathologically incorrect, for incoherence and tremor may coexist in very dissimilar

states of mind and body, and originate from a diversity of causes; but it has been so long assumed by the profession, and known by the public as applicable to a disease originating solely from continued and excessive indulgence in alcoholic stimuli, that a more general signification cannot be recognised without leading to confusion and error. The cause and the course of this interesting disease are so very different from that of the affections above noticed, that no affinity in nature or pathology can be admitted. The functions of the brain in it are, I conceive, interfered with in consequence of the vitiated nutrition of its substance, and the irritation of the membranes. A peculiar erythism and excitement, as has been already asserted, is thus set up by the continued introduction and presence of the alcoholic poison; and every drop of intoxicating fluid now supplied to the circulation increases the poisonous action. If the supplies are still increased beyond this point—the furthest limit of endurance—the unfortunate individual will, in all probability, be seized with fatal convulsions or coma; or be cut off, or shattered for life, by the establishment of decided inflammatory action from protracted excitation of the brain and its membranes.

Now, if I have succeeded in showing that the alcoholic principle tends, by long-continued and excessive use, to occasion delirium tremens as the result of a specific poisonous action on cerebral matter; and that this happens on the principle of accumulation (as is the case with many other agents, such as mercury, lead, iodine, opium, Indian hemp, strychnia, etc., each acting in its own peculiar way), it should follow, that even a small quantity administered in the treatment of that disease, must necessarily increase the mischief instead of curing it. On theory, therefore, the rule of practice appears to be sufficiently evident; but whether or not the above reasonings and statements are considered sound and satisfactory, no inconsiderable amount of experience may be claimed in recommending an entirely non-stimulant and non-narcotic plan of treatment. I am aware that in advocating the disuse of stimulants and opiates I may be considered guilty of a medical heresy. The practice objected to has, there is reason to believe, been for long almost universally followed in this country, to a greater or less extent. It has arisen, partly, from blind adhesion to the popular error I have already attempted to expose, which assumes that delirium tremens originates from, and is aggravated by a diminution, suspension, or abstraction of an accustomed stimulus, and therefore to be treated successfully only

"by a hair of the dog that bit;"[1] and it has arisen partly also from acquiescence in those modern pathological notions which attribute so much to the disordered organisation, and diminished nervous power of the solids, and so little to vascular disturbance, to chemical change, and to poisonous action of the fluids of the body. It is pleasant to observe the spirit of inquiry now drifting towards the much neglected claims of a humoral pathology, and bent on investigating the nature and extent of blood-poisonings; and I despair not of seeing, ere long, still greater advances made in this direction.

As regards the treatment of delirium tremens on the views which I have endeavoured to unfold, the experience of upwards of fifteen years may be pleaded; and during the five previous years I also had ample opportunities of witnessing the practice of others, and of personally testing the merits of the mode of treatment ordinarily pursued. In the earlier period of practice the observations were made almost entirely in connection with hospital and dispensary attendance, affording a great many examples of the disease both in its pure and in its complicated forms, as occurring among tavern-keepers, brewers, butchers, and the lowest order of dram-drinkers generally; latterly the instances have been mostly among a better class of society, yet the disease presenting the same features, and originating from the same degrading cause. The frequent sudden fatalities which I have witnessed from arachnitis, convulsions, and coma, when stimulants and opiates were freely administered; and the length of time ere recovery took place, even in the most favourable instances of the malady, when these agents were given more sparingly and cautiously, long since convinced me that their tendency is highly dangerous. I do not say that I would never give a stimulant in delirium tremens. It may possibly happen, although I have never met with such a case, that in the advanced stage of the affection the pulse may begin to falter, the heart lose its usual rythm, the surface of the body to become of a leaden hue, the tremors to disappear, and subsultus tendinum occur, and delirium of a muttering character only continue, then certainly the flagging powers of life would require to be sustained by some diffusible stimulus. Here there would be no alternative. Then, again, I would not hesitate to give an allowance of his usual stimulant to a habitual drunkard

[1] The common practice has been, and, I have reason to know in many quarters still is, to give from one tablespoonful to a wine-glassful of spirits every two or three hours, either alone, or combined with opium.

when affected with a wound or ulcer, so as to obtain a healthy action therein; or to administer stimuli of one kind or another freely in ordinary fever, or in the typhoid state of traumatic delirium, so that his circulation may be enabled to keep up the functions of organic life until food be made use of. This would only be using legitimate means to maintain his ordinary condition of body; but it is quite another thing to prescribe alcohol when the individual is already manifestly in a state of alcoholic poisoning.

From all that I have seen and read, I believe that the combination of stimulants with opiates is a most hazardous practice in the treatment of delirium tremens; for while the former increases the determination of blood to the head, the latter is apt to occasion engorgement there, and thus, doubtless, they are the joint cause of many sudden deaths, and of many incurable palsies of body and mind—indeed of the great proportion of those casualties which take place, and for which the disease, and not the treatment, is blamed.

Opium given alone in delirium tremens is, I am aware, almost universally considered by the profession to be quite an indispensable agent —the *sine qua non*—for securing what is called the critical sleep; and hence it is prescribed in smaller or larger doses in as routine a manner as sulphur is for the itch, or colchicum for gout. Notwithstanding this high estimation of its value, however, I hesitate not to say that it is a very doubtful remedy even in the most promising cases of the disease, and a most dangerous one in others. It is well known that a moderate dose of opium in delirium tremens, so far as regards its action on the brain and nervous system, is in the first instance exciting and preventive of sleep. I have frequently seen such doses as in other affections would have been considered very large, in this greatly increase the agitation and excitement after each successive administration; and although sleep was secured at times, it was but short and disturbed, and followed by delirium as violent as before. Besides, the most unmanageable cases of delirium tremens which are met with, are those affecting opium or morphia eaters, who appear to be extremely liable to this disease if they indulge in spirituous liquors. From the use of opium or morphia alone, as already stated, true delirium tremens never occurs; but with the unfortunate slaves of this debasing habit, a very short course of intemperance is sufficient to develop it.[1] I have also remarked in

[1] See Case No. V.

several of these instances, that if, during the attack the usual dose of the narcotic is taken under the impression that it would soothe distress and procure sleep, more especially if that dose be morphia—which is apparently much more stimulating in this affection than opium—the paroxysm is greatly aggravated.[1] It is evident then, that if opium is to be used at all in delirium tremens, it must be given in a large dose (in from two to three or more grains, and repeated at intervals of a few hours); and it is thus generally given, the object being to overstep the stage of excitement, and force on the desired sleep. Now the acknowledged effect of a large opiate on the encephalon is to occasion engorgement of the vessels, more especially of the veins, and consequently, the larger the dose the greater will be the amount of sanguineous compression of the brain. What then must be the probable result in a disease in which there is already, if not an approach to arachnitis, at least a very excited action of the meninges, and a preternatural loading of the vessels generally? The cerebral functions are oppressed, and at length overwhelmed, and sub-arachnoid effusion is the result. The symptoms attending this untoward event are characteristic. Sleep is obtained, but it goes on deepening, and, as it becomes more profound, the pulse becomes smaller and less frequent, the surface of the body covered with a cold sweat, the face pale, the pupils contracted, the breathing slow and soft (although sometimes stertorous). An epileptic fit may now occur and terminate the scene, or the powers of life gradually become more and more depressed, and the victim perishes as if in a profound and gentle sleep. Now this progress and catastrophe, although viewed as evidence of an unmanageable, a malignant form of the disease, in a bad subject, is nothing more than the common course and result of injudicious management. Even Graves, who prescribed opium in delirium tremens in the manner I will afterwards notice, warns emphatically against its premature and incautious use.

"Opium," he says, "if given in the beginning, will increase the congestion and bring on sub-arachnoid effusion. I treated a case of delirium tremens in this way too boldly, and the man died with sub-arachnoid effusion; it was a lesson to me, and I advise you to profit by my experience."[2]

I am convinced that it is in this way very many of the sudden deaths we hear of in delirium tremens occur. I saw it frequently in early practice, and have seen it occasionally since in the practice of others; and feel persuaded that any practitioner who has been

[1] See also Case No. V.

[2] Clinical Lectures, vol. i. p. 530.

accustomed to treat this affection with large doses of opium, will be able, on reflection, to explain his want of success, and the occurrence of casualties. In fact, when recovery takes place after a long sleep forced on by a large opiate, it is simply from the wonderful conservative power of nature resisting the evil influence of the agent, just as some will recover from a severe apoplexy or a palsy. The practice is one of the utmost hazard. If death were the certain alternative in delirium tremens should sleep not be early obtained—for it it is said that "the patient must sleep or die,"—there might be some reason in attempting to force on the sleep by opiates. This, however, is certainly not the case, and consequently such interference is not only uncalled for but most improper, when there is danger to be apprehended from the practice. Sleep occurs as the natural, the favourable crisis, or rather termination of the disease; and it is not to be viewed as a part of the affection, or in the same light as we are accustomed to regard a critical sweat or other discharge. It is the result and the proof of an improved condition of the brain and nervous system,—a salutary relaxation succeeding a state of dangerous tension. It will take place in the mild but genuine forms of the affection at the proper period, which, as I have already remarked, is on the second or third day, when the paroxysm has run its course, when the peculiar erythism, the "nervous irritability," is brought to an end, and a condition of "exhausted nervous power" now truly produced. That sleep may likewise ensue in severe examples of the disease, although no opiate of any kind is given, the cases at the close of the present paper will prove; and while convinced that the plan of treatment now to be recommended will be found the most efficacious, I have no hesitation in saying that in a larger proportion of instances, sleep would take place spontaneously at an earlier period, and the subsequent condition of the patient be much more sound and safe, by doing nothing at all, than by the use of opiates. I have seen very decided cases of the disease recover well when a mere placebo was given with a view to keep up the appearance to friends of something being done, and prevent them from using as remedies things which would be hurtful. Dr Ware of Boston, in an excellent memoir on delirium tremens,[1] strongly advocates from experience the do-nothing plan of treatment. Among other things, he says of opium :—

[1] Quoted in the British and Foreign Medical Review, vol. xxiii. p. 603.

"In the cases which I have formerly treated with opium, and which have at last terminated well, a salutary sleep has not taken place till the close of the third day, let the quantity of opium be what it would. I have, indeed, seen sleep induced by opium at an earlier period, but it was premature, it passed into a state of coma, and the patient died. I am satisfied, therefore, that in cases of delirium tremens, the patient, so far as the paroxysm alone is concerned, should be left to the resources of his own system, particularly that no attempt should be made to force sleep by any of the remedies which are usually supposed to have that tendency, more particularly that this should not be attempted by the use of opium."

Dr Cahill[1] also cites several cases of the genuine disease, in which he found opiates decidedly injurious, and treatment without them salutary.

The treatment recommended by Dr Graves,[2] to which I have already alluded, is advocated on the ground that opium is highly dangerous in the early part of the paroxysm. His rule of practice is to begin with tartar emetic alone, with the view of combating vascular excitement, then to add a little opium, and gradually to increase the quantity, keeping its action carefully guarded and controlled by the antimony, until at length when engorgement of the cerebral vessels is no longer to be apprehended, to use opium alone. If opium is to be given at all in delirium tremens, this is certainly the safest mode of prescription. For some time I tried it, but from previous experience of the beneficial effects of antimony in this disease,[3] I soon became convinced that it was from that agent solely, especially its effects in the first stage, that ultimate benefit was derived; that the relative quantity of opium employed at first is too small[4] to counteract the power of the antimony, or to produce any notable effect whatever; that in ordinary cases, ere the time arrives for increasing much the amount of the opium, the

[1] Dublin Medical Journal. Observations on the Treatment of Delirium Tremens without Opium. Vol. xv. p. 397.

[2] Clinical Lectures, vol. i. p. 530.

[3] This experience of the effects of tartrate of antimony I had before I was aware that Dr Graves had recommended it with opium, or that Stoll, Göeden, Klapp, and others, had advised it in emetic doses.

[4] Dr Graves' formula for first use is:

℞ Antimon Tart. gr. iv.
Tinct. Opii. ℥i.
Aquæ ℥viij.

Signa. A tablespoonful to be taken every second hour. There is thus in each dose only five drops of laudanum to ¼th grain of antimony.

affection has run, or nearly so, its natural course, and the period for the salutary sleep commencing is at hand; and that when a greatly increased dose is given before this much wished-for change has arrived, there is a proportional increase of excitement and consequent delay of its occurrence.

From these considerations, I resumed the use of the antimony alone; and, during the last ten years, have treated upwards of eighty cases of the genuine disease, many of them very severe ones, with uniform success,—not only in regard to the speediness of the immediate recovery, but the comparatively thorough restoration to a healthy condition of body and mind;—as much so, at least, as could possibly be expected in individuals, many of whom had been, and were likely soon again to become, habitual drinkers. The dose which I have been accustomed to give has ranged from one quarter to one-half of a grain, in simple solution, every two hours, sometimes at shorter intervals, according to the degree of excitement and irritability. The action of the antimony appears to be chiefly sedative. Its direct influence is in reducing the vascular excitement of the brain, soothing the nervous system, and diminishing muscular power; and its more indirect action is exerted on the functions of the skin, kidneys, and intestinal canal. In two or three instances only have I found it necessary to suspend its employment, in consequence of diarrhœa and hemorrhagic discharge from the bowels; and in these cases digitalis and ipecacuan were substituted with marked benefit; and I do not recollect of ever seeing it produce continued vomiting, although occasionally I have found the first or second dose eject from the stomach a quantity of bile. It is for the sake of its emetic effect that, in Germany and America, it has been prescribed in large oft repeated doses, even from four to seven grains every hour, and that, too, according to report, with benefit.[1] But although there is, doubtless, extraordinary tolerance of this agent in delirium tremens, I do not think that the use of such, or any other very heroic means, are warranted. Bleedings, large opiates, or large doses of tartar emetic, are all, although certainly not equally, unsafe, and therefore to be deprecated. An antimonial course of treatment in moderation, and with the design I have indicated, gently diminishes excited action, induces weariness of muscle, general nervous exhaustion, and mental

[1] Quoted in the work of Höegh Guldberg, already referred to. See also British and Foreign Med. Rev., vol. vi. p. 330. Also Copland's Dict. of Pract. Med., p. 501.

languor. It thus removes all hindrances to the occurrence of the salutary sleep. It prepares the way for it, not by forcing, but by favouring it; and when the individual, exhausted, seeks his couch, and finds repose, that goes on, not as a drugged sleep, but as a purely natural and profound repose, from which he awakes with restored reason and muscular control.

Although I have recommended the tartrate of antimony as a chief remedy in delirium tremens, there are several other means essential to its successful treatment. In the department of medicinal agents, however, I have only further to suggest, that, should the bowels not be moved by the antimony, the compound powder of jalap (ʒi) will generally be found speedy and efficacious. The other means of cure belong strictly to regimen and diet; and the first of these in importance is bodily freedom. Nothing is more hurtful in delirium tremens than restraint, particularly that of the strait-waistcoat. I have seen instances, and heard of many more, where the cerebral excitement was so increased by the never-ceasing maddening struggles for liberty, that fatal convulsions at last afforded release. All the control required is the presence of one or two judicious attendants, who will humour the patient in his whims and fancies; who will speak and act regarding them so as to assure him of safety, and to relieve him of apprehension, which is the most characteristic feature of the delirium; and who will mildly but firmly interpose, if he attempts anything which may accidentally prove injurious to himself or others. Of course injury inflicted wrathfully or vindictively is not to be anticipated, for rage, violence, or outrage, do not occur in this remarkable disease, but only in that affection which I have already briefly noticed, and with which it is sometimes confounded, namely, the madness of drink. Hence the frequent accounts met with in the public prints, of homicidal, suicidal, and other violent acts, said to be perpetrated during fits of delirium tremens, originate in an entire misapprehension of the nature of the two diseases. The apartment, however, in which the delirium tremens patient is confined should be well secured, for he may rush out at the door, or jump over the window, in the fright and frenzy of imagined danger. The larger, too, the room is, so much the better, that he may have ample space to advance and retreat, according as he wishes to scrutinize or avoid a suspicious or distressing object of his fancy; to arrange and re-arrange articles of furniture; or to carry on, after a fashion, the duties of some bustling occupation.

All this expenditure of muscular effort, without any restraint, aids greatly the antimony in producing a safe kind and amount of physical and mental exhaustion, from which the patient, languid and worn out, at last lies down voluntarily, and falls into the much-desired sleep. It is thus, too, that "the walking drill," according to Dr Blake's experience in the West Indies,[1] was found efficacious in warding off attacks of delirium tremens in the case of drunken soldiers; not, however, as supposed, from the exercise proving a new stimulus in place of the rum, to which they had no access, but from its wearing-out effect, while the proper nutrition of the body was maintained. No one would ever think of ordering continued and monotonous hard work, and muscular fatigue, for an affection of "exhausted nervous power."

During the entire paroxysm of the attack, it is of some consequence to afford the patient abundance of light; not, however, as supposed by Dr Blake,[2] on account of its stimulant or excitant effect, but for its aid in correcting false optical impressions. The excited brain is very apt to receive erroneous impressions from the appearance of surrounding objects, if there is an uncertain light. Hence the exaggeration of many of those agitating and terrifying illusions and phantasms which more distinct vision would prevent, or quickly dispel. During the daytime, therefore, there should be no half-closed shutters, nor half-drawn blinds or curtains, but advantage taken of the clearest light available; and during the evening or night, the more distinct the artificial light is so much the better. Perhaps perfect darkness may serve the purpose equally well; but this can be available only in the well-padded chamber of a lunatic asylum; and, besides, in private practice, the other parts of the plan of treatment here recommended, which requires the presence of an attendant to regulate the doses of antimony, or other sedative, and to administer, from time to time, suitable nourishment, could not be carried on without the admission of light. This leads me to remark, in conclusion, that, during the administration of the tartar emetic, I give, at intervals of a few hours, a moderate quantity of good beef-tea, mutton broth, or chicken soup, and sometimes *café au lait*, with the white of an egg switched up with it. Thus, while the vascular action in the brain is being subdued, and the nervous system liberated from the presence of the alcoholic poison, the functions

[1] Op. cit., p. 19.

[2] Op. cit., p. 60.

of organic life are sustained, and a better ultimate recovery is secured.

I shall now conclude this paper by appending reports of nine cases, in order to illustrate the views advocated in regard to the nature and treatment of delirium tremens, and these I shall give in detail, so that it may be acknowledged that the true disease has been understood and described. These cases, too, it must be borne in mind, are not complicated, or the symptoms masked by the effects of stimulants and opiates—unless in the instances of the unauthorized supplies hereafter to be noticed. They may probably, therefore, on first consideration, not appear to be remarkably severe instances of delirium tremens. They are indeed, however, most characteristic examples of the affection,—five of them at least being considerably above average severity; and I have no hesitation in stating my conviction that all of them would have assumed a more severe complexion and taken a more serious course, had the ordinary remedies been employed; nay, that it is the stimulo-narcotic plan of treatment alone which makes this disease in almost any case appear a formidable one. The following cases also are not selected; for, with three exceptions, they all occurred consecutively at a period —some years since—when I purposed bringing my views before the profession; and the others have occurred in succession also, and were noted with a view to publication; and, but for extending this communication to an undue length, I could have given the details of many more examples of the disease and its treatment.[1] Enough, however, I trust, has been brought forward to show, that delirium tremens is a form of alcholic poisoning—or an alcoholism; that its exciting, as well as its predisposing cause is the habitual abuse of intoxicating liquors—and not the sudden abstraction or diminution of accustomed stimulants; that these produce a specific form of irritation of the brain and membranes, the tendency of which is to arachnoid inflammation; that this takes place most readily in those who have a highly sanguine temperament, and a nervous irritable disposition; that the chief phenomena attending this disease are invariably uniform in their character, and distinguish it from every other

[1] As the individuals, whose cases are noted in Nos. I., II., III., IV., and V. were affected repeatedly with delirium tremens before or since the occasions described, amounting in all to twenty-three times; and as they were all these times successfully treated on the plan now recommended, the cases now brought forward may be considered as thirty-two in number, instead of nine.

affection; that the occurrence of the salutary sleep is the normal termination of the paroxysm, indicating diminished activity of the cerebral circulation and functions, and the commencement of convalescence; that the cordial and opiate treatment is generally pernicious, and frequently dangerous; and that the main indications of cure, are, to reduce the cerebral excitement by a moderate but decided and steady course of antimony, or other agent capable of exerting a somewhat similar influence, and thus favour—not force—the wished for sleep; to soothe the feelings and dissipate the fears of the affected by kind and judicious superintendence, and the permission of light and liberty; and to support the physical strength by a moderate allowance of animal nourishment.

CASES.

Case I.—An innkeeper, aged 48.[1] A habitual drinker, but seldom or never intoxicated, has been attended by me in eight different attacks of delirium tremens—more or less severe—within six years; and on all the occasions treated successfully without stimulants or opiates. For some time previous to the present attack he is said to have been drinking less than in former years, in consequence of ill health, and still less within the last fortnight, although every day, early and late, imbibing a little with his customers. On my *first* visit I found him very dull; without appetite; sleepless; complaining of slight cough and pain in the chest; tongue slightly furred; bowels constipated; pulse 90. As yet no visions, and no decided tremors. Calomel gr. iv. Pulv. Jalapæ, comp. 5i., ordered.

2nd day.—Bowels slightly opened; cough troublesome, but no bronchitic signs. In other respects same as on previous day. On account of the catarrhal symptoms ordered a mixture every four hours, each dose containing, Sol. Mur. Morphiæ ♏ 5, and Liq. Acet. Ammon. 5ij.

3rd day, noon.—Paroxysm of delirium tremens evidently begun. Had passed a restless night. There is considerable tremor and agitation of manner. Pulse 94, full, but soft. Discovered that he had been getting a little wine and spirits from time to time during the last three days. Forbade everything of the kind, and withdrew also the mixture ordered yesterday.

4th day, 10 A.M.—Pulse 106, soft and small; hands and tongue very tremulous; face pale; perspiring copiously. Could not stand still for a mo-

[1] For obvious reasons the names—even the initials—of the individuals, whose cases are detailed are not given, or the dates of attack mentioned.

ment, but darted from one window to another, as he anxiously expected the police to come for thieves, who, he said, were tied up in the next room. They had been stealing his property for the last six days, and he had just been writing down a list of the articles amissing. This inventory he showed to me, but it was utterly unintelligible. He knew me at once ; and answered correctly questions when this could be done in four or five words. It appeared that he had been in bed, but was sleepless, tremulous, and agitated, until 3 A.M., when he was seized with what his wife described as a fit. She then gave him a wine-glassful of brandy, and ever since he has been up and much excited,—running about the house after imaginary rats and thieves, and once escaped to the street in his night-shirt publishing his wrongs. A trustworthy attendant was now placed over him with instructions to see that he had as much freedom and light as possible. All stimulants prohibited, and the following mixture ordered : —℞ Tart. Ant. gr. iv. Vini Ipecac. ℥iij. Aquæ ℥vij., ℥v.—a table spoonful to be given every two hours. A cup of tea, café au lait, or beef-tea, to be given at a few hours' intervals, if cared for.

8 P.M.—Pulse 96. Bowels twice moved since the morning ; perspiring copiously ; and much calmer, although still talking in a rambling manner concerning all sorts of difficulties and troubles. A cupful of beef-tea twice taken. The antimony has been given regularly, and is to be continued until there should be an appearance of depression, and a wish to go to bed.

5th day, 11 A.M.—He had his last dose of tartar emetic at ten o'clock last night, and soon thereafter appeared exhausted, and was prevailed on to go to bed, when he slept profoundly from 11 P.M. to 5 A.M. He had then some tea and bread, and had been sleeping again until now. Is dull, but quite rational ; pulse 70, soft and regular ; skin moist ; bowels once purged. To be kept very quiet, and to have nourishment as formerly directed.

6th day.—Had slept the most of previous day, and all the last night ; is now quite convalescent, although weak.

Remarks.—A good example of an ordinary case of delirium tremens ; reduction of accustomed stimulants from inability to take more ; aggravation of all the symptoms from (unauthorised) administration of stimulants, and probability that the disease would have taken a more severe form had these been continued ; early and decided improvement under treatment with antimony, animal nourishment, and careful watching ; the patient a living proof of the safety of a non-stimulant and non-opiate treatment from good recovery under so many attacks of the disease—the more frequent the recurrence of delirium tremens, the greater being generally supposed the danger.

CASE II.—A spirit-dealer, aged 48. Long an habitual drinker. His average daily amount for some time had been four gills of whisky and one bottle of beer, taken from early in the morning until late at night ; and there had been no diminution in the quantity previous to the present seizure. Had

slept very little for a week, and none at all on the last two nights; and for some days was very tremulous, and quite unable to transact business.

1*st day's visit*, 3 P.M.—Was very distressed and agitated during the last night,—walking constantly up and down through the house, terrified with visions; had his last glass of whisky at 11 this forenoon. Pulse 104, small; skin cool and clammy; great muscular tremor; tongue foul; eyes yellow and lustreless; mind constantly occupied with false and horrific impressions of all kinds, although in no very definite form; but can answer a question put directly to him. *Instructions*—Plenty of light; complete liberty to promenade through the house, the doors and windows being secured; and two intelligent men to attend and humour all his fancies. To have a wine-glassful of the following mixture every two hours:—℞ Tart. Ant. gr. iv., Infusi Quassiæ et Aquæ ā ā ℥x., whether it sickened or not, and only to be discontinued if he should go to sleep. Beef-tea and weak coffee with milk to be given occasionally. 8 P.M.—Took one glass of the mixture at 3.30 P.M., which caused vomiting of a quantity of bilious matter; one at 5 o'clock, which was followed soon after by a loose alvine evacuation; and one at 7 o'clock. He is at present pale and perspiring; very tremulous and restless—in constant apprehension of rats and strange men; quite sensible when spoken to; pulse 110. To have the mixture only every third hour. Beef-tea, etc.

2*d day*, 10.30 A.M.—Pulse 106, very small; perspiring freely; face very pale; urine scanty and high-coloured; great tremulousness. He can put out his tongue, or rise up, or sit down when desired, but that is nearly the amount of his intelligence. He is in constant motion, not rapid or boisterous, but chiefly busy in arranging bed-clothes, carpets, small articles of furniture, and sweeping imaginary crumbs from off the table. Had never been in bed, and had taken only three doses of the mixture since I saw him last. Took a glass from me, supposing it to be pale brandy:—no sense of taste. The mixture to be continued regularly. Was seen by my friend Dr Cappie at 3 P.M., and again at 9 P.M., who found him much the same as when last reported. Had been purged several times. Antimony, etc. continued.

3*d day*, 2 P.M.—In bed, sound asleep; pulse 84, of good character; a good deal of subsultus tendinum; skin very moist; paleness of countenance gone. It was stated that he had appeared very much exhausted last night about 12 o'clock; was then got to bed, fell asleep almost immediately, and did not awake until 7 this morning. When awake he was not quite sensible, but took some bread, coffee and milk, and fell asleep again. Continued so for other two hours, and was then perfectly coherent, but not inclined to speak. He had some more breakfast and an egg, and went to sleep again. An hour ago he was awake for a few minutes, and took some beef-tea. The antimony had been given once this morning:—to be discontinued. Nourishment only to be offered when he awakes.

4*th day*.—Found him quite well; mind perfectly clear, and had been able to read a little.[1]

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[1] This patient has since had another attack—not quite so severe, originating, without any diminution of habitual supplies, and successfully treated in the same way as on the former occasion.

Remarks.—An ordinary case of the disease, rather more severe than Case I.; no suspension of wonted libations up to the period of seizure; excellent illustration of the *modus operandi* of the tartar emetic; and also of the benefit derived from the other means recommended for sustaining the organic functions, and bringing about natural sleep.

Case III.—An engineer, aged 30. Had been twice formerly under my care in delirium tremens, and recovered well without the use of stimulants or opiates. Has been drinking largely and constantly for some months past, and exhibiting at times excessive irritability and violence of temper—even to the extent of threatening the lives of his wife and children. In apprehension of this disposition he was some time since treated for delirium tremens in the Morningside Asylum; but on what plan I do not know, save that he was confined in a dark chamber. On the present occasion, at my *first visit*, I found that he had been drinking up to the moment of his attack, which had commenced decidedly two days before. His pulse was 110, soft, and of tolerable strength; hands very tremulous; aspect extremely haggard; skin moist; tongue clean. He had been quite sleepless for two nights; but not violent in his manner or conduct. He was laughing and talking incoherently,—looking constantly under his pillow, and carrying on a conversation with imaginary beings underneath, in this way,—"aye, oh yes, yes, certainly, just so," etc. On requesting to know what the devils were wanting, he replied, "a glass of whisky." Prescribed—℞ Tart. Ant. gr. vj. Aquæ ℔ij. Solve. A wine-glassful every two hours; and desired that he should be closely watched, and kindly treated. To have some weak beef-tea occasionally.

2d day.—Had a few minutes sleep this morning, but his general aspect is in all respects worse. Pulse 116. He is very restless and agitated, wishful to get out; thinks his workshop is on fire; that the police want to get hold of him, and has many such like fancies. I discovered that a bottle of table-beer had been given to him this morning. A wine-glassful and a half of the antimonial solution to be given every two hours.

3d day, 11.30 A.M.—He had walked about all yesterday in a state of great excitement; got the antimony very regularly, and lay down for the first time about 10 P.M., when he fell into a sleep. This continued until 6 A.M., when he awoke quite collected, and has since continued so. Pulse 80; hands very tremulous; has taken a good breakfast, and is in all respects apparently convalescent.

4th day.—Quite well.[1]

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[1] Since the above occurred, this patient, on account of domestic calamities, was removed to the Royal Infirmary, under another attack of delirium tremens, where he died in an epileptic seizure. I understand that the plan of treatment practised in that instance was the one usually followed—namely, restraint in a strait-waistcoat, stimulants, and opiates.

Remarks.—A well-marked case of delirium tremens occurring in an individual in whom the *delirium ebriosum* might rather have been expected; but the long-continued course of intemperance gave to this attack the usual characters of cerebral alcoholism. The case also shows the liability to this disease without diminution of the wonted stimuli, and the tendency to aggravation even from a slight stimulus, such as table-beer; it also illustrates the singularly sedative effect of antimony.

Case IV.—A gentleman, aged 40, of highly sanguine temperament and nervous, but kind disposition. Has had two previous attacks of delirium tremens under my care, both very severe. Was a total abstainer for some time following his last illness, having been informed that he would not probably survive another attack, or if so, that in all likelihood he would become insane; but had been gradually led back to drinking habits through company. His digestion having soon become so impaired that he could not take substantial nourishment, he drank systematically to overcome the distressing sensations of sinking. Four days prior to my first visit he was unfit for business; had disturbed wakeful nights; was very tremulous and nervous—being aware that delirium tremens was approaching, and fearing that he might be deprived of reason; and he had lost entirely the appetite—even for drink. Some brandy, however, had been given to him on the previous day, and his bowels were well cleared out by laxative medicine.

1*st day, afternoon.*—Found him very much agitated, and talking quickly and incessantly. He was hearing sounds which reproached him as a bad man. Thanked me for visiting him, saying that he was undeserving of notice, having been such a rogue, and so cruel to his wife and children. Pulse 100, soft and full; skin warm and moist; countenance pale and anxious; tongue and hands very tremulous. ℞ Tart. Antim. gr. iv., Aquæ font. et Aquæ Cinnam. ā ā ʒiij. Sig. One tablespoonful every two hours, or oftener should there be more excitement.

2*d day*, 10.30. A.M.—Had several times last night a few minutes' sleep; pulse 104; tongue white. He is at present more excited and restless; looks on himself as a lost man; is constantly hearing strange sounds; and is every little while eagerly examining the corners of the room. An experienced male attendant now placed over him with usual instructions. Antim. continued.

8 P.M.—Much the same. Mind more agitated with regret, and the apprehension of some impending calamity.

3*d day*, 10 A.M.—Has spent a sleepless and agitated night. His aspect is very anxious and apprehensive. Considers himself "between the deep sea and the devil; in fact, too bad for the devil himself." Pulse 108; tremor great; tongue cleaner; bowels confined; sweating considerably at times; urine scanty and high coloured. Tartar emetic continued; and to have Calomel gr. iv. Pulv. Jalapæ Comp. ʒi.

7 P.M.—Pulse 110, smaller than formerly; bowels have been twice opened. He is at times moving rapidly about as if searching for something; now whis-

pering as if aware of some secret; and then again standing gazing at the floor bowing and scraping, and answering questions as if before a high tribunal. Already 12 grains of the tartar emetic have been given. To have now half-grain doses every two hours, or oftener if he becomes more excited. Also to have some beef-tea occasionally.

4th day, 11 A.M.—Had passed a violent night; fancied robbers were in the house, etc., and occasionally he shouted so loud as to be heard in the street. Had a large basinful of beef-tea at one time, and some coffee and milk at another, during the night. Between seven o'clock last night and seven this morning he had taken 6 grains of antimony. Shortly after the last dose he fell asleep, and has slept until now—four hours—awakening quite sensible. His look is now free from apprehension, but haggard and as if worn out. Voice and manner wonderfully firm. Pulse 96, and of good character. To have beef-tea, and no more antimony.

8 P.M.—Is again much worse. He is lying on the sofa sullen and dejected, with a very maniacal aspect, and declaring that he was the worst of men and doomed to die. It appeared that he had gradually been getting worse since the forenoon. His keeper and friends supposing him beyond risk, had allowed several acquaintances to visit him; and it was my firm conviction at the time, that a stimulant had been administered by some one. The half-grain doses of tartar emetic were ordered to be renewed.

5th day, 11 A.M.—Had wandered from room to room all the past night. Thinks that the newspapers contain a great deal about him, and that various enemies are plotting his destruction, etc. Pulse 98, firm; tremor inconsiderable; perspiring freely; bowels opened twice during the night. Antimony to be continued.

10 P.M.—Was very calm about noon; sat for some time in the parlour with his wife, reading the newspapers, and kissed the children. He then again became much excited. I found him standing in an attitude and with an expression of reverential awe, arms extended, body slightly bent forward, and eyes turned upwards. His language was as if answering questions put by his Maker, such as, "Yes, Almighty God."—"Dr Peddie cured me of my fever, Almighty God."—"M.D., Almighty God," and so on. Having sat down for an instant I was implored with an expression of deep alarm and concern to get up, otherwise I would be killed on the spot. Pulse 118, not so firm as in the morning; skin moist; tongue pretty clean; bowels twice moved. Had taken tea and some soup. The antimony to be continued.

6th day, 10 A.M.—Had passed a very restless night, having had altogether only about half an hour of sleep, from which he has newly awoke. Lying in bed with his clothes on, pretty calm. He said, "Don't speak to me, as you little know what a bad man I am. The sooner I am out of the world the better, for I am to be publicly whipped through the streets to-morrow morning," etc. Pulse 92; not much tremor; tongue a little furred. Bowels repeatedly purged. On account of this looseness I withdrew the tartar emetic and substituted—℞ Vini Ipecac. Tinct. Digitalis, ā ā ʒss., 20 drops to be given every three hours.

9 P.M.—Had been much much calmer since 2 P.M. The last mixture to be continued.

7th day, 10.30 A.M.—Had slept soundly from ten last night until nine this morning. Is still gloomy and desponding. Digitalis, etc., to be continued at intervals of eight hours, and as much nourishment as he will take.

8th day.—Passed a good night, and is in all respects much better.

From this period he gradually improved. Sleep became more and more refreshing, and the mind stronger. In a week he was able to resume all his ordinary occupations; and has continued ever since—after a considerable lapse of time—temperate and well.

Remarks.—This case is an example of true delirium tremens at the outset, modified somewhat in the relapse, with symptoms of a maniacal character occurring in an individual apparently so predisposed, but not of the nature of delirium ebriosum. This maniacal relapse was in all probability occasioned by some improper tampering. It shows also the benefit derivable from ipecacuan and digitalis, when the tartar emetic begins to purge too much.

CASE V.—A journalist, aged 41. Had for many years been in the habit of Morphia eating. The ordinary quantity consumed was 9 grains of the solid Muriate per day, or 5i. in the week. Had been under my care (over a period of several years) during seven previous attacks of delirium tremens, most of them severe, and on all occasions treated without stimulants *or opiates*. After each attack he abstained for a few days or weeks from morphia, but the necessity of fulfilling some literary engagement drew him again into the vice. His whole appearance was that of the confirmed opium eater, yet there never had been any tendency to delirium tremens so long as stimulants were abstained from. The occasions in which he indulged in intoxicating liquors to any extent, only occurred at intervals of many months. Begun by the excitement of the social board on some festive occasion, they continued for from two to three weeks, but never so as at any time to produce decided intoxication. The quantity generally taken amounted to three wine-glassfuls of spirits, and one pint of porter daily; and this short course of drinking invariably led to an attack of delirium tremens. While indulging in liquor, he had always found it necessary to diminish a little the habitual dose of morphia, on account of the nervous irritability and tremor which he soon began to experience.

1st Visit, 5.30 P.M.—Was made aware that the course of cause and effect has been the same on the present as on former occasions; and that for the last four days, feeling himself under all sorts of horrors and fancies, and unable to sleep, he had left off the morphia entirely. Last night, however, he had taken three grains, having been induced again to try if it would produce a composing effect, but instead of this, it made him, as he himself expressed it, "ten times worse." He is at present walking up and down in a most wretched condition. States that strange visitors had been all day talking to him in whispers; that his breath as it went in and out took the form of whispers accusing him of misconduct, which, he says, is little needed, as his conscience is sufficiently reproving. Feels as if he had two heads—the one conjuring up fancies, and

the other thinking and judging correctly. Asps are also crawling on his breast, and he cannot shake them off, etc. Pulse is 100, soft, and of very good strength; pupils contracted; tongue clean; no appetite. Tremors, not only of his hands and tongue, but of his head and whole body have much increased to-day; and his voice also is bleating and unsteady. Says he has slept none for some nights, and is much afraid of the one approaching. He also states he had vomited himself freely with some antimonial solution which he had beside him since last illness; and likewise that he had been well purged. Desirous of ascertaining whether any other depressing or sedative agent would answer as well as the antimony formerly employed, the following was prescribed:—℞ Tinct. Aconiti gtt. x., Aquæ ℥iv.,—a tablespoonful to be given every two hours, and some beef-tea occasionally.

2*d day*, 10 A.M—Has spent a very restless night; had some short, but very disturbed sleeps. Asps and other reptiles are crawling in great multitudes about the bed. Appearance of countenance most wretched; skin slightly clammy, and of a dirty colour; tongue a little white; pulse 110, weaker than yesterday; urine scanty, and high-coloured; no appetite. Had taken during the course of the night one-half of the mixture (Aconite 5 ♏), but being unable to visit him frequently, so as to watch the effects of the medicine, and fearing it might prove too depressing for the circulation, I withdrew it, and ordered instead 10 drops of Ipecacuan wine, to be given every two hours, and ℥i. of the Pulv. Jalapæ Comp. at noon. To have also beef-tea.

4 P.M.—Much more excited and delirious; says there is a court sitting in judgment on the five senses, etc. Tremors are excessive, and he is sweating profusely. He confesses to me that his attendant, thinking him very weak, had at noon given him a wine-glassful of spirits. And on close questioning, also admits that he has some morphia in his possession, but will not say whether he has taken any, and will not give it up. To have 20 drops of the Vin. Ipecac. every two hours.

10 P.M.—Is rather better. Pulse 108. Says that he has had a great many strangers visiting him, pressing him very much to go out with them. Pupils contracted.

3*d day*, 10 A.M.—Has passed a most agitated night; walking from room to room incessantly; sometimes waving a white handkerchief from the window, under some notion of making peace with God. Has taken a little breakfast. He had gone to bed a little before my visit, and is lying with his eyelids half-shut, and squinting when they are open; is working with his hands in the air, as if arranging things, or seizing objects between the finger and thumb, or pointing a way. There are great general tremors, and considerable twitchings of the eyebrows. Pulse 110, and very weak. To have plenty of good beef-tea; also the Vin. Ipecac. to be continued.

4 P.M.—Pulse 114. Is sitting up in bed, very pale, and talking more humorously. A lady and gentleman, whose portraits are hung on the wall, have been speaking to him from out of their frames, and annoying him much, but he had discovered that by a particular wink of his eye, he could make the one jump into the frame of the other, and thus stop their discourse. His attendant delivered to me a small packet of morphia which was found in his

possession, a search having been made for it by my instructions; and he did not deny that he had been helping himself to a little from time to time. Ipecac. to be continued; also beef-tea, etc.

4th day, 10.30 A.M.—Had spent a very turbulent night. Is lying at present with a poker in his hand, with which he had been warding off supposed intruders. Now, however, he is asleep, and has continued so since 9 A.M., but is very distressed, judging from his moans, and the movements of the muscles of the forehead and eyebrows.

2 P.M.—Has just awoke after sleeping five hours. Pulse 84; hands very tremulous, and voice bleating; tongue cleaner. Mind confused, but no raving. Inclined to be quiet. To have beef-tea or a mutton chop, if he can take it. Discontinue medicine.

5th day, 10 A.M.—Has passed an excellent night. Pulse 80, soft, and of good character. Feels his head quite cool and clear; and talks intelligently on some favourite subjects of study.

6th day.—Greatly improved. Intends to walk out a short distance.

7th day.—Feels better to-day than he has done for months.[1]

Remarks.—The above case is an illustration of the opinion that morphia alone (or opium), will not produce delirium tremens, but that the combination with stimulants will very readily induce an attack—even a very short course of drinking. Here also it is apparent, that the morphia latterly produced a stimulating and injurious effect, so much so, that during the premonitory stage of the delirium tremens, the patient voluntarily diminished the dose; and that subsequently, its stealthy use protracted and aggravated the attack. I am of opinion that the ipecacuan did good (although, perhaps, not so much as the tartar emetic would have done); and that its effects would have been more apparent had spirits not been taken on the second day of the paroxysm, and morphia repeatedly.

CASE VI.—A clerk, æt. 41. For a number of years a hard drinker, and for some time past indulging to a great extent, but said to have been very moderate during the last six or eight days, in consequence of general indisposition. Appears to have twice had delirium tremens. On the last occasion is said to have been very violently and dangerously ill for three weeks, and to have been treated with spirits and opiates.

1st day.—Pulse 98; tongue foul and tremulous, also considerable tremor of hands, and agitation of manner; countenance anxious; bowels much disordered; sleepless. To have ℞ Mass. Pil. Hydrarg. gr. iv., Ext. Colocynth. gr.

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[1] This patient died sometime since apparently from an apoplectic effusion, without having been under any form of treatment. Upwards of two years had elapsed since the attack above described. The practice of morphia eating, however, was soon resumed, and was persevered in to the last.

vi. Misce ut fiant, pil. ij.,—for immediate use ; and afterwards 30 drops of the Vini Tart. Ant. to be taken every three hours.

2*d day*, 6 P.M.—Was unable to see him earlier. Pulse 98, full, but soft ; bowels have been freely purged. Slept none since last visit ; has been very restless all day ; and being himself apprehensive—from previous experience—of the approach of delirium tremens, has ordered the windows to be nailed down, and his razors removed. Antimonial wine to be continued. 9 P.M. Is now seeing objects in bed, and becoming more restless. Pulse 100, of good character. Tongue cleaner. Now to have the antimony in larger doses. ℞ Tart. Ant. gr. iv., Aquæ ℥ij.,—a wine-glassful to be given every two hours. Arrow-root and coffee with milk allowed. To have liberty to walk about the house ; to have all his opinions and diseased impressions humoured as much as possible ; and to have the advantage of clear light.

3*d day*, 11 A.M.—Says that he has had eight hours of excellent sleep, and feels quite well and comfortable. In reality, however, he has spent a very restless night ; up and down through the house several times with a lighted paper, looking for thieves. Has been much quieter since the last dose of the antimony. Pulse 106 ; more tremor ; considerable warmth and moisture of skin. Antimony to be continued, and beef-tea to be given occasionally.

4*th day*, 10 A.M.—Pulse 110, weak, and slightly intermitting ; muscular tremor great ; perspiring copiously ; pupils large ; face pale ; urine scanty and high coloured ; bowels open ; no sleep ; and very much excited with all sorts of fancies, although he can answer any question distinctly. 8 P.M.—In most respects much as he was in the morning. Pulse 120 ; skin clammy. He has been travelling all day along with his wife, and something or other has constantly been going wrong. Now, they are both (his wife to please him) sitting in bed with their knees drawn up to prevent water covering them, as it has got into a boat in which they are crossing a river, etc. To continue the antimony, etc.

5*th day, noon*.—Pulse 100, and steadier. Tremor not quite so great. Has taken some breakfast with relish, and more beef-tea. Has been in bed several times over night, but has only had one hour's sleep. At present is doing penance by walking on the floor barefoot. To continue the antimony, etc. 4 P.M. Is much calmer ; pulse down to 86. In order that fatigue and consequent sleep might be produced, advised a half-hour's walk out of doors in charge of a friend. 7 P.M. Sent for hurriedly. He is much more excited—more than he has been for the last 24 hours ; pulse 115 ; said that he saw his wife disposed of at a lottery a few minutes ago to another gentleman, which he considered most disgraceful, etc. He had been out walking for a very short time only ; and although I suspected that liquor had been given to him by some one, I could not ascertain that this was a fact. Antimony now to be given in half-grain doses every two hours.

6*th day*, 11 A.M.—Has passed a very agitated night. A short time since made an attempt to get over a window, and knocked down a large flower box into the street in the attempt. Is now writing dispatches to the Duke of Wellington, as he thinks himself in a besieged fortress. The writing is mere scratches of the pen, no letters being formed. Pulse supposed to be about 120,

but the muscular tremor and tendinous jerkings are so great as to prevent its being correctly counted. Half-grain doses of antimony to be given every hour, and beef-tea liberally. 11 P.M. Shortly after last visit the excitement had begun to subside, and with each successive dose of the tartar emetic he was observed to become calmer and more rational. At 3 P.M. he was taken out by a hired keeper for a short walk, but the latter having shortly before had some drink, took his charge into a spirit shop to get more. Here the patient, although offered liquor, declined; but the attendant having drank freely, and being unable to take care of himself, the former had actually to help him home. Worn out by this exertion, he went immediately to bed—half-past 4 P.M.—and has slept soundly until now. He is quite composed and rational. Antimony discontinued.

7th day, 11 A.M.—In all respects quite convalescent. Had eight hours sleep over night.

8th day.—Left cured.

Remarks.—The above is an instance of a somewhat severe attack of delirium tremens, in which recovery took place under the use of tartar emetic, etc., at a much earlier period than on the previous occasions when the treatment was stimulo-narcotic. It is also an additional illustration of the fact that the accustomed stimulus is frequently diminished by the patient himself when the disease is forming and advancing, simply from a sense of inability to stand the same amount as formerly. It likewise illustrates what I have frequently observed, namely, a severe outbreak of excitement shortly before recovery commenced, but which must be unhesitatingly met with the antimony, perhaps in increased doses.

CASE VII.—The last-mentioned patient having fallen back into habits of intemperance after the lapse of a year, was again seized with delirium tremens. On my *first visit at* 5.30 P.M., I found that he had been carefully treated and watched by an intelligent student of medicine who lodged in the same house, and who not only had observed the success of the practice pursued on the previous occasion (Case VI.), but had during the interval, by the timely use of the same means, cut short two threatened attacks of the disease. It appeared that he had been drinking very freely up to the premonitory period of this attack, three or four days ago, since which time he has had an aversion to liquor, has tasted none, slept none, and laboured—especially during the last two days—under considerable excitement of the usual kind. There had already been given to him, in one-fourth and half-grain doses, viij. grains of the tartrate of antimony. His pulse I found to be 120, weak and slightly irregular; skin clammy; hands tremulous; face pale, notwithstanding a considerable eruption of acne; pupils dilated; and the tongue furred and presenting prints of the teeth along its edges. His chief occupation was examining anxiously the corners of the room, presses,

etc., arranging articles, partly real, partly imaginary, and taking memoranda, which, however, were quite unintelligible. Advised a continuance of the antimony.

2d day, 1 P.M.—Pulse 120; considerable heat of head and skin, but with general moisture. Answers any direct question rationally, but immediately thereafter talks incoherently. Is greatly occupied looking after dogs and cats, who, he says, have got into the house. The urine is scanty and high coloured, coagulates readily with heat and nitric acid; and a drop evaporated spontaneously presents numberless beautiful phosphatic stellæ. Antimony to be continued; and beef-tea to be given occasionally.

10 P.M.—Pulse 110. Is not quite so agitated and restless, but still loquacious and fanciful. Has hitherto had the antimony at the rate of 4 grains in 12 hours:—to be continued at the same rate, and good beef-tea to be given from time to time.

3d day.—Did not see him to-day, but in the evening received the following report from my medical friend in attendance:—"After you left last night he talked for a little, but quieted down about 11 o'clock, went to bed shortly afterwards, and slept soundly until 5 o'clock this morning. On awakening he took some of the antimonial solution, drank freely of barley water, and fell asleep almost immediately. He awoke again at 8; and has had short naps during the course of the day. He complains a good deal of headache, and his eyes are dull and heavy, and water a good deal. There is a copious flow of urine, which is much lighter in colour. Pulse 88. No excitement or delusion, and he is inclined to sleep. I have been giving the antimony, but not so frequently of late."

4th day, 11.45 A.M.—Is quite convalescent but weak; urine still somewhat high coloured, but is unchanged by heat, although rendered slightly turbid with nitric acid; and on evaporation no phosphates are discoverable, but a large amorphous deposit of the urate of ammonia.

Two days subsequently I found him up and going about quite well, and the urine perfectly normal.

Remarks.—The above case is a well-marked instance of delirium tremens in which stimulants were freely taken up to the occurrence of its premonitory stage, when they were suspended in consequence of the constitutional effect of alcoholic accumulation having been established. The easy course which the disease afterwards ran, compared with that of the previous attack, was undoubtedly attributable to the prompt and decided use of the tartrate of antimony. The case is also interesting from the circumstance that during the paroxysms of the affection, the urine was found to be highly albuminous, and loaded with phosphates, a condition which is probably invariable in this disease.

CASE VIII.—A wine and spirit merchant, æt. 42, long addicted to drinking

habits, not consuming much at one time, but imbibing upwards of a pint of spirits daily. He was attended by me, about a year before, in an attack of delirium tremens of considerable severity, but recovered well under the antimonial plan of treatment. There did not appear to have been any diminution in the amount of his supplies on the present occasion, but rather the reverse, up to the moment of my *first visit*, which was *at* 4 P.M. I found him in his shop, to which he had escaped from home, although apparently in the second day of the paroxysm, extremely excited, and busily engaged among boxes, bottles, and barrels, searching for lost articles. The delirium was of a very rambling and confused character, and his hands and tongue excessively tremulous. Pulse 110, and small; skin very dry; pupils large; face pale and having an anxious expression. Prescribed ℞ Tart. Ant. gr. vj. Supertart. Potassæ ʒi, Aquæ ℔ij—a wine-glassful to be taken every three hours, or oftener, if there be more excitement. To be taken home and closely watched, etc.

2*d day*, 11 A.M.—Pulse 114. Tremors greater and more general, as if he was paralytic. Urine high-coloured and scanty. Has been wandering through the house all night in an extremely excited state, and, so far as was intelligible, under the apprehension of visits from burglars. Antimony to be continued every two hours, and ʒviij. of strong beef-tea every six hours.

3*d day*, 11 A.M.—Pulse 80, and of good strength; tongue clean; urine like strong beer in colour, but more plentiful. Manner calm; mind collected; and altogether apparently quite convalescent. It was stated, that yesterday, about 4 P.M., he fell asleep, awoke about 6 P.M., took some beef-tea, immediately fell asleep again, and did not awake until 10 P.M. He then had more nourishment, and was again soon fast asleep, in which he continued until 6 o'clock this morning, when he awoke and took a hearty breakfast of porridge and milk. His reason was only now, however, found to be quite restored; for when awake at the former times, he still talked incoherently. Early this morning he had the last of the 6 grains of antimony ordered on my first visit. Quiet, and nourishing diet prescribed.

4*th day*.—Found him in all respects perfectly well—better than he had been for many months past, both physically and mentally, and now reading in bed and conversing intelligently.

Remarks.—A characteristic example of delirium tremens of average severity; occurring without any abstraction of the usual stimulants, even on the second day of the paroxysm; and yielding satisfactorily in almost 24 hours to the influence of antimony, aided by good nourishment and careful watching.

Case IX.—Formerly a butler, now a first-class lodging-house keeper, æt. 53. Florid complexion. Has drunk spirits for many years in a systematic way, beginning early in the morning; but confesses to much greater indulgence during several weeks past, and more especially two days before he came under treatment, when, as expressed by himself, he had been "much the worse of it" (intoxicated); and it appeared also that on this occasion he had partaken

largely of salmon, stewed rhubarb, and sundry other articles, which had disordered his stomach. At 5.30 next morning, he was seized with severe pain in the bowels, and soon thereafter with vomiting and purging. In the course of that and the following day, he had taken repeated doses of tincture of rhubarb, laudanum, and brandy, but without benefit, and I was sent for in the afternoon. I saw him at 7 *evening*. He was then much pained in the bowels and purged ; tongue exceedingly white ; thirst considerable ; urine not passed for many hours ; pulse 90, rather full and vibrating ; and extremities cold. Fearing an attack of cholera, I ordered a large sinapism to be applied to the epigastrium, heat to the feet, ʒvj. of castor oil to be given immediately, and an opium pill, 1 grain, after the first movement of the bowels. Three other opium pills of the same strength were prescribed, one to be given at intervals of from two to four hours, according as the diarrhœa should be more or less urgent.

2*d day*, 11 A.M.—Has had 4 grains of opium during the night, which has checked the diarrhœa; but he has slept none, and complains much of pain in the bowels, about which he is nervously anxious, fearing that some dangerous malady is in progress. His manner is considerably excited, and he is very restless. Pulse 100 ; pupils contracted. Another sinapism ordered to the epigastrium. I now perceived that an attack of delirium tremens was approaching, and regretted much that I had prescribed opium so freely.

6 P.M.—Pulse 116 ; tongue white ; perspiring copiously ; pupils still contracted ; no return of diarrhœa, and does not complain of abdominal pain ; hands slightly tremulous ; considerable agitation of manner ; voice weak ; speech rapid and stuttering; and since the forenoon he has at times been talking incoherently, fancying that he saw strangers in the room, etc. To have ipecacuan wine ♏ xx every two hours, and some tea, or weak coffee and milk and bread for diet.

10 P.M.—Pulse 120. Symptoms of a paroxysm of delirium tremens confirmed. Is now out of bed, dressed, cheerful and active, as if there had been no previous ailment. Says that he is quite well, but that a number of "queer customers" have been visiting him, etc. To be strictly and judiciously watched, and the ipecacuan to be continued.

3*d day*, 11 A.M.—Pulse 108, feeble ; pupils quite natural, but eyes dull and expressionless. Urine dark and turbid. Has not been in bed at all during the night, but busy arranging furniture and hunting rats, particularly two old fellows, which, he avers, are hiding among the bed-clothes. Continue the ipecacuan and give beef-tea occasionally.

5 P.M.—Pulse 116, rather firmer than in the morning. Was permitted to walk out for an hour in the afternoon, well attended. He is now much more excited, but not quite so tremulous. Is perspiring copiously, and very earnestly catching imaginary objects in the air, which, however, are no sooner secured than they invariably slip through his fingers, and are broken and lost, thus occasioning him great distress. Ipecac. etc. to be continued. A specimen of urine passed in the morning became turbid with heat, and on evaporation presented a considerable abundance of phosphates.

10 P.M.—Head bathed in perspiration ; hands cold ; pupils natural ; pulse 112, and small. Urine high-coloured. Bowels not moved since early yesterday

morning. Is at present standing close to a wardrobe, where he says he has locked up in a small crevice "a female thief of the long-nebbed kind." To continue the ipecacuan, and to have a laxative dose of the Pulv. Rhei. Comp. to-morrow morning.

4th day, 9.50 A.M.—Perspiring much. Pulse 116, very weak, yet he is extremely active. Has not been in bed during the night, but going about very excited, and troubled with phantasms. Thinks he has been sentenced to be flogged on the Castle Hill in the forenoon, to the extent of fifty lashes; and is now shouting into the corner of a press "how many are on my side?" on the supposition apparently that a petition is to be got up to prevent the punishment from being carried into execution. Has had beef-tea at one time, and *café au lait* at another time this morning. The urine examined after this visit was clear, but high coloured, became slightly turbid with heat, and was found to contain numerous phosphatic stellar and penniform crystals.

5 P.M.—Pulse 120, weak; more tremulousness of hands than formerly, and some tendinous jerkings; and is more excited also than he has yet been. Every article of furniture in the room, even two very heavy wardrobes which might have been supposed quite beyond his strength, have been moved out of their places again and again; and he is now in the midst of his confusion, haggard-like, and bathed in perspiration, searching for seven children, who, he says, were sent from Newcastle. Ipecacuan to be continued, and nourishment as formerly.

11 P.M.—Has been sleeping quietly and calmly for the last hour, quite worn out apparently; by his exertions among the furniture, searching for thieves, dogs, and children; stopping up water pipes which had burst; replacing bell-ropes which had been pulled down, etc. During the afternoon he has had his shirt changed three times on account of the excessive perspiration. Had some minced collops in the afternoon, and some tea and bread in the evening. He has now had, within the last forty-eight hours, ℥i. ℥vj. of the ipecacuan wine. Ordered to be kept very quiet, so as to prolong the sleep if possible; and when he awakes, to have some ipecacuan and some strong beef-tea.

5th day, 11 A.M.—Last night had slept three hours, and then three hours again this morning; but between these periods he was as excited as formerly, and is now toiling as hard as ever among the furniture, which is piled up in the middle of the floor. He is covered with perspiration; looks very anxious and alarmed, and is very cross, contradicting whatever is said by his attendants. Pulse 120, and small; pupils somewhat dilated; urine still high coloured, but not so scanty, and only very slightly turbid with heat. To discontinue the ipecacuan, and to have instead, ℞. Tart. Antim. gr. iv., Inf. Quassiæ ℥iv., a tablespoonful every two hours; nourishment also as formerly.

11 P.M.—Worn out by exertion; he had voluntarily gone to bed about 4 P.M., when he fell at once fast asleep, and has not awoke since. He is now breathing calmly, and his pulse is 96, soft, and not so weak as in the forenoon. Has only had one grain of the antimony, which is now to be discontinued.

6th day, 10.30 A.M.—Has slept well all night, awakening for a short time about midnight, when he got some nourishment, and then slept again until lately. Pulse 74. Mind quite clear and composed, and hands steady. Feels the whole body stiff and aching from the fatigue which he has undergone.

7th day, 11 A.M.—Continues improving. Feels more clearness of head and general lightness of the system than he has experienced for a long time past. Is to be up in the afternoon.

8th day.—Was able to walk out, quite well, and in every respect capable of resuming his ordinary occupations.

Remarks.—The above is a very severe instance of *delirium tremens* —the paroxysm lasting about seventy-seven hours. It was a first attack, and resulted from habitual drinking and no diminution of supplies; but on the contrary, excessive indulgence up to the period when seized with the choleraic symptoms—which probably precipitated or hastened on the disease, aided no doubt by the doses of brandy, laudanum, and tincture of rhubarb, taken before my first visit, and by the four grains of opium afterwards unfortunately prescribed to check the diarrhœa. In regard to the phenomena presented by this case, and the effect of remedial means, I would remark 1st, That the contracted state of the pupil only lasted while the effect of the opium continued. 2d, That the tendency to perspiration usually attending this affection was much increased apparently by the ipecacuanha, but without proving injurious. 3d, That the urine was found during the paroxysms, to be albuminous, and to present phosphatic crystals. 4th, That the speedy improvement following the change to the antimonial treatment suggests the probability that the attack would have been shorter, had that agent been employed earlier, but which was withheld from the supposed risk of bringing back the diarrhœa. 5th, That very considerable weakness of pulse may exist along with astonishing capability for muscular effort. 6th, That muscular exertion may be permitted with safety, nay, even with benefit, as a means of inducing natural sleep; and 7th, That this mode of treating the disease does not lead to any subsequent debility, but on the contrary, holds out the best expectation of recovery, with a sound condition of the mental and physical powers.

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