eyeball, which interfere so seriously with the operator's manipulations, may all be overcome by the administration of chloroform; and I should resort to this anæsthetic at any stage of an operation, although commenced without it, did the patient demonstrate by his conduct that he was not possessed of that amount of self-control necessary to its successful completion. The occurrence of vomiting, which is the great bugbear of chloroform, so far as its use in cases of cataract-operation is concerned, may be guarded against by the administration of an efficient purgative the day previous, by interdicting supper, and permitting only a very light breakfast, with a small cup of tea four hours before the operation; while any feeling of faintness may be removed by the administration of two tablespoonfuls of equal parts of brandy and sherry, in sips, twenty minutes before commencing the extraction. Should vomiting occur in spite of these precautions, we may prevent its ill effects by the instant application of a compress bandage, which should, at the commencement of the operation, be secured above the brow by a strip of plaster, so as to be ready for use without disturbing the patient. Vomiting ceases to be a very serious symptom when met in this way; and I am not aware of any other objection to the use of chloroform. The ease with which the lens may be extracted in the dead subject, has often been remarked; and the conditions so favourable to operation in the dead may be very faithfully imitated in the living if the anæsthesia be only pushed far enough. By commencing the incision at the summit of the cornea, and limiting it (until the capsule is incised) to an extent of three or four lines, all risk from premature escape of aqueous humour, and consequent wound or injury of the iris, is abolished; while there is no difficulty in opening the capsule (so long as we may manipulate the eyeball with impunity)—a proceeding very much facilitated by a widely dilated pupil, an advantage which we may secure up to this point by the previous free use of atropine. It is true that the pupil contracts when the aqueous humour escapes; but not so much as it otherwise would; and an interval of a few minutes usually suffices to open it up sufficiently for our purpose. This partial paralysis of the circular fibres of the iris also considerably diminishes the amount of bruising which that tissue undergoes when the lens is subsequently extruded. In this way, I consider that many of the difficulties and dangers of ordinary extraction may be avoided; and nothing is easier than to enlarge the flap to any required extent by the use of a blunt-pointed knife (such as I pass round), cutting to the left while the eye is fixed with the right hand, and cutting to the right while it is fixed with the left. The dangers which we should still have to encounter arise from arrest of the lens (from adhesions or immaturity), rupture of the hyaloid membrane, prolapse of the iris, and reflexion of the flap. If the lens should be arrested, and do not yield to such pressure as may be safely employed, it is better to pass a fine wire spoon (like the one I show you, made for me by Mr. Coxeter) as far as the outer margin of the pupil; then, by retracting the instrument, to draw open the pupil sufficiently to enable you to tilt over the lens on its axis, when by thrusting it onwards, the lens comes to lie in the concavity of the spoon, and may be safely extracted without passing it into the vitreous cavity.* Rupture of the hyaloid membrane is not very likely to occur if anæsthesia be perfect and the operator be very careful; but if it should, the risk from its occurrence is very much reduced, and prolapse of the iris, as well as reflexion of the flap rendered impossible by the employment of a suture. Suturing the flap, in cases of cataract-extraction, was practised by Dr. Bader of Guy's, seven years ago; and Mr. Williams of Boston has recently published a number of cases in which he has used it. Mr. Williams advises the application of the suture after the completion of the flap and the removal of the lens; but, I suspect, few surgeons will be induced to follow his example, as the extreme danger of so much manipulation as would suffice for the passage of a suture through the cornea when the operation is just happily over, one-half of that membrane converted into a flap, and every movement likely to rupture the hyaloid membrane, can scarcely be exaggerated. After several experiments, I am convinced that the only safe and convenient method of applying the suture is, to insert it before the capsule is opened; and, when the wound is only a line or two in extent, it may thus be passed with comparative ease and safety, the loop drawn through, and then, even if the hyaloid should be ruptured during the subsequent steps of the operation, the flap may be drawn up and tied securely. This accurate apposition of the flap prevents prolapse of the iris, limits the escape of vitreous humour, and affords so much security that cortical fragments may be removed by the sucker or scoop through the sides of the wound. By these means, I believe, we may save many cases of flap-extraction that would otherwise be lost, and also preserve that highest indication of success, the central and moveable pupil.

[To be concluded.]

ON THE USE OF ETHER AND ETHERISED COD-LIVER OIL IN THE TREATMENT OF PHTHISIS.*

By BALTHAZAR W. FOSTER, M.D., M.R.C.P. Lond.,

Professor of Medicine in Queen's College; Physician to the General Hospital, Birmingham; etc.

I NOW come to the second part of my task; namely, the therapeutical application of the foregoing facts. Having found, as I considered, sufficient evidence of the special action of ether on the pancreas, I determined to test the value of the discovery by administering ether in all cases characterised by inability to digest fat. In the out-patient departments of our hospitals, many such cases occur, which are generally classed as dyspepsia. Many cases of neuralgia are also to be met with in which a most decided improvement follows the increased power of absorbing fatty food. To both classes of patients I gave ether sometimes in combination with cod-liver oil, sometimes alone before meals. The results were most satisfactory; the oil was digested more easily and the nutrition of the patients greatly improved. Of these cases I shall speak more fully on a future occasion. I next ordered ether in mixture to all my phthisical patients at the General Dispensary, selecting the Dispensary for my investigations, rather than the Queen's Hospital, because all the patients were out-patients, and consequently exposed to no new and favourable conditions while the experiment was being tried. The patients being also of a somewhat better class than those attending the hospital, were not, as is so often the case in our large towns, struggling to combat a mortal disease while suffering from the effects of disease's chief ally—improper and insufficient food. For some months I pursued the treatment, seeing a very large number of consumptive cases, to all of whom ether either alone or in conjunction with cod-liver oil was administered; and the good effects were so decided, that I determined to investigate the subject more methodically, and to keep a careful record of each case. The good results observed in this preliminary inquiry were a return of the power of taking oil and fatty food, which had been previously distasteful or had even excited sickness: increased appetite, improved general nutrition and increase of weight, diminution of cough and expectoration, and cessation of night sweats. The general impression produced in my mind was so favourable, that I began my more exact inquiries with much confidence. In my first cases, the ether had been given in water with hydrocyanic acid and bicarbonate of potash, twenty-minim doses of ether to each ounce of the mixture. The ether was afterwards added to cod-liver oil, the ether purus of the *Pharmacopœia* being used, and about ten minims (9.259 m.) added to every two drachms of oil at first, afterwards fifteen and twenty minims were occasionally given in the same quantity of oil.† In some cases the ether was administered in water alone, and taken a short time before the oil. The effects were similar in all cases; but for convenience sake, and on account of its power of masking the unpleasant properties of the oil, I now, generally, give ether mixed with cod-liver oil, in the proportions mentioned. In my second and systematic inquiry, I treated fifty cases taken as they presented themselves at the Dispensary, each patient being carefully examined on admission and at least once every fifteen days during treatment. A brief record was kept of the progress of each case; but, from former experience, I determined in this inquiry not to accept the statement of the patients themselves as evidence of improvement, but only to consider those patients better in whom the result of a physical exploration of the chest, in addition to decided increase in weight, confirmed the statements made. I therefore weighed every patient once a week. As it would be impossible to give a record of each case in a communication such as the present, I must confine myself to a brief statement of the results obtained in the fifty cases.

Sixteen were admitted in the first stage of the disease; nineteen in the second stage; and fifteen in the third stage.

Of the sixteen in the first stage (or stage of deposition), seven improved in general symptoms and in physical signs, gaining on an average over 7½ lbs. each; five remained stationary, all gaining weight slightly; and only four became worse.

Of the nineteen cases in the second stage, six improved in all respects, gaining, on an average, about 8 lbs. each, two cases gaining 14½ lbs. and 10 lbs. respectively; six remained stationary; and seven became worse.

Of the fifteen cases in the third stage, seven improved, gaining, on an average, about 5 lbs. each; five remained stationary; and three became worse.

* Concluded from page 544 of JOURNAL for November 21st, 1868.

† Mr. Peter Moller, of Oxford Street, has prepared for me some etherised cod-liver oil of excellent quality.

* Dr. Macnamara extracts the lens in this way, but with a metal spoon; which, I think, takes up too much space.

Of the total fifty cases, twenty improved, sixteen remained stationary, and fourteen became worse.

Six of the cases treated, in no instance for a less time than three months, and observed over a period of many months, retained their weight; were troubled by no symptoms, and maintained the improvement in their physical signs. Only one of these was observed over a less period than fifteen months, three over two years, and two over eighteen months. These cases may be considered, I think, as examples of the arrest of the disease, for the patients have returned to their ordinary avocations, and are able to earn their livelihood untroubled by their former disease. The only other remedies used in those cases were croton ointment, as a counter-irritant, Dover's powder occasionally to relieve the cough, and, in a few cases, a little linctus morphine. But, as cod-liver oil was administered as well as ether, the objection may very naturally be made that the improvement was due to the use of the oil. For my own part this objection has not much value, for I had long used oil largely without obtaining any results at all equal to those stated. In order, however, to meet this objection the ether was stopped in ten instances and the oil continued; six times there was a fall in weight during the following three weeks. In one case the patient, who had taken ether for some two months, continued to gain weight. In the three other cases the gain ceased, but was again observed in these patients, as it was in all, when ether was again administered.

These results are not only instructive, as showing the effect of ether in increasing weight, but also as showing that the digestion of fatty food is restored to its normal state, in many cases, after a long course of ether. In the cases which have done best under treatment, that is, the cases which I think we may consider instances of arrested phthisis, the power of taking fats, which was at one time much impaired, has returned, and the gain in weight has been maintained over a period of many months. I may here also add that, in all the fifty cases there had been marked wasting before my treatment was adopted, in at least half the cases, cod-liver oil notwithstanding. Many of my patients have over and over again expressed their preference for the etherised oil; and many who have been unable to retain ordinary oil when taken, have been able to use etherised oil, not only without disagreeable symptoms, but almost with pleasure: "to drink it from the bottle", as some have expressed it. In advocating a new method of treatment, it is most satisfactory to be able to appeal to confirmatory evidence. It gives me great pleasure, in the present instance, to be able to call as a witness, in behalf of my views, the Secretary of this Section, Dr. E. L. Fox, to whom I mentioned the advantage of prescribing ether in phthisis in April 1867. I had the benefit of discussing the subject with Dr. Fox at that time; and he has since been so good as to send me the results which he obtained. In the early part of this year, he wrote to me as follows: "I fear I have kept no precise records of the oil and ether question; but since you mentioned it to me, I have used it very fairly. I give it in two sets of cases: 1, those who are tired of taking cod-liver oil; and, 2, those who have been taking it without gaining weight. In the first cases, I find it useful, as the ether, half an hour after the oil, seems to settle the stomach; and, I believe, induces the digestion of the oil. The nausea felt by so many patients is, I think, merely evidence of the oil not being digested. In one hospital case, the man took oil for fourteen days without any benefit; indeed, lost flesh. I continued the same dose of oil, and added the ether, and he began to gain three pounds a-week, and went on at the same ratio as long as he was in the wards. I think I have given it to about thirty patients since our talk in April, mostly in private patients of chronic phthisis, and in one case of great debility, in which I believed the pancreatic secretion was too little. In this case, the young lady had a great horror of all fat things, but took the oil with ether after it fairly well, and gained on it. It seems a plan generally liked by patients, and I am convinced of its utility." Such is the testimony of Dr. Fox, and I need hardly say how gratified I am to have the support of so able an observer. I might quote the testimony of others who have used the ether at my suggestion, were it necessary.

I may here remark, that I have used ether in the treatment of phthisis, not hoping to find a specific, for we have in these days ceased to search after specifics, but simply expecting to discover a rational means of combating one of the most serious symptoms of the malady, and restoring to its healthy state that perverted nutrition which forms so characteristic a feature in the great majority of consumptive cases. The peculiar character of this disorder of the digestive organs has been dwelt on, and the facts are, I think, sufficiently strong to show that in ether we have the best remedy for renewing the power of assimilating fat, whenever that power is diminished or lost.

Such, briefly told, are the results of my inquiry. I submit them to this meeting, in the hope that others may assist me in testing the truth of the facts advanced. Throughout, I have endeavoured to investigate the question with scrupulous care; the drug was selected only after a

laborious search, and when the evidence of its physiological action appeared to me conclusive. Starting from physiological facts, I have used the more simple science, physiology, to assist me in adding a new fact to the more complex subject—therapeutics; for it is in this way only that I believe medicine, a compound of sciences, can be advanced. First, must we learn the laws which regulate the normal before we can successfully analyse the laws which regulate the abnormal. In the selection of cases for experiment, I have also endeavoured to eliminate, as far as possible, all sources of fallacy, by selecting patients in the same condition of life, exposed very much to the same influences; and I have refused to accept any statement, as regards improvement, which has not been confirmed by the best test of all, in my opinion, the improvement of general nutrition. The cases, also, were, as far as could be determined, suffering from the same pathological conditions; they were all cases which may be termed chronic phthisis. In short, in all respects I have endeavoured to shut out from my inquiry all the accessory circumstances which might be sources of error; and I trust I have in this way avoided mistaking coincidence for the relation of cause and effect. The difficulties of avoiding all such sources of fallacy in a therapeutical inquiry are immense, and hence the slow progress which this part of medical science makes towards scientific form. If, in the present instance, my inquiry has been conducted with sufficient care to make it appear that I have indicated a new direction of fruitful research, my object will be accomplished, and I must leave it to the experience of the profession to decide on the value of ether in the combating one of the most subtle and certain approaches of our great enemy—death.

THE CRUCIAL TEST IN REGARD TO THE ORIGIN OF PHTHISIS AND TUBERCLE.

By HENRY MAC CORMAC, M.D., Belfast.

THE old alchemists were in the habit of impressing their bocal and their pots with a cross or *crux*—hence crucible—hoping thereby to propitiate the higher powers and realise favourable issues; and hence, also, the adjective "crucial", as applied to any test calculated to throw conclusive light on a given subject of inquiry. It is sometimes expedient to enter into special experimental inquiries, in order to realise the crucial test. At other times, we find the crucial test displayed, as it were, obviously before us, and needing only to be heeded, in order to be turned to avail.

I believe, and assume to show, that we have this crucial test at hand in respect of the production of tubercle. For, although tubercle may be expressly produced in the lower animals by forcing them to respire habitually air already respired, we find by the observation of facts—facts of every-day occurrence—facts lying before us—that tubercle is so induced in man and animals by reason of the habits, voluntary or constrained, which lead them habitually to respire air in part, at least, already breathed, instead of air no portion of which has been before respired.

My position is—the position which I take up—that tubercle is alone induced by the respiration of air in part already breathed; for air, all of which has been breathed before, is irrespirable, wholly, and, in fact, productive of immediate death. My averment is, that tubercle, with the diseases which tubercle is known to induce, is alone caused by air already breathed, in such wise that, if air already breathed in part be breathed habitually, tubercle is inevitable; and, secondly, that if no part of the air breathed have been breathed before, tubercle is impossible.

The notion of hereditary or inoculable tubercle I hold to be quite illusory. Tubercle is not inherited, though tubercle may be induced in the foetus *in utero* by the same causes which induce it in the mother. And, *à fortiori*, if tubercle be not hereditary, none of the diseases which tubercle induces—to wit, phthisis pulmonalis, tabes mesenterica, white swelling, scrofula, and hydrocephalus, so far as hydrocephalus depends on tubercle—are hereditary.

That this must be so is obvious, seeing that the production of tubercle is a chemico-vital process, and not producible otherwise. For what is tubercle? It is no other than the retrograde or effete carbon of degradation, the waste particles which, having discharged the purposes of life, and not being oxidised and converted into carbonic acid, are retained in the organism, and, with whatever foreign matters, water, fat, or cretaceous particles, oftentimes load the pulmonary and other tissues, to their destruction. If the effete carbon be burnt off, there is no tubercle possible. If the effete carbon be not burnt off, tubercle, sooner or later, is unavoidable.