

to the lower extremities, with the result of four to six minutes lapsing before life was extinct. Indeed, two dogs thus taken down as dead, recovered, and ran away very shortly after. In dogs thus suspended with half to one maund weight attached, no change, as regards bloody serum or other marked post-mortem condition, was observed.

(To be continued.)

ON THE PATHOLOGY AND TREATMENT OF HEAT APOPLEXY.

By A. R. HALL, *Assistant Surgeon, Royal Artillery.*

THE article on this subject, by Assistant Surgeon Candy, M.D., 109th Regiment, published in the *Indian Medical Gazette* for July, recommends a plan of treatment which it was to be hoped had been given up as worse than useless by those who had had experience of this disease. Blood-letting, tartar-emetic, and other lowering remedies have been attended with such disastrous results, that I may say hundreds of medical men condemn their use. I attended the first course of lectures on military medicine, delivered by Dr. Maclean at Fort Pitt, Chatham, in the summer of 1861, and I well remember the earnestness with which he implored us *never* to bleed in sunstroke.

While I was at Barrackpore, I treated several patients on the plan mentioned to me by my friend, Dr. W. K. Waller (and first recommended by him to the profession); and his own papers in the *Indian Medical Gazette*, together with several others, showing the success attending the exhibition of quinine in large doses in this disease, either by mouth, or hypodermically, surely ought to induce every medical man to give it a trial, and not go back to the old plans, which have been proved to be fatal in the end.

Dr. Candy's proposed treatment seems to me to be the more deplorable, because he places among several *pre-disposing causes* (which are probably true) what I think can be proved to be the *actual pathological condition* in heat apoplexy, viz., exhaustion, with depression of the nervous system.

The subject of increased heat of body has been latterly attracting much attention at home. In the *Lancet* for 3rd February, 1872, there is a special article on "heat" under the head of "Therapeutic Traditions." I beg strongly to recommend it to the notice of all medical men who have not seen it. I should like to make a good many extracts, but, as they would occupy too much space, I confine myself to a few. After stating that the old idea was, that the special sign of the sthenic character of disease was the excessive development of heat, the writer proceeds:—"An entirely new order of conceptions has been necessitated by modern discoveries, dating mainly from the more accurate researches on the relations of tissue-waste to the production of heat, and from the improved knowledge respecting the heat-regulating functions of the nervous system." "For the old idea, that sensible heat of skin with redness of the face in itself implies strength of constitution, no authority remains; the obvious fact being that surface redness means *vasomotor paralysis*, and that high temperature in partially protected regions like the axilla means simple tissue-waste, as already described. The only thing which might remain unchanged is the belief that extreme pallor, and especially extreme coldness of the surface, under circumstances of general pyrexia, are signs of really severe depression. No doubt that is so, but the reason for so considering it is, that this pallor and coldness of skin, under circumstances where there is necessarily the minimum of contractile resistance in the small arteries, implies that the heart has too little force to pump the blood to the surface in any considerable quantities. But this is only a phenomenon of

extreme cases." It is observed in those rapidly fatal cases of sunstroke, occasionally, where death by syncope kills in a few minutes.

The writer concludes his article thus:—"Broadly speaking, the indications from excessive heat of body ought now to be interpreted in exactly the opposite sense to that in which they were formerly read. Whereas they used to be supposed to show that the case was a sthenic one, we now consider them almost absolute proof that the reserve forces of the body are exceedingly low, and are being constantly and rapidly reduced. Only let us think of that fact, and then remember the fashion in which multitudes of practitioners still talk of 'hot skin,' 'bounding pulse,' and so forth, as evidences of strength; and we must admit that the advanced pathology of the day is not merely somewhat ahead, but is altogether out of sight, of a large part of the less observant and less reflecting sections of the profession."

Dr. Candy writes of the "enormously increased temperature of the body, dependent upon the accumulation of carbon in the system;" but I think we have evidence to prove that the accumulation of carbon depends on the non-oxygenation of the blood, consequent on the congested state of the lungs, one of the direct effects of nervous exhaustion, which exhaustion also causes the high temperature.

No one, I think, will doubt that Dr. Candy gives the true *exciting causes*, particularly "the suffocating atmosphere," which, I believe, is the principal cause of the great depression of the nervous system.

But with regard to Dr. Candy's indications for treatment: he recommends "free venesection to 20 ounces or more, to relieve the congested condition of the heart and lungs." But if this congestion depends on nervous exhaustion, as I think the writings of Dr. Brown-Séguard and others prove, what good is really done by bleeding? In some cases the abstraction of blood has, for a time, removed the *mechanical engorgement* of lungs and brain; but look at the enormous mortality following this treatment! The exhausted nervous system is further weakened. If, however, a nervine tonic is given, the congestion is removed by the *invigoration* of the nervous system.

He next recommends "to get the skin to act freely by the use of tartar-emetic," &c. In the *Lancet* for 17th February, 1872, another special article on "cooling" remedies appears under the same heading. In it occurs the following:—"But that diaphoresis, even in its most copious form, will necessarily relieve a severe fever-heat, is shown to be transparently false by the phenomena of rheumatic fever, and of relapsing fever." Even if copious sweating was induced, while the *cause* of the burning skin—viz. the nervous exhaustion—was not ameliorated, no real benefit would ensue.

In the article just quoted from, and in another on the same subject in the *Lancet* for 6th April, 1872, the old notions that "blood-letting cooled, and that alcohol heated," are overturned.

I should like to give some more extracts, but as almost every medical man in India takes in, or sees, the *Lancet*, I hope these articles will have been noted.

I think that all the well-known symptoms of heat apoplexy are produced by *intense nervous exhaustion*, and that it is a pathological condition closely allied to the *secondary fever* of cholera. I have seen the utmost benefit result from the hypodermic injection of quinine in insolation, where actually moribund patients have been saved by it. I would employ the same remedy in the *secondary fever* of cholera. In the number of the *Indian Annals of Medical Science* for March, 1870, I brought forward the theory that in the *collapse* of cholera there is very great *irritation* of the sympathetic

nervous system. I recommend for that condition the hypodermic injection of pure sedatives.

The cold douche over the head and body, or the cold bath lately recommended by Dr. Wilson Fox, in hyper-pyrexia, with auxiliaries, as stimulating enemata, counter-irritants to head and chest, have been proved to be of great value; but they often fail. I think that in the hypodermic injection of quinine we have the remedy for heat apoplexy; and I hope that medical men in India will follow Dr. Waller's advice, and try it extensively.

Dr. Manassim, and other physiologists on the Continent, are carrying out experiments to prove the *modus operandi* of quinine. Whatever effect it may have on the blood-corpuseles, it certainly braces up the nervous system in a wonderful manner; and it is this action which I think makes it of such value in insolation. I venture to say, that if medical men try it in a few cases, they will be soon convinced of its immense value in sunstroke.

But, for goodness' sake, at all events, don't let us revert to bleeding.

Dr. Candy, in concluding his paper, writes:—"The after-treatment must be left to the discretion of the medical attendant." It is sincerely to be hoped that the discretion of the medical attendant will not allow him to employ either resection or tartar-emetie in heat apoplexy. If he *does* use them, probably there will not be much *after-treatment* required.

SEETAPORE (ODDH), 11th July, 1872.

ON THE ETIOLOGY AND HYGIENE OF CHOLERA.

By T. OUGHTON, *Staff Assistant Surgeon, Neemuch.*

(Continued from page 177.)

How do you account for the fact that persons in robust health are sometimes seized and carried off? From their breathing air that is densely charged with the virus; for example, inspiring the very air that has just escaped from the lungs of a sick man, or remaining in a close and unventilated sick-chamber for long consecutive periods. Thus it is that healthy doctors are so peculiarly liable to be struck down at their post of duty by this pest. During the epidemic of 1849 in London, I remember the case of a fine and healthy young medical man, having a very extensive and rising practice in a populous thoroughfare, whose death was probably the result of visiting his poor neighbours who were lying stricken in small unventilated houses, where the air must have been surcharged with poisonous exhalations.

How would you suppose the poison to operate in such cases? Being admitted into the system in inordinate doses, either from long exposure to a less vitiated air or from short exposure to a very concentrated and poisonous atmosphere, it has the property of prostrating the vital powers at once, and of reducing the healthy man to a state of deranged health, that is synonymous with susceptibility, in which he is unable to excrete the virus as rapidly as it becomes generated.

Do you believe that cholera is a zymotic disease? The poison undoubtedly multiplies itself rapidly in the system, although this cannot arise from fermentation of the blood, or otherwise every dangerous focus would inevitably exemplify the disease in himself. Such multiplication is very analogous to the development of the virus of vaccination or small-pox, and the cholera-molecule probably germinates by a process of cytogenesis.

What should you consider to be the nature of a cholera-germ? A morbid molecule consisting of debased animal organic matter, which finds its nidus probably only in the circulating fluid. It may be dormant for a long time in the earth, or in

contact with clothes, but it does not germinate or develop under these circumstances.

Do you consider that the atmosphere would operate as a nidus for its generation? I do not think, neither has it been proved by experiment, that the presence of the three elements of decomposition, viz., air, water, and increased temperature, either isolated or combined, would tend to the active development of the cholera-molecule. Were it air—or water—born or bred, there would be no limit to its dissemination.

Has the existence of the specific germ in the blood, or the nature of the molecule, been determined by microscopical research? I am not aware of any experiment having been made in this direction.

On the hygiene of cholera.—Three or four cases having broken out in a town at or about the same time, to what method of sanitation, in each instance, would you be disposed to resort in order to prevent a further spread of the disease? The laws of the land forbid that the patients should be poisoned outright, and charity forbids that they should be unattended during sickness. I should be disposed to place over each case one faithful and tried attendant—a courageous man, in thorough good health, whom I should assure previously that the chances of his contracting the disease were very remote, provided he took ordinary precautions. Suitable medicines should be issued to him, with instructions as to their administration; and he should have the entire medical charge of the case. Lastly, both he and the sick man should be confined for several days, perfectly isolated in the apartment in which the case was placed.

Would you not superintend the treatment of the case personally? Not under the circumstances in consideration. The operation of every known medical appliance being so wholly unsatisfactory, I should feel myself justified in absenting myself unless the epidemic had become generally established.

What precautions would you enjoin on such attendant for his personal protection? Most generous ventilation; not to remain in the vicinity of the patient excepting when compelled to do so in order to administer to his wants or to ease his pain; most carefully to avoid inspiring the patient's breath, and to keep his head averted from the sick person as much as possible when rubbing his cramped limbs, &c., to maintain the strictest cleanness of his hands and face, and occasionally to wash himself all over; lastly, a generous diet—and, if a literary man, an amusing book to employ his mind.

What precautions would you enjoin on him in order to prevent the extension of the disease to others? That he should talk to no one, and permit no one to enter the apartment; and should fetch all food and other necessaries (previously provided for him) himself; that all waters made use of for washing purposes should be thoroughly disinfected before being thrown away; that the close stool should constantly be charged with a disinfecting solution, more of this being added whenever the patient vomited, or after every motion; and that it should be frequently emptied into an adjoining isolated latrine; that the apartment should be thoroughly fumigated, by being exposed for several days to chlorine or sulphurous acid gas, on his leaving it with the patient when the term of their isolation had been accomplished.

In the contingency of the patient dying, what procedure would you advise the attendant to adopt? To undress the corpse and wash it thoroughly, placing it on a table; to close the apertures of ventilation, and retire from the room after making the necessary preparation for a gaseous disinfection; to return in the course of three or four hours, and to re-ventilate the room for a like period of time; to admit the undertakers, no communication being held with them at the same time; to disinfect the room once more, and to place himself in a state of complete isolation for one week.

Do you consider that persons would be liable to render themselves dangerous foci by contact with a cholera corpse? The