

is suitable for those with prominent nasal organs. The glass itself is variously shaped, being round, oval, or semi-lunar (Fig. 10), the latter form being specially adapted for the presbyope who wishes to look over his glass; while the pantoscopic, Franklin, or "verres à double foyer," are specially suited for those who are both myopic and presbyopic, who have undergone cataract extraction, or who, for other reasons, require glasses of different powers, for distant and near objects (Fig. 11).

Glasses may be mounted on frames and nose clips of all sorts and patterns, and I have here a very ingenious contrivance by Messrs. Pickard and Curry, which may be used instead of spectacles in cases of astigmatism. I do not think I need say more on this occasion about spectacles. I must however, in conclusion, remind you that such aids to vision were practically unknown in this country until the reign of Richard II., and that until a very recent period thousands of those who became blind from cataract and other curable diseases remained in darkness for the rest of their days.

"Oh, dying years! Oh, flying years!
Oh, days of dimness, nights of sorrow!
Oh, failing sight! Oh, lessening light!
Oh, morn forlorn and sad to-morrow!"

Now, thanks to such institutions as the one in which I have the honour to address you, few escape operation; and so slight is the disability afterwards, that I am enabled to show you this small coin, within the narrow circle of which has been inscribed the Lord's Prayer by a patient who was formerly blind from cataract; also this beautiful landscape, which was painted for me by a patient two years after undergoing extraction for cataract in both eyes. There is also in the waiting-room at the present moment an elderly lady who still gets her living by mending lace, on whom I operated for double cataract twelve years ago; and some of you had an opportunity of seeing at our last meeting a gentleman who for the last eight years has filled the office of bookkeeper in a large factory after undergoing extraction in both eyes ten years ago. Such triumphs of our art would not have been possible without the added aid of spectacles, and much as we may and do regret the necessity (which comes to us all) for their use, you have only to realise how helpless we should be without them in order to appreciate the immense boon conferred upon us by those philosophers whose unselfish devotion to science has perfected the art of selecting glasses, and enabled us not only to preserve and strengthen and improve the sight in youth—not only to heighten the colour, brighten the light, and bring back the fading outlines of minute objects in advancing years,—but also to secure after surgical operations results which are little short of miraculous, and which without them would have been impossible, unsatisfactory, or only half complete.

ON THE

INTRODUCTION OF ETHER INHALATION AS AN ANÆSTHETIC IN LONDON.

By WILLIAM SQUIRE, M.D., F.R.C.P., &c.

THE success of the first attempt in this country to prevent pain by the inhalation of the vapour of ether during a great surgical operation had much to do with the rapid adoption of this means of producing anæsthesia. As I administered the ether on that occasion, and had much to do with the preliminary experiments in the two days preceding the public event, some record of the circumstances impressed on my memory then may call forth other recollections or references serving to clear away some uncertain points about the inauguration of this important era in medicine. With us, as with our professional brethren on the other side of the Atlantic, the anæsthetic effects of nitrous oxide, and the known similarity of ether vapour when inhaled in the same way, led to the practical discovery of Morton in America and to the ready adoption of that discovery here. The effects of both were shown in the chemical class, when I entered, at University College, once in the course; the ether inhalations could be repeated by pouring the fluid on to a folded handkerchief, while the supply of gas was limited. To a certain extent I could

control the tendency to move and talk excited by the ether; on losing this control after a larger dose, I knocked my knuckles against the desks without feeling pain. This was in my first winter session (1846), and it came to mind on first hearing of Morton's discovery.

On Saturday, Dec. 19th, 1846, I heard from Liston of this great news from America of a painless amputation under the influence of ether, vaporised from a sponge and inhaled from a glass vessel containing it. This was in a letter to Dr. Boott, of Gower-street, from Dr. Bigelow, senior, of Boston, with an extract from a paper read by his son. (See the first number of THE LANCET for 1847, p. 5 *et seq.*) My duties at this time were chiefly at the College, but I frequently attended the surgeons' visits to the hospital, and mostly followed Liston. He was a friend of my uncle, Mr. Peter Squire, and I had other introductions to him. On these occasions Liston would often bring me through a crowd of students to the bedside of some sufferer whose case was of interest. One man I remember well, with light hair, wasted form, and pale, worn face, who had strumous disease of the knee joint, with much suppuration; ulcerated cartilage was indicated by starts at night, which prevented sleep, in spite of all soothing means and of all mechanical aids, so that amputation was imperative. But the patient felt unable to undergo this operation. He had once consented, and then at his urgent appeal it had to be deferred. On his Saturday's visit Liston mentioned to me the letter he had received, and its bearings on this particular patient, asking me to confer with my uncle as to the best way of ensuring success. Mr. Robinson, a dentist in Gower-street, was said to have extracted a tooth without pain, but no great success attended a second trial. Liston took me to the other end of Gower-street with some ether from the hospital, but whether to the house of Dr. Boott or to that of Mr. Robinson I do not clearly remember. The glass vessel used was too small, and I believe Mr. Robinson afterwards used the sponge alone, covered by a folded cloth, with more success. Mr. Liston took me on to Oxford-street, where ether was given in this way to one of the assistants. Some cough was excited at first; then more ether was required; some excitement occurred, and the insensibility that followed was not of long duration, but it was sufficient to prevent any signs of pain from a pinch or prick. There was a strong smell of ether in the room, and it seemed that with a better store of vapour and less expenditure of ether a more steady effect might be produced, and Liston said that if this could be ensured and maintained for one minute he would amputate in the case already mentioned on the following Monday. The necessity for a glass or other vessel to contain the ether was obvious. My uncle became much interested in the object to be attained, and with his energetic assistance a suitable inhaler was improvised. This is substantially the apparatus now preserved at University College Hospital. A large, broad-based, conical glass vessel, with openings at the top and at the lower part, was found; a good-sized tube was fitted to the side opening, a sponge was introduced from the upper opening to receive the ether, and a smaller glass vessel, with sponges on which ether could be poured, was fitted into the top. Before adding any ether we found that breathing could be easily carried on through the apparatus when the free end of the tube was brought near to the mouth and encircled by a folded towel held close to the face, and covering both mouth and nose. Several trials convinced me that it was better to begin with a good supply of vapour, at first holding the tube and its conical mask a little away from the mouth, then holding it close while a good breath was drawn, and again removing it slightly during expiration. In this way very little excitement was noticed. In many inhalations on myself under Liston's supervision some subjective sensation of light and increased throbbing in the ears were experienced; then all senses but that of hearing were lost, and I could hear the voices of my friends in some of the trials after I had stopped inhaling, while insensible to pain. On one occasion a puncture was made under my thumb-nail, of which I knew nothing at the time, though it was painful afterwards. Mr. Taylor, the chemist, of No. 13, Baker-street, assisted at these experiments, and was the first to undergo a more prolonged unconsciousness under my management. More than a minute from the completion of the inhalation was allowed to elapse before his sensibility to pain was put to the test; complete anæsthesia continued for two or three minutes. Liston was informed of this further success at once, and called upon Mr. (now Sir) Edwin

Saunders on Sunday morning to see if the effects could be further tested that day in tooth extraction; indeed, a volunteer, who wanted his tooth drawn, was found, but after a whiff of ether he said the toothache was lessened, and he declined to proceed further. I again took ether myself and gave it to others, while Liston observed the degree of anæsthesia produced and the duration of it. This was increased and prolonged by replacing some of the upper sponges, chilled by evaporation of the ether, with fresh sponges and ether, and by keeping the mouth and nose closely covered during the latter part of the inhalation.

Some mesmeric deceptions by the O'Keys at University College Hospital, which had been recently exposed by Mr. Wakley, were likely to cause any new attempt at avoiding pain to be regarded with suspicion. Liston, therefore, looked into every detail for himself before arranging for the operation next day under ether. His decision was soon widely known; letters were written that night, and messengers sent next morning, to those likely to be interested, and a large assembly filled the operating theatre at the appointed time. Mr. Cadge, of Norwich, tells me that Sir John Forbes, as editor of the *Medico-Chirurgical Review*, living not far from Liston, was informed by letter; I am under the impression that Mr. Wakley was also written to. Messages were sent on the Monday to Dr. Boott, of Gower-street, and to Mr. Robinson, but I believe neither was able to be present. Dr. Thomas Park—now living, since his retirement from the army, at Leamington—went himself, at Liston's request, to Mr. Robinson. Dr. Ransom, now of Nottingham, was then Liston's house surgeon. Mr. Cadge, who was acting as Liston's assistant, was present at the operation, and agrees with me as to the few remarks made by Liston at the time. In a short address he spoke of the letter from America, of the advantages to be hoped from anæsthesia, of the weak condition of the patient, hardly able to sustain the operation without this expected aid, and asking the forbearance and quietude of all present. The house surgeon then saw the patient carried in and properly placed, a handkerchief lightly covering his face. I had the ether apparatus on a small table brought close to the left side of the head, and spoke to the patient. He knew my voice, as I raised the lower part of the handkerchief to bring the end of the tube near the mouth, directing him to draw his breath deeply. In no case since have I seen ether taken more easily and quietly; the respiration soon became deep and regular; his face was flushed, instead of pale, when the handkerchief was removed and a folded cloth instead, enclosing the free end of the tube, covered the mouth and nose. When this was held closely I am inclined to think the exhaled ether was rebreathed for a time, warming the evaporating spongesurfaces, and so increasing the supply of vapour. When unconsciousness was complete (I remember no stertor) the apparatus was moved back a little, and no more ether was given. No twitch or sign of pain was made by the patient as the operation began, and in twenty-eight seconds the limb was off. Here a short pause occurred. It was intended, had the effects of the ether been soon over, to keep the main artery under pressure and to ligature the vessels in another room; but a placid sleep continuing, the vessels were all tied, and wetted lint was placed between the flaps, which were brought together and lightly covered before consciousness returned. Then the patient, rousing as if from ordinary sleep, was heard to say: "Take me away; I can't have it off; I must die as I am"; while murmurs of satisfaction passed round the theatre. When asked as to pain, he said it seemed more in the toes than the knee, and, until he was raised to see for himself, could hardly believe the limb was gone. The expressive smile of surprise and delight with which he then looked around is deeply impressed upon my memory. A marked change for the better in the patient's condition began at once, and led without interruption to a good recovery; the stimulus of the inhaled ether was directly beneficial.

It seems barely credible that an amputation of the thigh should be carefully completed, so far as the removal of the limb is concerned, in less than half a minute; yet in this case only twenty-eight seconds elapsed from the first use of the knife to the last touch of the saw. I noted this particularly, for I had intended to observe how long the insensibility would last, but was so astonished at the celerity and ease of the operator's movements that I forgot my original purpose. The problem was no longer in how short a time can an operation be performed, but for how long can anæsthesia be safely and easily maintained. There can be little doubt that the

care and precautions taken in private under Liston's observation had much to do with the success of the first public trial of anæsthesia by ether, with the wide use it soon obtained, and with the strong conviction Liston formed of its very great importance. I took the apparatus to Mr. Liston's house later in the day, having meanwhile used it both in the hospital and in my own rooms close by. I hear from Mr. Cadge that Liston got him to take ether the same evening, and that he could think and talk of nothing else. My uncle only half liked the inhalation experiments; he did not give the vapour, but said he would find glass and be responsible for the purity of the ether, which he very liberally supplied. Some of it was *washed* ether, any admixture of alcohol being thus removed. Christmas interrupted my too frequent use of ether. On my journey home to Bedfordshire after a week of these experiments a snowstorm near Luton obliged me to be taken inside the coach, as these inhalations had produced a sensitiveness of the bronchial surface that I had not previously experienced. On my return, I gave ether at several places for a short time, and sometimes for Liston. Dr. Snow gave it for him after the winter session was over. Mr. Clover soon followed, and continued to administer both ether and chloroform upon becoming the resident medical officer to University College Hospital.

Orchard-street, W.

APOSTOLI AND HIS WORK.

BY HORATIO R. BIGELOW, M.D.

OPINIONS are valuable and carry weight if the source originating them is of recognised intelligence. Still, fortunately for science, opinions may be only individual conceits—purely theoretical deductions, or ill-judged expressions, which are defaced by preconceived judgment. When opinions are the outcome of a logical weighing of evidence and fact, irrespective of all preconceived mental processes that imply definite personal bias, they become facts of record and facts of large-spread potentiality. Too often medical literature recounts the history of a valuable idea buried under the opprobrium which an ill-timed criticism, a sceptic laugh, or a jealous sneer has levelled at it. Far too often opinions are merely a source of ventilation for egoism. No opinion, emanating from any source whatever, can be convincing unless all the points with which it deals have been covered; and no clinician is a clever one who forgets the classic teaching that an exception proves the rule. No judge can be a fair exponent of legal justice who overweighs his charge with his own preformed conclusions to the detriment of an unbiased consideration of the argument. No scientist is worthy of credence who repudiates a new idea simply because it militates against ideas of his own which previously were in favour. The ethical test of truth must be within the observer himself. Upon this test he must bring to bear an honest subjective condition, an honest personal experience, and an honest study of evidence. The subjective status is the most difficult division, since it is almost impossible to find any scientist or professional person who can absolutely disrobe himself of all preformed judgment. Happily, if the observer be conscientious, this will be more than met by (1) his own experience with the problem in dispute; and (2) his study of the evidence adduced and offered by others in defence or condemnation of the same. When a multitude of upright men of sound judgment, of large intelligence, and reliable scientific accuracy report success resultant upon a given plan of treatment, we cannot believe them all to be victims of hallucinations, of enthusiastic and hastily-formed opinions, or of a deceit practised upon them by the originator of the plan. Objections may be raised (1) by those who argue upon theory and dilettante logic—general principles they call it; (2) by those who have tried the plan and failed. Theory pure and simple carries no weight whatever. It is a valueless, lifeless subjectivity, without form and void. As opposed to fact it is like the baby's wail. Theories deducted from facts supposed to be similar to the fact in question are of the greatest value; but who can guarantee that the facts *are* similar? Theories based upon supposed similar facts, which do not coincide with the facts of observation offered in evidence, presuppose either a want of similarity or a want of knowledge in building up the