many days on water alone. A careful series of weighings would be valuable in cases treated by different enemata; but I have not had this carried out systematically in any case which I deemed it necessary to treat in this way, as I regard absolute rest of the body as an important aid to quick recovery. I have scarcely ever any trouble about the retention of enemata. They should never be large, but may vary from two to three ounces as a rule, the frequency of repetition being decided in each individual case. Success is largely due to the care of the nurse, who should give the injection slowly, and encourage the patient to help the operation. The rectum should be washed out when any irritative symptoms appear, and opium will then seldom be necessary. To the sister of my ward for women, who for many years has superintended the treatment of these cases with every attention to detail, I owe much of the success I have had. The lesson to be derived from consideration of such cases as these is that there is no difficulty in keeping most patients on fluid enemata for some weeks; that in all cases when the symptoms are masked, such treatment is imperatively demanded at once; that even in doubtful cases it is very often advisable, though very small and frequently repeated quantities of milk &c. by the mouth may often be tried with success, and are thus obviously preferable; and that drug treatment of any kind is scarcely ever of any use, and would be, as a rule, contraindicated. After the resumption of solid food, nutrition is apparently aided by the administration of arsenic and iron for some time. From time to time, and especially in cases which are fed by the mouth on milk throughout, evacuations of the lower bowel must be effected by means of simple enemata, and the rectum should never in any case be allowed to remain or become loaded.

In conclusion, I would remark that in my experience, both clinically and anatomically, gastric ulcer is immeasurably more frequent in women than men. This is the view of most authorities, with the exception of Dr. Fagge, who quotes his experience in the post-mortem room of Guy's Hospital as not supporting the disproportionate distribution between the sexes. Domestic servants, and especially cooks, contribute largely to this class of cases, and I have been sometimes inclined to think that their habit of eating much and often hurriedly at all times and seasons, and just possibly their passion for unlimited vinegar, has something to do with the production of the malady; but Dr. Wills, who has made special inquiries regarding the first of these points, in many cases finds that this cannot be established as an invariable element of causation. That the well-to-do and generally healthy but seldom suffer from gastric ulcer is, however, not to be questioned, and it is further certain that, whether it be regarded causally or not, considerable anæmia of long standing often precedes the symptoms of undoubted or demonstrated ulceration.

Harley-street, W.

OBSERVATIONS ON THE ADMINISTRATION AND DANGERS OF ANÆSTHETICS.

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IN view of the recent development of this subject, circulars asking for information upon it have been issued by THE LANCET to scientific medical men throughout the world. This circular has stimulated Dr. Dunlop to record the results of his observations on the subject made in wards 15, 23, and 24 of the Glasgow Royal Infirmary during the last ten years, and to state his opinions thereupon.

Allowing for unrecorded cases in these wards, the following opinions are based on observations of 3500 cases within the specified period. To produce anæsthesia in this number of patients, chloroform has been principally used. In the administration, the drop method was adopted. Ether was sometimes employed; its use by Clover's apparatus was begun on March 8th, 1882. Its use was greatly dependent on the skill and ability of the assistant, some assistants administering the drug with greater skill than others. In a general way ether was administered in the proportion of one case of ether to thirty cases of chloroform. Ether was employed preferably

in cases of debility from long-standing disease of joints or from loss of blood in severe railway smashes or machinery injuries. This drug, however, was found unsuitable in operations for hernia, lithotomy, reduction of dislocations, rectal operations, and in persons suffering from pulmonary or bronchitic ailments, or addicted to habits of intemperance.

Referring to the relative dangers of various anæsthetics at the operation or after the operation, Dr. Dunlop remarks that "chloroform is never absolutely safe, no matter how carefully or how skilfully it might be administered. Chloroform is much more dangerous than ether during operations; but after operations ether is more dangerous to life than chloroform from bronchitis or pneumonia setting in. It may be said that when pneumonia or bronchitis follows, the ether was badly administered. That may have been so. It is much more difficult to administer ether accurately than to administer chloroform accurately." On two occasions recently he encountered great difficulty with ether. In one case the breathing had almost ceased, and the pulse failed. The young woman's face had become blanched. She was dying not from asphyxia, but from weak heart action. The remainder of Dr. Dunlop's remarks are as follows:—

Every intelligent assistant I have had during the last ten years has felt happier during an operation when ether was used than when chloroform was administered. I have not seen any deaths from ether or chloroform for ten years; but I have seen many patients both in hospital and in private practice in very imminent danger to life during the administration of chloroform, the symptoms in some instances being those of impending asphyxia, in others those of defective heart action. I have laid down for my own guidance as a surgeon the rule never to have chloroform administered to a patient in my own house, even by the patient's own medical man. It is an extremely awkward and painful experience for a surgeon to have a death from chloroform in his own consulting-room.

A patient coming from the country, accompanied by the family doctor to administer chloroform in a surgeon's consulting-room, the patient to have an examination for stone, or the excision of a wen, or a reduction of dislocation at the elbow, or the breaking down of joint adhesions, is usually in a very unfavourable and unsafe condition for chloroforming. The patient is probably hot, anxious, excited, nervous, and tightly clothed, and at an early stage of the administration of the anæsthetic by the family doctor symptoms of heart danger suddenly appear, and death ensues. It is really much safer for such a patient's life to have him rest for a time in a hotel or elsewhere, and to have the anæsthetic administered there rather than in the surgeon's house. Under no circumstances, and for many reasons, should chloroform be administered by a medical man without at least a third party being present. Again, I never now administer chloroform in a dentist's room in dental cases. There is always great danger to life, and deaths have been far too numerous in the rooms of dentists. Besides, nitrous oxide is so much safer in the hands of dentists than chloroform.

In the space at my disposal it is not my intention to discuss the general accuracy of what is termed Syme's views on the administration of chloroform, or to consider the conclusions arrived at by the Hyderabad Commission, which are based on experiments performed on Indian dogs and monkeys. To help THE LANCET in its consideration of the question, How to save people's lives? I desire to contribute some evidence on the other question, Why and how do some people die under the influence of chloroform?

During the last twenty years in conjunction with my colleague, Dr. Moore, as one of the medico-legal examiners for the city of Glasgow, I have had exceptionally favourable opportunities of acquiring experience of the fatal results following chloroform administration. In these years there has been a considerable number of deaths of individuals while under the influence of chloroform. The deaths, which were made the subject of post-mortem examination, took place in the Royal and Western Infirmarys, in the hospital of the Barnhill Poorhouse, in the operating rooms of dentists and consulting-rooms and elsewhere of private practitioners in the city and suburbs of Glasgow, within the county of Lanark. A careful study of such details as are before me leads me to the conclusion that considering the population, its numbers and character under medical treatment, and subjected to chloroform, the proportion of fatal cases is very small, probably not more than from two and a half to three per annum. Within the last ten years the

deaths under chloroform have been more numerous than they had been in the previous decade. There have been, however, at least eight or nine deaths since Jan. 1st, 1888, and of these seven were the subject of post-mortem examination, and in all, so far as I can learn, it was the respiration that was watched and not the pulse. The respiration gave no signs or warning of approaching danger. It was noted that the fatal results occurred in the young and middle-aged, not in children or very old men, and in females as well as males. It was further noted that some forms of surgical procedure had some peculiar influence in predisposing to a fatal result, such as operations upon joints, not, however, involving the use of the knife. Two individuals died who were having dislocations at the shoulder reduced, one a dislocation at the elbow, and three in breaking down adhesions within and about the knee-joint. In no single case was death attributable to nervous shock from the operation having been begun or completed while the patient was not fully under the influence of the anæsthetic. Some of the deaths which took place while the patients were under chloroform were not directly due to the poisonous effects of the drug itself, but to some other cause. One death was due to asphyxia from vomited matter (tripe) obstructing the air-passages. The help present was neither adequate nor skilled, and the men lost their heads. Another was caused by the bursting of a small pouch (aneurysmal) in the brain, a third of an aneurysmal pouch in the first part of the aorta, both deaths taking place in the early period of the administration and while the patient was struggling. The deaths which are to be distinctly charged against chloroform are, according to the post-mortem appearances, divisible into two distinct classes. In the one and larger class the appearances are those of death by asphyxia—death through the lungs. In the other, and fortunately smaller class, the appearances are those of death by syncope—death through failure of the heart. The proportion is one death from syncope to about twelve from asphyxia. I may mention here that I think the deaths from asphyxia ought to be to a large extent preventable. The deaths from syncope are in most instances beyond the control of the highest skill and the greatest care. In order to make these observations somewhat clearer I mention the following.

In the deaths from asphyxia the right side of the heart was full of liquid blood, not dark blood such as is present in asphyxia from drowning, but blood with a pinkish or magenta tinge, which seems to be characteristic of death from asphyxia by chloroform. The left side was firmly contracted and empty, the veins leading to the right side full of blood, the lungs behind engorged with liquid blood of a dark pinkish tint. A general engorgement of the veins of the liver and kidneys, and in some cases petechial spots formed by extravasated blood in the serous covering of the heart and pleural lining of the ribs, and the covering of the lungs. We find often similar petechial spots in newborn infants, who make a struggle to breathe fully and freely, and fail from obstruction by pressure, &c. In the deaths from syncope, or failure of heart's action, there was found a flaccid heart with all the cavities empty. No blood on the right side; no contraction of the left ventricle. There was blood in the veins; the cavæ were distended with blood. In some instances the heart was large, soft, and fatty, and its tissue friable. Along with this condition of heart was noted a more or less yellow, soft, fatty liver. In other instances there was no evidence of any disease of the heart or other organs; all that was noticed was a flaccid empty heart, with venous engorgement in the lungs. In one fatal case examined by Dr. Moore there was, in addition to the empty flaccid heart, complete adhesion all round to the pericardium. Death was due to syncope from failure of the heart's action. Deaths from asphyxia, or preventable deaths, took place under two distinct sets of circumstances. In one set the administration of the chloroform was too long continued. The patient was too deeply under its influence from the beginning. There was an overdose, the breathing became shallower and shallower, the chest ceased to move, the diaphragm and abdominal walls only moving. The face and lips became livid, and death ensued in spite of artificial respiration. In the second or other set the patient was placed fairly under the influence of chloroform, administered with a due admixture of air, but during the operation, owing to the patient appearing to come out from under its influence, a further dose was administered, and this dose was excessive,

and the patient died. The cause of death was asphyxia through the lungs. This is not an uncommon blunder, even in the hands of skilled men, and is due to want of care in the administration and the neglect of watching the respiration.

There are some conditions of lungs and other organs which render the administration of chloroform specially hazardous, and which increase the risk of death from asphyxia. One is a lung or lungs bound down to the walls of the chest and diaphragm by old adhesive bands, the patient having had extensive pleurisy. The breathing capacity or volume of the weakened lung being greatly diminished, a small or ordinary quantity becomes an overdose. With lungs in this condition a very little chloroform seems to embarrass the respiratory organs and bring about a fatal result.

In two dental cases in which chloroform was administered by experienced men, who had not, however, examined the chests, and did not know how imperfect and unsatisfactory the respiratory machinery was, death ensued early in the administration and rapidly. There was no help at hand of a proper kind to save life by artificial respiration. I have known humpbacked patients giving great trouble from imperfect breathing apparatus. Another condition which is embarrassing, but in a different way, is albumen in the urine—Bright's disease. In several of the fatal cases albumen was present in large quantity. Urine should always be examined when possible—"forewarned is forearmed." With kidney action defective in the elimination of urea, epileptiform convulsions may occur and death result. There are always danger and trouble during the administration of chloroform when albumen is present. To prevent death from asphyxia chloroforming requires skill, experience, undivided attention, prompt action in time of danger, and a suitable method of administration. Anæsthetics should never be administered in a close, crowded, small, ill-ventilated apartment, or side room of a ward, or in the lobby of an operating theatre. Neither should there be a crowd around the patient witnessing the operation. Several deaths had the fatal result induced or hastened by one or other of these conditions.

Of the apparatus used in the administration of chloroform, based upon the evidence afforded by the deaths, Allis's inhaler is the most dangerous. Next in order is the folded towel arrangement, and the safest of all is the drop method on flannel stretched on wire.

Deaths from syncope or failure of heart are not common. They do, however, occur, and as a rule early in the administration. A small quantity of concentrated vapour without any air administered to a nervous, timid patient has proved fatal. A healthy, florid-faced young man had chloroform administered to him in private by a surgeon who had gained much experience of chloroforming in the wards of the Royal Infirmary. The chloroform was administered on a folded towel, three or four drachms having been poured on. While the patient was counting, and when he had reached the number twenty-five, his face became at once pale and blanched, the pupils suddenly widely dilated, no pulse was felt at the wrist. The young man was dead. On post-mortem examination I found his heart an empty flaccid bag. There was no disease of any organ, and no evidence of death from asphyxia. I have known a robust-looking ship captain die under precisely similar circumstances, and on post-mortem examination I found only an empty flaccid heart. Both men had hearts and nervous systems specially sensitive to chloroform, and the fatal result could not have been provided against. There is no possibility of discovering beforehand the existence of such a sensitive heart. Weakly, flabby, thin-walled, yellow hearts, and hearts bound to the pericardium by old adhesive bands of probably rheumatic origin, are prone to become paralysed very early in the administration of chloroform.

Indian dogs and monkeys the subjects of experiments by the Hyderabad Commission do not afford the cardiac and pulmonary complications which are often present in man, and conclusions based upon such experiments, however interesting and important they may be when viewed from a purely scientific standpoint, are of very little practical importance or value as guides to us in the safe administration of chloroform to our patients.

Strange as it may seem, disease of valves, hypertrophy of walls, cardiac murmurs of all kinds, give no trouble during the administration of chloroform. I know that from experience in the operating theatre, and I have never found any

valvular disease in any case of death under chloroform. I have no post-mortem data of deaths from syncope in the last period of the administration of chloroform. On that point I have nothing to say.

In conclusion, I have to state that after thirty years' experience as a surgeon in hospital and in private practice, experience both of the living and the dead, I have formed the opinion that at all times and under all circumstances chloroform cannot be administered without some risk to the patient's life. That risk, however, may be greatly diminished—reduced to a minimum—by an accurate knowledge of the patient's condition of body and mind, and the skilful administration of the anæsthetic, which includes due attention to the pulse, as well as watching the respiration.

Glasgow.

PERFORATING GUNSHOT WOUNDS OF THE CHEST AND OF THE WRIST-JOINT, BOTH IN THE SAME PATIENT, AND FOLLOWED BY RECOVERY.¹

By SURGEON GEO. S. THOMSON, I.M.S.

THE patient, the native adjutant of the 1st Bombay Lancers, was admitted into the regimental hospital on Nov. 25th, 1889, on account of a perforating gunshot wound of the chest, and another of the left wrist-joint. This native officer was shot in the lines by a sowar (native cavalry soldier), who had at the same time shot Colonel Heyland and another native officer by firing self-made cartridges with his Martini-Henry carbine. I first saw the patient at 8.30 A.M. on Nov. 25th, or about two hours after he had been wounded. He was then suffering from partial shock, with pallor of the face, cold surface of the body, and frequent small pulse due to loss of blood from the injuries inflicted on him by the two shots fired at him. One bullet had entered the chest on the left side behind, at the level of the ninth rib, below the angle of the scapula, and three inches from the spinal column, and having traversed the chest made its exit one inch below the left clavicle, and three inches from the intra-clavicular notch. There was an indented skin-deep wound one inch above and internal to the wound of entrance produced by the wad used in loading the cartridge, and consisting of a circular plate of lead. Air bubbled from the wound of exit anteriorly (traumatopnoea) with a hissing sound during the movements of respiration, and slight pain and difficulty of breathing were complained of. No hæmoptysis, wound emphysema, or internal hæmorrhage was present, and the patient felt at ease except for a sense of oppression in the chest and a slight pain behind the manubrium sterni during swallowing, probably reflex in origin, from injury to some nerve fibres connected with the recurrent nerve. The second bullet had traversed the left wrist-joint, and this wound was produced by the first shot fired at him. The bullet had entered at the root of the thumb between the radial artery and the median nerve and external to the pisiform bone, which was exposed in the large lacerated wound of entrance, and it came out half an inch external to the styloid process of the ulna and just over the wrist-joint, apparently between the radius and ulna. The wound of exit was small, round, and everted, and both wounds bled freely; but there was no arterial spouting, nor could any vessel requiring a ligature be detected. The wounds were all carefully washed out with warm (1 in 5000) perchloride of mercury solution, syringed with a warm solution of tincture of iodine (one drachm of tincture of iodine to one pint of warm water); and after all foreign particles had been removed and all hæmorrhage had ceased the dressings were applied. Powdered iodoform was plentifully dusted into and over the wounds, and covered with lint dipped in 1 in 2000 perchloride of mercury solution, and cotton-wool, a splint, and bandages were applied. The chest wounds were not probed, but carefully examined (by the finger previously rendered aseptic) for any bleeding points, damaged ribs, and foreign bodies; then syringed with the iodine solution, and dressed with powdered iodoform, perchloride of mercury lint, cotton-wool, strapping, and bandages. Perfect rest

was enjoined in a separate ward, and the following powder was given at once:—Five grains of subchloride of mercury and half a drachm of compound jalap powder, followed by twenty minims of liquor opii sedativus in a draught; and the patient was ordered to be fed on milk, chicken soup, mutton broth, and sago congee. At 4 P.M. the same evening his temperature rose to 103.4° F., when he was given five grains of antifebrin in an ounce of brandy; this was repeated in four hours, and brought the temperature down to 100° that evening. When I examined him at 5 P.M., I found bronchial breathing and dullness over the middle portion of the left lung in front and behind. There was no hæmoptysis at any time, and the sputum was quite free from even the slightest tinge of blood. He complained of pain in the chest at the seat of the wounds and difficulty in swallowing, and of pain in the wrist-joint and hand. On Nov. 26th the temperature was only slightly over 100° in the morning (100.8° at 8 A.M.) and reached 101.6° at 12 noon, when five grains of antifebrin in one ounce of brandy were given, and the temperature fell to 99° at 3 P.M.; and never again rose to 101° during the remainder of the time the patient was in the hospital. On Nov. 29th I examined the hand and found it considerably swollen from the webs of the fingers up to the wrist-joint; it was painted with the following solution:—Twenty grains of nitrate of silver, two drachms of spirit of nitrous ether, and one ounce of distilled water, and the following purgative and iron mixture was prescribed:—Four drachms of liquid extract of cascara sagrada, four drachms of the tincture of perchloride of iron, one ounce and a half of sulphate of magnesia, four drachms of liquid extract of liquorice, two drachms of spirit of chloroform, to six ounces of camphor water; half an ounce to be taken every four hours until the bowels were freely moved. The wounds of the hand and chest dressed as before.—Dec. 3rd: I again looked at both wounds and found exit wound of chest almost healed; no pus coming from it or discharge of any kind. The swelling of the hand had completely subsided and the wounds of the wrist-joint were granulating healthily. The skin-deep posterior wound discharged a little matter, due to dead subcutaneous tissue which was sloughing, and had to be gradually removed with scissors and dressing forceps. Syringed both wounds with the iodine solution and dressed as before.—5th: All the wounds healing well, especially those of the chest, and the hand wounds are granulating satisfactorily. Patient eats and sleeps well and is free from pain and fever. No chest symptoms are present, but he is weak, and still complains of difficulty in swallowing. To have tonics and stimulants.—8th: From this date the patient went out daily for a ride in the station hospital cart, and continued to mend rapidly, and made such satisfactory progress that he was able to go on six months' sick leave to his native country on Jan. 3rd, 1890. The chest wounds were perfectly healed, and no symptoms of any antecedent injury to the lungs or thoracic viscera could be detected by careful physical examination, and he felt nothing abnormal in the chest. The hand wounds were almost completely healed, except a small space at the root of the thumb about half an inch in area, which had not yet been covered in by skin. The wrist-joint movements were fair, giving some degree of flexion and extension. The hand is slightly adducted when at rest, and all the movements of all the fingers and of the thumb are perfect, and sensation is normal in all parts of the wounded extremity.

Condition on return from leave, July 18th, 1890.—The patient expresses himself as feeling quite well, and looks healthy and strong. The chest is quite free from all pain and any symptoms which might indicate the serious nature of the injuries inflicted on it. He can adduct, abduct, flex, and extend his wrist-joint and use his hand in riding, but says he finds it becomes more easily tired than his uninjured hand. The scar of the wound of entrance is slightly tender on firm pressure over it, and there is occasionally a burning sensation in the ring finger of the left hand, which finger cannot be moved in flexion with as great freedom as the others. Massage, electricity, and dumb-bell and gymnastic exercises are now being used to the hand, and under this treatment the wrist-joint has become more supple and the sense of power in the hand has increased. The patient is able to perform all his duties as a native officer, and attends all parades with his troop, to the charge of which he has recently been promoted, and is in every respect fit for service.

Remarks.—In this case none of the usual and what are

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