

less: pulse 110, small, weak, and sometimes intermitting; tongue dry and furred; with sordes about the teeth. I omitted all the medicines, and gave her twelve pills, each containing one grain of opium, with directions to take one on the occurrence of a paroxysm of pain, and if necessary to repeat the dose. After taking a number of the pills a most beneficial change took place. "In a few days the pain ceased, the pulse became slower, and fuller, the tongue cleaner, and gradually the swollen uterus diminished in size." The patient recovered. In all these cases two circumstances were observed alike—the pain on pressing the swollen uterus, and except in the last for one day, the freedom from abdominal tenderness. Secondly, the relief derived from the exhibition of opium. It would not be just in the two former, to exclude entirely the calomel from a share of the benefit, as it was given along with the opium; yet if we may judge from the latter, in which it was given alone, a very considerable part of the good was doubtless owing to the opium, and I may add to this the benefit derived from it in the two former cases, after I omitted the calomel.

Since writing the above, another case of puerperal metritis has occurred to me, in which the *uterine* tenderness, and the benefit derived from opium, were equally well marked. In this case I had the advantage of consultation with my friend Dr. Ireland. After much suffering the patient is now convalescent. From these cases, puerperal metritis would appear much less fatal than puerperal peritonitis.

ART. XIV.—*On the Injurious Effects of Salt on the Animal System.* By WILLIAM MATEER, M. D., Physician to the Belfast Hospital, Lecturer on Chemistry in the Royal Belfast Institution, &c. &c.

WHEN we consider that salt is the only inorganic substance which enters largely into our articles of food and drink, and also its extensive consumption in all countries, we may justly feel surprised that its medical properties have not been more care-

fully investigated. In former times, when scorbutus prevailed to a great extent, the well known effects of salt in giving rise to, and in aggravating this complaint, made medical practitioners prejudiced against its use. They supposed that it contaminated the blood, and made it unfit for maintaining a healthy condition. At the present day a different opinion seems to be entertained. Chemists having discovered salt in many animal solids and fluids, it has been inferred, that it is a necessary constituent of the animal system, and that its presence serves some useful purpose. It has even been considered an important agent in digestion, secretion, and in maintaining the animal heat. And since scorbutic affections, in the form which they once assumed, have long since disappeared, the opinion now obtains, that the use of salt, as a condiment, is not only salutary, but even necessary for supporting life. To a certain extent, both kinds of opinions are right. It is true that a sparing use of salt may be quite consistent with the healthy state, but on the other hand, it is also true, that the immoderate use made of it by the poorer classes proves highly injurious, in causing changes in the quality of the food which render it less nutritious, or still more directly by acting on the coats of the stomach. The view which Dr. Paris gives of the matter accords also with this ; and in proof of it he refers to the well known effects of salt upon the vegetable kingdom. A small portion of it mixed up with the earth promotes vegetation in a very remarkable degree, whereas a large quantity checks the growth, and completely destroys plants.* Dr. Paris, however, merely states these facts, without offering any opinion as to the way in which the injury is induced, or in what it consists. He seems to have been aware of the many difficulties connected with such an investigation, and of the necessity of being provided with numerous observations, and experiments, before any proper conclusion can be arrived at. The subject first presented itself to my notice, while engaged as a district attendant, and in consequence of meeting with a peculiar kind of complaints, which

* On Diet, page 143.

seemed to originate from an excessive use of salt. The facts and reasons which led me to form this opinion, I have been induced to lay before medical readers, with a view of directing attention to the matter, and to ascertain how far they may coincide with their own experience and sentiments.

In addition to the ordinary duty of visiting the sick at their own houses, the attendants of the dispensary in Belfast are also in the habit of giving advice, and prescribing at their own houses, to whatever persons may choose to apply. As not only the really poor, but also the working classes, apply for relief, such cases are very numerous. Those which fell under my notice presented a striking uniformity in their symptoms. Nearly one-half of the adults complained of the same kind of indisposition. The symptoms so generally complained of were great weakness, lassitude after any ordinary exertion, a feeling of soreness through the whole body, and a sensation at the region of the heart, which the patients themselves differently described, as, a "crushing," "tearing," and "gnawing," at the heart. There were also palpitations, stitches through the chest, with a catching cough, dyspnœa in a greater or less degree, and costiveness of the bowels. The appetite was for the most part unimpaired, which sufficiently distinguished this complaint from dyspepsia; neither was their present flatulency, or the burning and acidity of the stomach, which characterize this disease. The stitches in the chest, and short cough (when present) might readily have caused them to be mistaken for some affection of the chest, but the feeble pulse, the shifting of the pains, and the existence of other symptoms, proved that they were merely sympathetic.

These complaints were found only among the lower classes; the higher being, as far as my observation has extended, quite exempt from them. This circumstance would naturally lead us to refer their origin to some deficiency in cleanliness, clothing, or diet. There is none of these circumstances which marks the difference in the conditions of society, so much as the nature of the diet. In the case of the poor, it consists in a great part of

salted provisions, which are but sparingly used by the rich. An interesting inquiry would be, to determine the relative quantity of salt which is used in these two cases. Mr. M'Culloch states the whole consumption of salt in the united kingdom, to be about twenty-two pounds per annum, for every individual.* This is supposed, however, to be below the real quantity. Dr. Paris gives it, in the article of bread alone, at two ounces per week, or six pounds and a half yearly, for every individual. To calculate the particular quantity used by the poorer classes, we must throw a much larger share into their scale, on account of their diet consisting so much of salted beef, pork, fish, (herrings), and butter, articles very sparingly used in other cases. Taking into account this circumstance, we will perhaps be borne out in stating the consumption of salt for every individual, in the humbler ranks of life, to be one-third greater than the average amount. This excessive use of salt gives rise to evils, of which those who are its victims seem to be well aware, and patients labouring under the symptoms we have briefly noticed, have in many cases referred their ailments to this cause. This fact led me to consider them as possessing a *scorbutic* character, and I have always treated them as such. The entire disuse of salted provisions, and a diet of fresh vegetables and flesh meat, continued for some time, always afforded relief. By putting patients on their guard against the evil, and prescribing this regimen, I have reason to believe, not only that the unpleasant symptoms were for the time relieved, but that afterwards, by paying more attention to their diet, they have secured to themselves better health. The only medicines given was a mixture composed of the infusion of quassia with sulphate of magnesia. The use of antispasmodics and pectoral mixtures, given with the intention of relieving the palpitations, or affections of the chest resembling catarrh, hardly ever had the desired effect. So that as far as treatment was concerned,

* Diction. Commerce, Art. *Salt*.

the disorder in question originates from the use of salt, and also that it bears a close analogy to scorbutus. A description of the essential symptoms of this disease, as given by medical writers, will set this in a stronger light.

During the lengthened period (from the fifteenth down to the present century) that scorbutus prevailed to such a fatal extent, its causes, symptoms, and treatment, were ably investigated by many medical writers. It was supposed, that scorbutus was proteiform, that it took on all possible shapes, and was masked in such diseases as fevers, jaundice, dysentery, and scrofula. It was asserted, that it occurred frequently in a mild form, and unaccompanied by those symptoms which characterized the severer stages, and some even went so far as to affirm, that it formed a general condition in all diseases whatever.* In late times, by one of those revolutions in opinions so frequently to be met with in the history of medicine, writers of the present age keep great silence on the subject; a circumstance which would lead us to suppose, that this disease in all its forms and modifications is now of rare occurrence. We have no reason, however, to think that such is the case with this, any more than any other disease of recent appearance. The scorbutic disposition still remains, and is frequently called into action. The only change that has taken place in respect to the disease is, that it seldom occurs with aggravated symptoms, because epidemic influence and a cold moist atmosphere do not operate to the same extent as formerly. We rarely meet, now-a-days, in the milder form which still prevails, livid spots on the skin. It may be thought, therefore, that any disorder which does not possess this character, fails in an essential symptom, and cannot be ranged among scorbutic affections. The petechial eruption, however, is no more essential to this disease, (scorbutus), than a similar appearance, found formerly in putrid fevers, ought to be considered as characteristic of febrile diseases generally. These

* Sprengel Haus. der Patholog. Th. iii. p. 498.

forms, both diseases assumed at certain periods, when epidemic influence, and other aggravating causes, were present. By assuming as a generic character the petechial eruption, Dr. Good has been led to class purpura hemorrhagica and scorbutus under one genus. Though these diseases may agree in this one particular, they are yet very distinct in other points: such as their causes and mode of treatment. Purpura hemorrhagica, according to Bateman and Wellan, is unaccompanied with constitutional disturbance, whereas this is constantly found in scorbutic affections. To a similar error Sir Gilbert Blanc attributes the fatal ignorance of former practitioners, as to the cure of these complaints: they paid too little attention to the state of the constitution, which is the most essential character of the disease. The petechial eruption may then rather be regarded as a contingent symptom. The others given by Good are more characteristic; they are, languor, and loss of muscular strength, debility, and depression of spirits: in addition to these we have what Dr. Parr calls tensive pains in the chest and limbs, a sense of constriction in this part, with stitches or coughing. There are also different local symptoms, arising from affections of the heart and lungs, such as palpitation, dyspnœa: the appetite generally remains unimpaired: we find also the countenance pale, an offensive breath, and a spongy state of the gums. These symptoms exist in all forms of scorbutus, the mild as well as the malignant, and they are, therefore, the most constant and essential: if we compare them with the affections already described, we shall find between them sufficient resemblance to justify us in pronouncing them identical. The analogy of these two forms of diseases gives us an indirect proof, that the complaints simulating scorbutus originate from the same cause, viz. the use of salted provisions, assisted by a cold atmosphere. Of all the predisposing and exciting causes of this formidable disease, the excessive use of salt is by far the most powerful.

* *Medic. Logic.* p. 27.

There is perhaps no fact in the practice of medicine so well grounded in observation; and hitherto when practitioners have been called upon to distinguish between affections resembling scorbutus, they have directed their inquiries to the cause, and if they found this to have been the use of salt, it was supposed that they then possessed a sufficient character, by which to form their diagnosis. I am aware that a modern writer, Dr. Steevens, has advanced an opposite opinion to this, or indeed to any entertained on this subject. He states, that salt does not give rise to scorbutus, nor that citric acid can in any case remedy it. On the contrary it is supposed, that vegetable acids may give rise to, and a plentiful use of salt serve as a cure for these complaints. This opinion, however, requires to be further verified. This individual opinion, however weighty, cannot counterbalance the great mass of evidence which a host of medical writers have brought forward on the opposite side. But even supposing that they were substantiated, we could escape from the dilemma, by having recourse to the doctrine of homoiopathy, which teaches us that remedies act by inducing a state similar to the diseased one. And though, according to Dr. Steevens, muriate of soda should cure scorbutus, by being administered in the excessive quantity which produces this complaint, yet this would not appear more strange than our treating delirium tremens with the materials which caused this affection, wine and opium.

We proceed now to state some particulars regarding the *modus operandi* of salt, in giving rise to this train of morbid symptoms. It acts as a stimulant. That this is its mode of action, appears from the use that is every where made of it as a condiment. When employed as a therapeutic agent, it is in virtue of its stimulating properties. For this reason it is used in stimulating enemata, and in the form of a bath for producing a gentle heat over the surface of the body. This property of salt explains to us the reason why the lower animals show such an avidity for it, travelling as we are told immense distances to

saline springs, and other places containing it, for the purpose of gratifying their taste. They do so from the same principle that leads man himself to the use of stimulants. So that it would appear, the desire for stimuli for the gratification of the appetite, is not confined to mankind alone, but also influences the lower orders of animate nature. When this stimulant is swallowed, the stomach is either slightly inflamed, or greatly irritated, according to the quantity which is taken. If it be great, it will exhibit all the effects of the most violent irritant poisons. Dr. Christison relates a case of this kind, where death took place in twenty-four hours, from taking a pound of salt dissolved in a pint of ale. The symptoms were those of irritant poisoning, and the stomach and intestines, on a *post mortem* examination, presented the same morbid appearances, being found excessively inflamed.* A moderate dose may only cause a slight degree of irritation on the mucous coat of the stomach; but as this viscus is connected by means of the ganglionic system of nerves with the heart and lungs, these organs will in consequence be sympathetically affected. This sympathetic action of the heart and lungs is always developed, when substances are taken into the stomach which irritate its inner coat. When a moderate dose of salt is taken, it will produce its peculiar action, in a slight degree only, and will leave no permanent effects; but an excessive quantity, *habitually* used, and continued for a length of time, will at last end in forming a morbid state. For it is important to bear in mind a fact stated by Christison and other toxicologists, viz., that more changes are affected by *habit* on the action of the organic, than on that of the inorganic poisons. Alcohol, opium, tobacco, and other such vegetable poisons, may be taken in very large doses with impunity, provided we habituate the system to their use, by giving small doses at first, and afterwards gradually increasing them. But inorganic substances are little

* On Poisons, p. 491.

impaired in activity by the force of habit. It is even asserted by the author now quoted, that in respect to those irritants which enter the blood, (and salt is of this kind), habit rather increases their power; the stomach becoming more tender to the subsequent doses by each repetition.* Salt and other saline compounds are, as Dr. Burrows states, when cautiously used, some of the most efficient remedies in the pharmacopœia, while in large and frequently-repeated doses, they form a class of most destructive poisons.† When the slight degree of irritation originally produced, is constantly kept by the habitual use of the stimulant, serious injury will be caused, and we shall have at last formed a deranged action of the heart and lungs, giving rise to palpitations, tensive pains in the chest, dyspnoea. In fatal cases too we would expect from such symptoms to meet with appearances indicative of derangement of these organs. I have not had an opportunity of witnessing any dissection where death was caused solely by a scorbutic state, but the morbid appearances given by writers sufficiently prove this. The heart is said to be generally found hypertrophied, of a pale colour, and surrounded with a reddish serous fluid: the chest also contains this liquid, and the lungs present a blackish and ecchymosed aspect: the lining membrane of both these organs has an inflamed appearance. According to Broussais, the mucous membrane of the stomach is also found inflamed, and of a reddish hue. This fact, however, is not of so much importance as regards this particular instance, since the same thing has been noticed by this writer in fevers, and in most other diseases. It might be interesting to inquire, how far the inflammatory state of the gastro-duodenal portion of the intestinal canal, so frequently assumed, is dependent on the nature of the aliments. Were we not afraid of being accused of ascribing to the cause under consideration too many, and perhaps imaginary effects, we would suggest as highly probable, that it does,

* On Poisons, p. 25.

† Gulstonian Lecture for 1834.

in most cases, originate from this cause. At all events, it is certain, that the use of a material which is stimulating and irritating in its nature, is capable of giving rise to this phenomenon; and to a cause of such general influence, we may with great fairness attribute a morbid condition, so frequently met with by pathologists.

We have referred only to the *local* action of salt. This substance may however act *remotely*, and upon every part of the system. It may be taken up by the absorbents, and be carried into the circulation, and thus produce a stimulus on remote parts. In this way it may stimulate the inner surface of the heart and lungs, and give rise to the chief morbid symptoms and appearances already noticed. This is accordant with the high authority of Mr. John Hunter, who distinctly states, that "the blood can receive and retain extraneous matter capable of destroying the solids *by stimulating to action so as to destroy them.*"*

Salt is found always in the blood, in considerable quantity, the greater part being carried to it by the absorbents, from the ingesta. When the quantity is moderate, it can do no injury, it may even serve some useful purpose, because the blood of animals in a wild state, and who have never had access to salt is found to contain it. It appears to be produced in the system by the action of the secretory organs, in the same way as other inorganic salts contained in the body, such as the phosphates of lime and of soda, carbonate of ammonia. In such cases, the quantity of the muriate of soda found in the blood is, according to Berzelius, one-third less in quantity than in man. This extra portion which the human blood contains being no doubt supplied by the salted food which is made use of. Salt gives to the blood a gentle stimulating property, when in the natural quantity, but when carried into the blood so as to accumulate in more

* On the Blood, page 99.

than this, it produces too great a stimulus. That it acts in this way, when present in the blood, appears from the experiments that have been performed, of injecting large quantities of saline solutions into the system, by the channel of the blood-vessels, for the purpose of curing cholera. The quantity of salt injected was generally about one drachm. In the stage of collapse, this mode of treatment was found to be followed by a remission of the severe symptoms. The functions of the brain, nerves, and heart, were considerably excited, and perhaps if the disease had been dependent on mere temporary suspension or intermission in the action of the nervous functions, this plan of treatment would have answered the expectations that were at one time entertained of it, and would have been an invaluable remedy in this severe malady. The experiment shows us, however, that such a small quantity as one drachm of salt, injected into the veins, produced a temporary excitement, and proves to us the highly stimulating properties which it imparts to the blood.

There is yet another way in which salt may act, so as to give rise to diseased action, and to this we shall briefly advert. We have seen that it may act locally, by irritating the stomach, as also the heart and lungs from sympathy; that when absorbed into the blood, it may influence remote parts of the system, in a similar way. In all these cases it is the *solids* that are affected. But there can be no doubt whatever, that it produces great changes in the animal *fluids*, particularly the blood, when absorbed, and carried into the circulating system. Blood drawn from scorbutic patients is dark-coloured, does not coagulate in a firm clot, but remains dissolved, as it were, in its own serum. It has been supposed by some, that this blackened and dissolved state is caused by acid, alkaline, or saline, principles; and the nature of the change has been further particularized, by supposing, that the alteration consists in the action of these substances on the fibrin and albumen. As these are assential constituents of the blood, by being deprived of them, it may be made

unfit for fulfilling the purposes of respiration, and of nutrition. But we have no certainty on this point: chemical analysis promises some time or other to throw light upon the matter; for the changes, whatever they may be, are generally believed to be chemical. If so, they can only result from a weakening of the vital powers, for the natural tendency of the action of the solids is to resist any alteration in the state of the fluids; and it would appear, that in proportion as the solids are impaired by the irritation of stimulant substances, the blood becomes less capable of resisting the chemical action of the salt which it contains, and thus is slowly altered in its qualities. This view of the subject will reconcile the opinions of Lind and of Sir John Pringle; the former referring the primary changes in scorbutic diseases to a relaxation of the tone of the animal fibres: the latter to a gradually accumulating putrefaction of the blood, from the use of salt.

From what has been stated we may draw the conclusion, that the ultimate effect of an excessive use of salt is a debilitated state of body. Hence the constant appearance of such symptoms as depression of spirits, langour, lassitude, and want of muscular strength. We have particularized some others, occurring in cases of a scorbutic character, that have frequently fallen under our observation, and where the immediate action of salt upon particular organs was developed; in most cases, however, the effect produced may merely be a debilitated condition of the body. This in itself may not be of serious importance; but as it renders the subject more susceptible to epidemics, it may be the source of much suffering and mortality. In large towns, fevers, dysentery, and cholera, often exist to a great extent among the humbler classes, while the rest of the community are quite free from them. Bad air may predispose to such epidemics; want of proper clothing is still more likely; but the difference in the diet is that to which, by the universal consent of writers, the greatest effect is to be attributed. The facts and reasonings which we have brought forward, will enable us

to comprehend, in a general way, what this difference is. Much remains yet to be known; but it is to be hoped that the importance of the subject will attract more attention, and cause it to be more carefully investigated.*

ART. XV.—*Practical Observations in Midwifery.* By WILLIAM F. MONTGOMERY, A. M. M. D., Professor of Midwifery to the King and Queen's College of Physicians in Ireland, and Accoucheur to Sir P. Dun's Hospital.

II. Pregnancy rendered unusually obscure, by the presence of an Abdominal Tumour, of such a size and so situated as to render unavoidable the Cæsarean Operation.

I HAVE elsewhere observed, when speaking of the signs of pregnancy, that it “not unfrequently takes place in diseased states of the system, which would *a priori* render its occurrence very improbable, and which, when it does occur under such circumstances, give rise to an unusual difficulty in recognizing its existence,”† both of which positions will be amply and forcibly verified in the details of the very important case which forms the subject of the present communication, and which will, I think, be found a most remarkable, if not a solitary instance of such an amount of disease, (independent of deformed pelvis), and so circumstanced, as to preclude all possibility of delivery being effected by any means, through the natural passages, and yet admitting of impregnation taking place, and of utero-gestation being accomplished.

* “It will be satisfactory to Dr. Mateer to learn, that views, in many respects similar to those he has promulgated in the preceding excellent paper, have been held for several years by some of his professional brethren in Dublin, and among the rest by Dr. Graves, who has published a lecture on the subject.”—EDITOR.

† See Cyclopædia of Practical Medicine, Vol. III. p. 491, et seq., where reference is made to several cases in illustration.