

Practical Remarks on some of the predisposing causes, and prevention, of Puerperal Fever, with cases. By WALTER CHANNING, M. D. *Lecturer on Midwifery in Harvard University.*

[Communicated for the New-England Journal of Medicine, &c.]

THE puerperal state in some seasons seems unusually liable to disease, and in such seasons puerperal fever is occasionally to be met with, it however, does not occur with the frequency, and other circumstances, which would constitute it a genuine epidemic. The cases are sporadic; and though in unusual numbers, some time elapses before a new case occurs, and practitioners are not apprehensive that new ones will happen.

If the cases that do occur under the circumstances now alluded to, were carefully investigated, some facts of an interesting and useful nature might be discovered. In some of them we might learn, that pregnancy has not advanced with merely the common occurrences of that state. We might find that its mechanical or sympathetic effects have been such, as to predispose to a state of system unfavourable to the puerperal condition. We might discover, that the patient, towards the close of pregnancy, had been exposed to great inclemency of weather, and that unusual and long continued exercise had been pursued. We might in conclusion, learn or recollect, that labour was accompanied with circumstances unusually severe; that it was protracted to an unusual length, or discovered, even before its termination, decided indications of serious disturbances in the system. Under all these views, prevention becomes a very important object; and it is the design of the following paper, to point out some of the causes which may predispose to puerperal disease, and some of the means which may be employed as preventives. The following remarks will naturally fall under the general heads of Pregnancy, and Parturition, or Labour.

Pregnancy.

During puerperal epidemics, those women have been most frequently observed to do well, who have suffered least from costiveness during pregnancy, and more especially if the bowels have been freely opened during labour. Without entering into an useless speculation, on the manner in which habitual costiveness, during pregnancy, may predispose to a condition of system un-

favourable to the great and sudden changes which are among the phenomena of labour, and without endeavouring to prove, that such an habit may increase the power of other predisposing causes of such diseases, which few will deny, some means will be mentioned for obviating the habit, and preventing its consequences. Some of our best means for this end will be found in diet, medicine and exercise. With regard to diet, rules must necessarily be vague. In some individuals, when pregnant, the stomach is so irritable, as almost to reject every article of food; and to prevent the debilitating effects of almost total abstinence, the appetite and inclination must be consulted. In less severe cases, the appetite is equally capricious, and though many kinds of food might be retained, those only will be taken, which a paramount instinct seems to recommend. Should costiveness occur in such individuals, and continue with great obstinacy, diet will not be remedial, and recourse should be had to purgative medicines. The indications for their use being answered, their exhibition is to be suspended, and that their further use may not be demanded, very particular attention should be paid to diet. To rely entirely on purgatives, will be to induce occasionally a state of the bowels unfavourable to health. The natural tone of these organs may gradually be diminished, more powerful articles may be required, and by their use pregnancy itself may be disturbed, and abortion take place, or a feeble, puny child born at the full time. These effects are not mentioned as evils necessarily connected with the frequent use of purgatives during pregnancy. They may occur, however, and are therefore to be guarded against. Should costiveness be entirely neglected, or only partially obviated, the concurrence of a very few other causes, for instance, a very difficult labour, might involve serious disease in the puerperal state.

Exercise was mentioned as among the means of preventing or obviating costiveness. Exercise is an universal tonic. The vigour which it gives the organs of loco-motion is readily communicated to other organs. Under its salutary uses, the circulation is regular, without being hurried. The organs which are in immediate contact with the enlarged womb, and which must suffer some mechanical pressure, experience a temporary relief in the variety of movements of the body during exercise. Their functions, so liable to disturbance, are assisted in their labours. The bowels are among these organs, and their functions are susceptible of the influences referred to. The mind too, which in the pregnant state has so much influence over the body, is also under the beneficial uses of exercise.

Exercise considered as a predisposing cause of Puerperal disease.

Are there any circumstances in the use of exercise during pregnancy, which may render it a predisposing cause of puerperal disease? To be salutary, exercise should be neither violent nor long continued. Violent motion has always some effect on the circulating system. It has an effect on all the organs of the body. There are organs, however, which may be considered as susceptible of a wider range of motion than others, and whose contents also are decidedly influenced by sudden or violent exertions. The pregnant womb is eminently such an organ. In the early periods of pregnancy, it may be even thrown from its natural situation, and from occupying others, produce very dangerous and even fatal effects. What now have been some of the consequences of violent exercise, and sudden motion, on the pregnant and puerperal state? In the first place, abortion has been produced. The function of gestation has been destroyed, the child blighted, and prematurely expelled. In rare instances death has followed this occurrence. In one case under my care, puerperal convulsions supervened on abortion induced by great bodily exercise. In another individual, injudicious, viz. fatiguing exertions, during a removal from one house to another, were followed by sense of weight and coldness in the abdomen, a diminution of the abdominal tumour, slight uterine hæmorrhage and ultimate abortion.

Abortion, however, does not appear to be the only effect, which has followed long continued and violent exercise during pregnancy. In some cases it has appeared, when thus used, to have been among the predisposing causes of dangerous and even fatal puerperal fever. Undoubtedly the exposures necessarily incident to long journeys, if such be the manner in which exercise is taken, are also among these predisposing causes. The following facts may serve to illustrate these remarks.

Case 1. The subject of this case had endured the fatigue and exposure of a long journey about three weeks before delivery. Severe pulmonary disease was the immediate consequence. The puerperal state occurred at the close of this pulmonary affection, and before the patient had entirely retrieved the strength and health which had been necessarily prostrated by severe disease, and prompt treatment. Spurious pains of a very severe nature came on, which were relieved by prompt bleeding. True labour soon followed, and was unusually distressing and protracted. The patient was delivered of twins, both of which died soon after birth. Bleeding was deemed

necessary during labour, and was practised. Genuine puerperal fever was developed on the fourth day from confinement, and though protracted to the nineteenth of the disease, it proved fatal. In this case the lungs first suffered. The uterus first discovered its morbid state by the spurious pains above mentioned. These pains were relieved by bleeding. They were very probably the precursory symptoms of that disease, which followed labour, and which ultimately proved fatal.

Case II. The patient, an unusually healthy individual, performed a long journey in the latter months of pregnancy. The journey was fatiguing, and the exposure unusually great. The individual, however, did not immediately suffer any inconvenience from either. Four days previous to the occurrence of labour, she took an airing in a coach, over a very rough road, and of some miles. Before she got home, she was seized with slight rigors; complained of a sense of weight and coldness in the abdomen, which were entirely new to her. Her head ached, and her system generally seemed suddenly to have undergone some great change. Labour occurred four days from this time. It was laborious, and unusually distressing. A very large child was delivered. It was dead, and appeared to have died some days before. The placenta came away at once. It was of a dirty yellow colour, the blood, of which there was but a very small quantity, on that part, viz. which had been attached to the uterus, was black and fetid. The placenta itself looked like a mass of washed putrid flesh. Not a drop of red blood followed its expulsion. The uterus contracted imperfectly, and on the day following delivery was found still to occupy a portion of the abdominal tumour, a fetid serous discharge took place from the uterus, the quantity was great, and the discharge perpetual; no remedies diminished it, or for a moment controlled the fever which followed. The patient died on the fourth day of the disease.

Case III, IV. In both these cases, the patients had persisted in the use of exercise. At times the exercise was violent and long continued. In both of them fatal puerperal fever followed delivery, and in both the child was dead.

If the fact be at all established, that there exists any connexion, let it be never so small, between the occurrence of abortion and puerperal fever; and the use of long continued and occasionally violent bodily motion; if they exist at all in the relation of predisposing causes, and ultimate effect, a very simple but important rule of preventive practice at once presents itself, viz. the subjects of pregnancy should carefully avoid exposing themselves to long continued and violent bodily motion.

They should be cautioned against an error by no means uncommon, that exercise is salutary in proportion to its continuance and excess. If unavoidable circumstances require great exposure, on the part of the individual, much may and will be done, to diminish its dangerous consequences, if it be known that excess cannot always be committed without hazard. The rule will be still more important, in cases where the least predisposition to any disease is observed during pregnancy, and more especially during a season, in which there is any good ground for suspicion, that any epidemic puerperal disease exists.

Disease occurring during pregnancy, considered as predisposing to Puerperal Fever.

In one of the cases already mentioned, severe pulmonary disease occurred near the close of pregnancy. In this case fatal puerperal fever followed delivery. One or two more instances will now be mentioned, in which pregnancy, in some part of it, was accompanied with severe disease.

Case V. The subject of this case had suffered severely from intermittent fever, previous to the occurrence of pregnancy. This disease had been relieved, and the patient became pregnant. In the course of pregnancy, the intermittent again discovered itself, and with symptoms as severe as before. The disease did not produce miscarriage, although its morbid effects were visible in the system. The patient was delivered at the full time. Puerperal fever soon followed on delivery, and proved fatal.

Case VI. The subject of this case was naturally very feeble. Her health had always been delicate. Former pregnancies, however, had occasioned but little inconvenience, and labour had been accomplished without unusual difficulty. During her last pregnancy, however, her health seemed sensibly impaired, and an unusual disposition to disease was discovered in the frequent formation of phlegmons on the body, which in general suppurated, and kept the patient in a state of perpetual irritation. Labour occurred at the full time. It soon became complicated with convulsions of a very violent and alarming nature. The delivery was artificially effected, and a fine healthy child born. The convulsions abated. They returned again soon after, and very soon became complicated with genuine puerperal fever. The patient died in twenty-four hours after the febrile accession.

For cases like those just mentioned, it is hardly possible to give any rules for prevention, which will admit of general ap-

plication. The necessity for such rules is diminished by the fact, that severe disease occasionally occurs during pregnancy, and at times near its close, without any untoward occurrence during the puerperal state. The cases have been stated, because it is by no means unimportant to know, that fatal puerperal disease has happened during, or after labour, in individuals who have suffered severe disease during pregnancy. And farther, it can never be perfectly indifferent what treatment we make use of in a disease occurring in an unusual state of the system, as in that of pregnancy, and it may be, in a stage of it, which is soon in the order of nature to produce the most striking revolution the body can undergo.

The influence of the mind in predisposing to Puerperal disease.

Puerperal diseases occurring in lying-in hospitals, have always been severe, and very frequently fatal. This is more especially the case with regard to puerperal fever. The treatment, however, which has within a few years been found so successful in this disease in private practice, will undoubtedly be found as salutary in that of hospitals. But why is it, that in lying-in wards the cases are so numerous? One answer will be, because the individuals, subject to the disease, in such establishments are numerous, and that if there be any thing specific or peculiar in its exciting causes, every individual is equally exposed to their action. But it may be asked, is every individual equally susceptible? In the preceding pages, some cases have been mentioned, in which it would appear, that peculiar circumstances may concur to render the puerperal state, in some measure, an unsafe one. This may be the case in some of the patients of lying-in hospitals. There still, however, remains another cause, which may tend to increase the predisposition in such patients to puerperal disease, and this is the state of the mind during pregnancy and in the puerperal state. In the establishments just alluded to, the situation of patients is peculiar. They are the witnesses of every event that happens. If the process of labour is not accomplished in the general ward, but, as in some of these establishments in Europe, is completed in another apartment, the patient is immediately returned to that she previously occupied, and lives or dies in the society of those, who either have just been confined, or are in daily expectation of this event. If we suppose the disease to be epidemic, and admit that the mind has any influence in predisposing the pregnant individual to disease, a more

unfortunate arrangement can scarcely be imagined, than these charities exhibit. There are some means, however, by which this influence might be prevented, or at least diminished. In an establishment, solely devoted to lying-in patients, the apartments might be multiplied. There might, for instance, be one room for receiving patients; one for delivery, and one for recovery. In a general hospital, however, into which the number of this order of patients is comparatively small, two wards would be quite sufficient, one for the accommodation of patients previous to confinement, the second for confinement and recovery. Should severe puerperal disease occur in a case, and labour take place in another individual, this process might be completed in the general ward, and the patient, if necessary, afterwards removed.

By an arrangement something like that now proposed, a predisposition to puerperal fever might be diminished, and as far as the mind is concerned in its production, be prevented. In private practice, during a puerperal epidemic, and at any time in which the cases of fatal disease, occurring immediately or soon after delivery, are unusually frequent, the existence of such disease, and more especially its fatal termination, should be carefully concealed from those who are soon to be confined. The energies of the mind should be preserved in their natural strength and activity, and the puerperal state, as is generally true, should be represented as perfectly safe. The only case in which the mind appeared to have much influence in predisposing to puerperal disease, came under my notice, some time before those above mentioned, and shall be very briefly stated.

Case VII. The subject of this case had been the mother of several children. Her labours had been easy, and her recoveries rapid. In her last pregnancy, her mind became gradually very much depressed. Her despondence increased, and at length life seemed hardly desirable. Labour occurred and a living healthy child was born. The revolution produced in her body, though so great, and so sudden, was not accompanied, or followed by any salutary change in the state of her mind. Without any other apparent cause, puerperal fever, very soon occurred, and within the usual time of its crisis proved fatal.

Parturition.

Having, in the preceding pages, mentioned some circumstances which, occurring during pregnancy, may predispose to puerperal disease or excite abortion, and having illustrated the

remarks which were suggested, by cases, it remains as was proposed, to consider, whether the puerperal state is ever morbidly influenced by the labour, and to inquire into some of the means of prevention.

During a puerperal epidemic practitioners have observed, that all puerperal patients are equally liable to its attacks. The ease with which labour is accomplished, affords no promise of exemption from the disease. This has been very particularly adverted to by the latest and best writers on the subject. It happens however very frequently, that in the sporadic cases that happen, even though more frequent than common, we have some premonition, and some ground for suspicion in the circumstances of the cases themselves, that the situation of our patients is critical, and that severe disease, may very probably follow delivery.

This will be illustrated by the following cases :—

Case VIII. The subject of this case was thirty years of age, and this was her first confinement. The labour was exceedingly protracted, and the sufferings of the patient extreme. A very unusual rigidity of the internal organs existed, which for a long time, neither yielded to bleeding nor to such attempts as prudence sanctioned to effect dilatation. The foetal head, when it came within reach, was found to be unusually enlarged, and this enlargement was found to be owing to water within the brain. This water was evacuated, and with very great difficulty the child was delivered. A smart rigor was experienced before delivery. Severe uterine hæmorrhage took place, which tended still farther to reduce the woman. The pulse which had been for two days previous to delivery, one hundred and thirty beats in the minute, lost none of its frequency after this event. Genuine puerperal fever occurred. The pulse increased to one hundred and fifty in a minute. The abdomen became tense and painful, the respiration short and hurried. The face continued pale through the disease. The skin hot. The mind wandered, and the patient died exhausted on the 11th day of the disease.

Case IX. In this case the labour was neither remarkable for its length nor its severity. The circulation however was so rapid, that the pulse could scarcely be counted. The mind was sensibly affected. The patient being constantly in a state bordering on delirium. After delivery the pulse remained as quick and as frequent, as before that event. The other symptoms of puerperal fever very rapidly developed themselves, and the disease was fatal on the fourth day. Examination dis-

covered, that violent inflammation had existed in many of the abdominal viscera. The intestines adhered every where, by interposed masses of coagulating lymph, and a large serous effusion had taken place into the abdominal cavity.

Case X. This case has already been alluded to, whilst considering the possible influence of violent exercise, in predisposing to puerperal disease. This patient was nearly thirty years of age, and this was her first labour. The labour was laborious. The efforts of the uterus were strong, but not very effective. The patient being of a remarkably full habit, and some rigidity existing, blood was detracted during labour. The pulse was quick and strong. Enemata were occasionally exhibited, and during the labour, rest was for a short time procured by an anodyne draught. Some hours before delivery while the head was undoubtedly advancing, a remarkable degree of restlessness was observed in the patient. This was a new occurrence in the case. A constant and strong desire was expressed to be moved frequently from one side to the other, and an unusual impatience evinced, when any circumstance prevented an immediate compliance with the request. The patient's pulse being very strong and full, and the face much flushed, a vein was again opened, and another enema exhibited. The labour pains being very efficient, and every circumstance favorable to a speedy termination of the case, artificial means to promote delivery were thought inadmissible. The head had now arrived at the extreme parts, and apparently was on the point of being excluded, when the patient suddenly insisted on being turned to the opposite side. Though urged to be perfectly quiet, the desire was still enforced with a good deal of agitation, and the change of position was allowed. The uterine efforts were at once suspended, an universal, and violent chill came on, accompanied with peculiar mental distress. A mildly cordial draught was immediately given. The pains soon returned, and though less severe than before, the third uterine effort completed the delivery. The patient was comfortable through the day following delivery. Puerperal fever occurred the second day from confinement. One of its earliest symptoms was the restlessness already adverted to. In the progress of the disease it became absolutely uncontrollable, and of a nature to the last degree distressing. The pulse soon acquired its characteristic frequency in this complaint, and the diseased condition of the abdominal viscera was discovered by its usual symptoms. Delirium at length occurred, and the patient died on the fourth day of the disease. This case, as was said above, has been alluded to. It forms in fact the second case in this collection.

Some important circumstances have been omitted in this fuller detail, but which may be found by recurring to that case.

Case XI. The circumstances which occurred during labour, in this case, and which strongly indicated the approach, and even the actual access of disease, were great soreness and severe pain in the abdomen. These were at once noticed by the practitioner in attendance, and from careful examination were ascertained to be totally different from the usual pains that characterize labour. This case was not seen by the writer, and the state of the pulse is not known. On account of the above symptoms the patient was freely bled during labour, and the symptoms disappeared. Genuine puerperal fever was not developed until the seventh day of the puerperal state. This may have been owing to the bleeding above mentioned, and to the other evacuations incident to delivery. Prompt treatment was at once commenced, and the patient was soon convalescent.

Cases XII and XIII. In both of these cases, which happened in the same season with those above mentioned, a remarkable tendency to puerperal disease was observed during labour. In one of them, the local symptoms of childbed fever were present during that process. In both the pulse was strikingly affected. It was characterized by that extreme quickness, which is perhaps among the most striking pathognomonic symptoms of this disease. The fever that followed was severe. The pulse remarkably quick and frequent, and the abdomen both tumid, and extremely painful. The treatment in these cases produced the happiest effects. Both patients recovered.

It is unnecessary to multiply facts any farther. The writer acknowledges, however, that these are not all the cases that occurred during the seasons alluded to, viz. the autumn of 1815, and the winter and spring of 1816. Eight cases occurred in the practice of one physician. Five of these were fatal, only one of these cases, however, has been stated in this paper. But few of the cases mentioned occurred in the writer's own practice. He however, saw many of the most remarkable recorded, and is indebted to his medical brethren, for some of the facts of which he was not an eye witness. The writer would farther acknowledge, that during the time specified, cases occurred of severe and even fatal puerperal fever, in which pregnancy had been apparently exempt from accident or disease, and in which labour had been unaccompanied by any untoward circumstances, and had been accomplished with perfect ease.

What are some of the reflections suggested by the facts just related, and what are some of the means which might be

adopted with a view to the prevention of the disease in question? It would appear, in the first place, that during labour, not only may puerperal fever manifest itself by its most characteristic symptoms, as has been mentioned by writers on the subject, but certain phenomena may be observed, that strongly indicate an unusual predisposition to disease. Again, it would appear, that in some cases, in which a predisposition had been produced during pregnancy, the disease may exist during labour, but be attended by symptoms so unusual, as never, for a moment, satisfactorily to indicate to us their true cause. This was remarkable in case X. Another reflection very naturally suggested is this, in all seasons, but more especially in those in which child-bed diseases are uncommonly frequent, a very special regard should be paid, to every unusual occurrence during labour. Where the patient has been known to have suffered from disease, or any other accident, during pregnancy, more particularly towards its termination, the attention should be still more alive to every unusual, or untoward occurrence. In this manner disease will be early discovered, its progress observed, and we shall be in less danger of being deceived into the opinion, that our patient is safe, because the changes immediately induced by delivery, have effected a temporary suspension of diseased phenomena: we shall, on the contrary, persist in a cautious use of those means of prevention, which may have been adopted during labour itself. These means will next be inquired into.

The means of prevention may be reduced to two. The first consists in adopting *during labour*, that treatment which experience has sanctioned as the best for puerperal fever occurring after delivery. The second, in facilitating, or rather hastening, by artificial means, the termination of the labour.

The efficacy and propriety of the first method, may be argued from the result of one of the cases in this collection, viz. the eleventh. In this case, something more than a predisposition to disease was indicated, Symptoms of puerperal fever manifested themselves. Prompt bleeding removed these symptoms, and, although the disease reappeared after delivery, this is no evidence that the first loss of blood was not highly beneficial in diminishing its violence, but leaves it probable, that had it been pushed farther, the disease would never have recurred.

It is true, that in some of the other cases mentioned, blood-letting was used. It was not, however, practised so much with a view to prevent the progress of disease, or to hinder its occurrence, as to facilitate parturition, by removing some of its

obstacles. The peculiar symptoms which occurred in the cases were not removed by it; and although delivery was sooner effected, in some cases, the unusual occurrences of pregnancy did not cease at that event, but continued and became among the most prominent symptoms of the disease that followed.

That prompt blood-letting, and purging also, (which are among the best means of treating puerperal fever,) may be used with a view principally to remove threatening disease, during labour, and without danger, may be argued from the most successful treatment of puerperal convulsions. This consists in suddenly taking from the system a large quantity of blood. It might farther be proved, by recurring to cases of severe uterine hæmorrhage, in which recovery after delivery seems hardly retarded; and from the fact that where fever has happened after such hæmorrhage, the indication for bleeding has been as great as in other cases, and that when fully answered, it has been followed by the happiest result.* It is meant to be distinctly understood in this place, that let our treatment be what it may, it should be used with a view principally to remove existing symptoms, or rather that incipient or perfectly formed disease, which those symptoms manifest. Our treatment will be preventive, when unusual causes have been allowed during pregnancy, to lay the foundation of future disease, and a strong predisposition to which may be manifested during labour. It should be employed as curative, when symptoms clearly manifest that disease itself has occurred. For my own part, I have no hesitation in saying, that in such cases, the treatment which has been found most beneficial in genuine puerperal fever, is the most rational, and in by far a majority of cases will be found the most successful.

The second method proposed for prevention, consists in the use of such artificial means as have been found to facilitate and hasten delivery. These, in themselves, involve not the least hazard to the mother or child. They should be resorted to when other means fail. They should especially be employed, when the length of the labour, or any peculiar circumstances attending it, leave no doubt on the mind of the practitioner, that the general system is suffering great disturbance and injury, by the process, and which, if not remedied, will speedily be followed by dangerous consequences. If the individual, during pregnancy, have been unusually exposed to any of the predisposing causes of child-bed fever, and the labour be unusually

* See Armstrong's highly valuable work, entitled *Facts and Observations relative to the fever commonly called Puerperal.*

protracted, these means should come under contemplation. If, on the contrary, no ground for such predisposition exists, but still untoward circumstances strikingly manifest themselves, we are to inquire if the proper use of these means does not involve infinitely less hazard than the indefinite continuance of ineffectual labour. Where the labour is advancing, though slowly, we are not authorized to interfere. Our interference may disturb the process and prolong it; or, by adding new sources of irritation, diminish the chances of ultimate recovery. In such a case, the means recommended under the first method, are peculiarly applicable; and by the powerful impression they are calculated to make on incipient disease, we may anticipate from their use, very favourable results. The patient, however, who, during labour, has discovered strong tendencies to disease, but which have disappeared immediately after delivery, is not hence to be presumed safe, and our preventive practice abandoned. One part of the plan, at least, should be persisted in, viz. the purgative; and Dr. Gordon, of Aberdeen, assures us, that in a very fatal puerperal epidemic in that city, of those who were freely purged the day after delivery, only one died of puerperal fever.

Some authors have believed fully, that puerperal fever is a contagious disease. The writer, just mentioned, felt as convinced of this as of any fact in medicine.

Prevention, under this doctrine, consists in merely removing the patient from the society and attendance of those, who have either visited or nursed patients ill of puerperal fever. Whether the doctrine of contagion be true or false, the practice here recommended is certainly not unreasonable, and where it is possible should be adopted.

The management of the puerperal state, viz. that which immediately follows delivery, with a view principally to the prevention of puerperal fever, or other disease, may form the subject of a future communication.

Note.—Page 159, line 18, read *fatal* puerperal convulsions, &c.

Contributions to Chemistry, No. 1. By JOHN GORHAM, M. D. Professor of Chemistry in Harvard University.

[Communicated for the New-England Journal of Medicine, &c.]

1. *Indigogene.*

THE investigation of the properties of this substance seemed to promise something interesting, from the two facts announced by Brugnatelli, that indigo, when exposed to