A Mirror
OF THE PRACTICE OF
MEDICINE AND SURGERY
IN THE
HOSPITALS OF LONDON.

Nulla est alia pro certo noscendi via, nisi quam plurimas et morborum, et dissectionum historias, tam aliorum proprias, collectas habere et inter se comparare.—MORGAGNI. *De Sed. et Caus. Morb.* lib. 14. Proœmium.

UNIVERSITY COLLEGE AND ST. BARTHOLOMEW'S
HOSPITALS.

Deaths from the Inhalation of Chloroform.

(The Patients under the surgical care of Mr. QUAIN and
Mr. PAGET.)

THE profession and the public at large are probably becoming alarmed at the repeated instances of death brought on by the inhalation of chloroform, and it is for ourselves a melancholy duty to record these unfortunate cases. In most of them the autopsy has been performed with the greatest care, and pathologists have endeavoured to discover, in the morbid alterations of the solids and fluids, a clue to the sudden cessation of life in patients who seek anæsthesia in the inhalations of chloroform. Have these careful examinations led to the desired result? Are we in possession of rules by which we can foresee the danger ere the nervous pulp has been too completely narcotized? We are afraid not; and those well acquainted with the administration of chloroform will be obliged to confess that no very marked progress has been made as to the means of averting a fatal result.

It was thought for a while that a great deal depended on the more or less anæsthetic practice of the person who administers the chloroform, and much reliance was placed on what are called experienced hands; but this confidence has proved fallacious, for fatal cases have occurred with the most practised and scientific chloroformists. The fact probably is, that the whole matter rests, not so much on actual pathological changes which may have taken place in the organs of the patient before he inhales chloroform, as on idiosyncrasies. We are free to admit that this is an unsatisfactory expression, and that the word idiosyncrasy only covers our ignorance; but there nevertheless exists a more or less marked difference in the tendencies of individuals, both as regards healthy nutrition and morbid alterations; add to that the influence of habits and mode of life, and you will have the import of what may be called constitutional peculiarities. Now it is plain that these peculiarities are extremely difficult of detection; and when we consider that they have perhaps more influence on the eventual results of chloroformic inhalations, than the presence or absence of fatty heart, it may at once be seen that in the present state of science and practice such inhalations must be surrounded with a certain amount of hazard.

And yet it seems to be perfectly well known, from experiments upon animals, by what progressive steps chloroform produces the insensibility of the nervous power. Flourens tells us that the anæsthetic effects travel from the lobes of the hemispheres to the cerebellum, then to the posterior half and roots of the nerves of sensation in the spinal marrow, then to the anterior half and roots of the nerves of motion, and lastly to the medulla oblongata and annular protuberance, or vital knot. The same author has shown that an animal, subjected to inhalations of chloroform, loses first the intellectual faculties, and the power of regular and well-poised motions; he afterwards loses feeling, and then the power of motion. At this period, the vital force, hunted, as it were, from place to place, becomes concentrated in the medulla oblongata. This, then, is the only portion of the encephalon which resists the anæsthetic influence, and the animal would soon perish by this last barrier being overcome; for, as M. Flourens says very plainly, "chloroform takes away pain, but it also takes away life."

Upon these facts certain rules have lately been framed by M. Baudens, a distinguished military surgeon of Paris, and although we cannot consider them as infallible, we may perhaps serve a useful purpose in translating them, after giving a few details of the fatal cases which have lately occurred in this metropolis.

But before entering upon these particulars, we must be allowed to express a certain amount of apprehension respecting

the results of a regulation which has lately been put in force in almost all the hospitals of London. The administration of chloroform is now exclusively entrusted to gentlemen attached to such charitable institutions in various capacities, and it is reckoned that patients will thus run less chance of an unfavourable issue. But it should also be remembered that a great proportion of those students who learn their profession in hospitals, will have to give chloroform in the country on a sometimes very large scale; and if you do not allow them, under proper guidance and tuition, to administer chloroform during their studies, you run the risk of placing patients, either in mining districts, on board ship, or in barracks, into the hands of practitioners who may be very good surgeons, but mere tyros at the work of chloroformic anæsthesia. This circumstance should be well considered, and means sought to train our future surgeons in the proper way of giving chloroform, without for a moment disregarding the safety of patients in our hospitals. Let us first take up the case which ended fatally at University College Hospital, from the notes kindly furnished by Mr. Hillier, the resident medical officer.

Emily R—, aged forty years, and a widow, was admitted October 5th, 1853, under the care of Mr. Quain. The patient was suffering from strangulated femoral hernia on the left side, which resisted the taxis with and without the warm bath; she had had severe vomiting, pain at the umbilicus, and constipation of the bowels for two days before admission. The hernia had been existing for some time past, and a truss had been procured, but there is a doubt whether she wore it regularly. The patient's habits have been very intemperate; she was intoxicated three days before the strangulation, and did not see any medical man until the morning of her admission.

Mr. Quain was sent for; he arrived about twenty minutes to two in the morning of October 6, and at once decided upon operating. The patient had remained in the bath about three-quarters of an hour, and did not feel particularly faint whilst in it.

Mr. Hillier at once commenced giving chloroform in ward 5, and used a long piece of lint of about the extent of the hand and folded twice. One drachm of chloroform was then poured on the lint, and applied about one inch from the nose and mouth, the apparatus being gradually approximated, and the face covered with a towel. She inhaled the chloroform as patients generally do, said scarcely anything, and was not excited. The pulse remained very good for two or three minutes, when forty drops of chloroform were poured on the lint and applied as before. Within a minute of this renewal of chloroform, the patient began to struggle both with her arms and legs, which she moved about very actively. During the struggle, Mr. Hillier had hold of her right hand, keeping it steady, and trying to feel her pulse; the task was however, difficult, owing to the struggles. The latter became very strong, but after lasting perhaps a little more than half a minute, they ceased, and immediately stertorous breathing commenced. The stertor was very loud and rough, not at all of the common kind. Mr. Hillier at once removed the lint and towel from the patient's face, and observed that the pulse had stopped. She drew several short inspirations, then two or three long ones, and ceased to breathe.

Immediately the pulse was felt to be wanting cold water was dashed on the face; as soon as the breathing stopped galvanism was also applied within one or two minutes, and she drew distinctly three or four deep breaths after the ordinary respiration had ceased to go on uniformly. No pulse was felt afterwards, but artificial respiration was excited through a wound made into the trachea, and kept up for about half an hour. One of the bystanders stated that the patient's face was convulsed when first exposed; it was slightly livid, the depth of colour increasing pretty rapidly. The pupils were dilated, and the tongue was not retracted, for Mr. Hillier felt for it immediately.

The quantity put upon the lint was just one drachm and forty minims, and chloroform had been given in the same manner, and from the same bottle, to six patients, on the very day which preceded the patient's death. Five of these had been narcotized by Mr. Hillier himself, and they had mostly had more chloroform than the present patient.

Post-mortem examination, conducted by Dr. Garrod, thirteen hours after death.—Rigor mortis well marked in all the limbs; a great deal of fluid blood was seen in the thorax on removing the sternum; abdomen very tympanitic. On opening the pericardium, about an ounce of colourless fluid escaped; the heart was quite collapsed and empty, which circumstance was possibly due to the extreme fluidity of the blood which had

escaped during the separation of the sternum. The parts have, however, not been much disturbed, and the head is lying at the upper part of the table, so that the blood would have had to flow upwards. Anterior aspect of the heart, chiefly the right ventricle, covered with fat, the muscular fibres being visible only in one or two places. The largest patch of muscle is seen towards the middle of the organ, a little to the right of the septum. The body generally is by no means remarkable for adipose deposit. No appearance of adherence in the thoracic aorta; the weight of the heart, without opening, is seven ounces and three-quarters; the aortic valves sustain a column of water well, so also do the pulmonary; the tricuspid valves are slightly beaded, but moderately healthy, and admit the tips of four fingers; the walls of the right ventricle are flabby and pale, their mean thickness being one-eighth of an inch. At some points the parietes become excessively thin and encroached on by fat, and at other places there is scarcely any muscular fibre visible at all. This extreme thinness is mostly perceptible near the apex of the ventricle. Left ventricle: Wall flabby, dry in appearance, pale in colour, easily rent, average thickness, half an inch; the mitral valve admits the thickness of three fingers, and is healthy. The right lung is crepitant throughout, there is no marked engorgement, and no tubercles are observed. Weight, seventeen ounces and a quarter. Left lung, seventeen ounces and a half, the characters being the same as on the right side. Vessels on the convex surface of the brain not congested; some slight thickening of the membranes seen in places. Near the longitudinal sinus the arachnoid was here and there thickened and opaque; on section of the hemispheres the red points were not found numerous, and the contrast between grey and white matter was well-marked; there was no fluid in the ventricles, and the substance of the brain was firm. Other parts of the brain quite sound; no coagula are to be seen, all the blood is fluid and of a dark colour. The upper part of the small intestines was much distended with air, as well as the stomach. The portion of bowel below the strangulation, including part of the small, and all the large intestines, is very narrow and contracted. Pink streaks are noticed on the superior part of the small intestines, and are of very fine injection; no effusion of lymph; the strangulated portion of intestine was about the size of a hen's egg. Other viscera of the abdomen healthy. The fibres of the heart were examined by Dr. Garrod, under the microscope, and presented the usual appearances of fatty degeneration.

ST. BARTHOLOMEW'S HOSPITAL.

Death from the Inhalation of Chloroform.

(The patient under the surgical care of Mr. PAGET.)

The patient was a girl of loose habits, twenty-two years of age, who had been in this hospital two years before the present admission. She was then labouring under an affection which was long looked upon as of a syphilitic character; there was, in fact, considerable discharge from the vulva, and within the vagina was seen an ulcer which was thought to be of a specific nature; but it turned out to be a cancrroid growth, situated just at the entrance of the vagina. It had, on former occasions been observed that no secondary symptoms were occurring, though the sore presented a certain amount of induration; there was no pain, but the discharge was pretty considerable, and harassed the patient much.

Mr. Paget, having resolved to destroy the tumour, gave the preference to the actual cautery, and hoped that by this means he should succeed in freeing the patient from the inconvenience she was suffering. A fortnight before the day when the inhalations of chloroform had a fatal issue, the ulcerated surface was touched for the first time, when the patient had also inhaled chloroform. She had been thrown into an incomplete state of anæsthesia, for she started when the heated iron came in contact with the sore; she was therefore made to inhale more chloroform, and fell into perfect narcotism, from which she subsequently recovered very well.

On the 21st of October, 1853, it was thought advisable to repeat the operation, and the girl was brought into the operating-theatre. Dr. Black, warden to the college, who administers chloroform by appointment, placed upon the patient's mouth the ordinary tin and leather inhaler, which covers nose and mouth, and which is always used in this hospital. When she had been placed on the table, Dr. Black applied the apparatus, and she continued to inhale the anæsthetic agent very quietly for about ten minutes before it took any effect upon her. All at once the patient was noticed to present an unusually dusky countenance, the pulse became

weak and fluttering, and the breathing irregular. Mr. Paget had not as yet begun to operate, and the whole attention was now turned to the state of the girl, and every effort used to recall her to life. Artificial respiration was first employed in the manner advised by Ricord, the air being thrown into the lungs from mouth to mouth. As this, however, did not succeed, an opening was made between the thyroid and cricoid cartilage, and artificial respiration continued by means of a tube passed into the aperture, to which a pair of bellows was adapted. In order to rouse the system brandy-and-water was thrown up the rectum. Whilst these measures were energetically carried out, a warm bath was being prepared, and the patient was placed into it as soon as it was ready, artificial respiration being persevered in while she was immersed. During the continuance of these efforts, Dr. Burrows and Dr. Black detected now and then a pulsation at the wrist; but all these endeavours proving useless, galvanism was had recourse to. The shocks produced very strong spasms, but no efforts at breathing, and it was plain that the only measure which could be relied upon was artificial respiration. This was continued with the greatest perseverance, but to no avail, and it soon became apparent that all the efforts at reviving the poor girl were perfectly useless. The whole amount of chloroform which had been inhaled was below two drachms, and, as stated above, the apparatus was the usual one—viz., the leather and tin case for nose and mouth, with the upper aperture and sponge for pouring in the chloroform.

Post-mortem examination made twenty-four hours after death, conducted by Mr. Paget.—There was general congestion of the brain, but not very marked, the only veins much congested being those at the posterior part, the blood being in a very liquid state. The puncta were not larger than usual, and the blood, which had been placed in a jar, did not coagulate. The ventricles contained an ordinary amount of fluid, and the pons Varolii presented normal features on a section being made through it. The only peculiarity worth noticing (and the same had been observed in the patient who died from the effects of chloroform some time ago, under the surgical care of Mr. Lloyd) is that the blood was found liquid in the veins, and remained so after it had been put aside. The kidneys were somewhat congested; the left one was found scarred from previous disease, when the proper tunic was drawn off, and it was supposed that this might be the result of disease in early life. The peritonæum was thickened on the surface of the liver, and the left kidney was full of fluid blood. The spleen was adherent to the diaphragm from previous general peritonitis. The stomach was full of undigested food, and still the patient had stated that she had had no dinner; it is supposed that she took bread from her locker, and had potatoes given her by her fellow-patients. On the mucous membrane of the stomach some coagulated milk was adherent, but the viscus itself was quite healthy, as was also the pancreas, of which there was a small offset attached to the serous surface of the jejunum. The heart was altogether flabby, but decidedly *not fatty*; the right ventricle was of the ordinary size, and slightly mottled at the upper part, the muscular tissue being rather of a thin texture, and generally pale. The lining membrane of the ventricle was rather thickened, and the paleness of the heart formed rather a contrast with the florid tint of the voluntary muscles, but the viscus did not present the characters of fatty degeneration.

Now what do we learn by these accidental deaths, and the account of the post-mortem examinations? 1st, that the fatal effects may ensue in a very short or comparatively long time, (three minutes in one case, and ten in the other;) 2nd, that a fatty heart will cause death to occur in a much shorter time than is necessary when this organ is sound; 3rd, that a perfectly healthy heart is no preservative from the fatal effects of chloroform; 4th, that a previous complete anæsthesia by chloroform is no guarantee that a subsequent one will be harmless; 5th, that even the artificial respiration from mouth to mouth, which has been much extolled, may fail at a certain advanced period of anæsthesia; 6th, that patients may fall victims to chloroform though in an excellent state of general health; 7th, that habitual intemperance seems a counter-indication to the use of chloroform; 8th, and lastly, that accidents of the kind described above will happen with the best and most practised hands.

The next question is—Whether we can offer any suggestion as to the means of avoiding the sad results which we have just mentioned? On this point we gladly refer our readers to the excellent papers which from time to time have been published on the subject, and shall just extract from Mr. Bauden's memoir such advice as may be considered of value under the present circumstances:—