than Axenstein, and directed north-east, it must be cooler than either Axenstein or Axenfels, and is suited for a residence when these hotels become too warm. The season is said to begin the 1st or 15th of June. I was so much pleased with this house, that I mentally resolved to make it my head-quarters if ever I spend the month of June on the Lake of Lucerne. It is but little known to the English, and is principally frequented by first-class Germans. The station is Stanysad, on the right arm of the lake, fifty minutes from Lucerne.

The Kurhaus Sonnerberg, at Seelisberg (2,772 feet), is just opposite Brunnen and Axenstein, nearly five hundred feet higher, and directed due north, with a higher shading mountain to the north. Consequently, it is much cooler, as I myself perceived, for I descended from one and ascended to the other the same day. It is also about two hours by steamer from Lucerne, the road winding up through pastures and beech and pine forests from the landing-place, Trolle, where carriages are always waiting. The Sonnenberg Hotel is a little town, with three hundred beds, large reception and dining-rooms, music three times a day, and a village of accessories and outlying works. It is full of life, bustle, and animation, which suits many even in a mountain sanitarium. I presume that, in a climatic sense, it is pretty much in the same condition as Burgenstock, except that it is sheltered on the south-west side by high mountains (Seelisberg, 6,316 feet), and is not, consequently, so much exposed to wind.

Engelberg (3,314 feet) is at the head of a valley—that of Engelberger Aa—which opens out at Stanz, whence starts also the road to Burgenstock, and is thirteen miles from Stanz. For the first nine miles, the rise is all but imperceptible, and the valley wide and fertile. The last six miles are through a romantic beech and fir-clad Alpine gorge, which opens out into the Engelberg valley proper, an amphitheatre of grass and fir-forest, backed by the Titlis mountain (10,515 feet). The glaciers of the latter descend into the amphitheatre, and are within an hour or two's walk of the Sonnenberg hotel. This hotel is a large, commodious, well appointed, well kept, and reasonable house, with above two hundred beds. Being 3,314 feet high and in proximity to the extensive glaciers of the Titlis, the climate is cooler than that of the stations on the lake already described. I was told that the nights are always cool and pleasant; but still the midday heat must be considerable even at this elevation in hot weather in July and August. I have always found it so at this height in Switzerland. At Grindelwald, where I am now writing, at an elevation of 3,418 feet, the thermometer is at midday 76 deg. in my shaded room, with glaciers all round in front of my windows, within a rise of 200 feet; whilst out-of-doors it is insufferably hot even on the glaciers, I am told by the tourists, and at 6,000 feet and more of elevation. I was once here before, thirty years ago, in August; and I recollect the thermometer at 84 deg. at the foot of the glacier. Engelberg, however, is a charming station, surrounded with easy mountain excursions, in a lovely valley, and is a well-known favourite resort. It is accessible early in June, and could be accepted as a residence until it becomes too hot. Indeed, according to its enthusiastic *habitues*—whose statements, however, can only be accepted with a certain amount of reserve—it is pleasant all summer.

Lastly, there are the Rhigi hotels, situated on this celebrated mountain, which every traveller who goes to Switzerland ascends by its curious railway. At the summit—Rhigi Kulm (5,906 feet, or 4,472 feet above the Lake of Lucerne)—there are now two splendid hotels, at which, however, no one ever stays; they are too bleak and exposed. They fill every afternoon with several hundred travellers, who sleep, see the sun rise, and depart after breakfast. At a lower elevation are several large commodious hotels—Kaltbad (4,728 feet), Rhigi Forst (4,747 feet), Rhigi Schleideck (5,407 feet)—which are residential and much frequented. They are exposed; vegetation is very bleak all around them, the trees being limited to a few small firs, growing sparsely and in groups, although I am told that the Alpine flora is rich. However, they offer a most valuable resource in case of extreme heat in any of the other sanatoria on the Lake of Lucerne and its vicinity. In the course of a few hours, even a great invalid can easily be transferred to the higher regions.

In speaking of these sanatoria, I have only mentioned the first-class hotels; but I must add that at all, with the exception of the Burgenstock, there is in the vicinity a group of minor hotels or pensions of a very reasonable character. In these, the pension or boarding terms, for a week at least, are from 5 to 8 francs (4s. 6d. to 6s. 6d.) a day. The expense of the large first-class hotels is from 10 to 15 francs—that is, from 8 to 12 shillings—a day; and several refuse boarders, keeping to hotel prices. There is all the difference in these establishments that there is in England between inns and hotels, where the expense is 4s. or 12s. a day. The Lake of Lucerne, as that of Geneva, is surrounded by cheap pensions, always clean and comfortable, although humble and

rustic. I am now examining the sanatoria of the Interlaken district, of which I shall give an account in a third and concluding paper.

I would again remark that any of my overworked fellow-practitioners who would like to combine pleasure and profit might take this account of the Lucerne sanatoria as their guide, reach Lucerne from London easily in three days, and examine for themselves all the places I have named, spending their holiday between them very pleasantly. Every one of these localities is surrounded by Alpine walks and excursions, which constitute the principal pleasure of residence to those who are well enough and strong enough to undertake them. Either the Geneva Lake district or the Lucerne is quite enough for one visit. I feel that I shall have to return to both for pleasure; that this journey is in a great measure one of study, one of business, and consequently much too hurried. I have to tear myself from the loveliest places, where I fain would linger and explore for my own satisfaction and delight.

REPORT OF A CASE OF MALIGNANT CHOLERA, IN WHICH THIRTY-TWO GRAINS OF CHLORAL-HYDRATE WERE HYPODERMICALLY INJECTED: RECOVERY.

By AUGUSTUS R. HALL, M.R.C.S.Eng.,
Surgeon-Major, Army Medical Department.

M. M., the wife of a soldier, a very spare woman, aged 30, the mother of four children, was carried to the Female Hospital, Fortress Gwalior, about three o'clock in the afternoon of October 27th, 1877, suffering from cholera. From a statement subsequently made by herself, it appears that on that same morning she was feeling well till after breakfast. About 11 o'clock she felt uncomfortable and oppressed, and laid herself on her bed. She went to sleep, and, about 1 o'clock, woke up, and found that copious watery evacuations were literally flowing from her, and saturating her bedding. Vomiting and cramp soon set in, and her husband then sent for a *dooly*, and had her conveyed to the hospital. On admission, she had the usual symptoms of well-marked collapse. The skin was cold, lips blue, eyes sunk, tongue and breath cold, finger-ends shrivelled, voice sepulchral; the pulse could not be felt at the wrist, nor even in the brachial artery. As she was a very thin woman, it could have been easily felt there if it had been present. There were cramps in the hands and feet, and a good deal of vomiting, but not very much purging. The temperature in the axilla was 95.2 degs. Fahr. On examining the thorax by percussion, it was found that the usual area of cardiac dulness emitted a resonant sound. On application of the stethoscope, the beating of the heart could be scarcely heard, and at times seemed lost; but respiration was detected over the part of the chest where the heart-sounds are usually perceptible.

Shortly after admission, one scruple of chloral-hydrate, dissolved in three ounces of water, was given by the mouth, but was rejected; it was therefore determined to administer that drug subcutaneously at once. At 4 o'clock P.M., six grains of chloral, dissolved in sixty minims of water, were injected into the substance of the left deltoid muscle in the following manner. As the hypodermic syringe employed held only twenty minims, containing two grains of chloral, the point of the cannula was passed through the skin and into the muscle perpendicularly for about the depth of one inch; the syringe was then emptied, and the cannula was withdrawn until its point reached the areolar tissue, but was not withdrawn through the skin. It was then thrust in a slanting direction at about an angle of forty-five degrees into another portion of the muscle. The cylinder of the syringe was then unscrewed, filled with twenty minims of the solution, screwed on to the cannula, and again emptied. The point was then plunged into the muscle in an opposite direction, and twenty more minims injected. By these means, sixty drops of the solution were injected into three different portions of the muscle with only one puncture through the skin, thus lessening the chance of irritation of the cutaneous nerves. These details are given thus minutely, as a strict attention to them is considered a very essential part of the method of treatment recommended.

Observations were taken with the clinical thermometer in the axilla every twenty minutes. Half an hour after the first operation, sixty more minims of the solution were put into the deltoid muscle of the right arm in the manner described above. The temperature in the axilla now began to rise steadily.—By 6 o'clock, eighteen grains of chloral in 180 minims of water had been injected through three cutaneous punctures, and the thermometer registered 97.8 degs. Fahr. The cramps had ceased by this time, and the vomiting was much less. Some serous evacuations had been passed.—At 7 o'clock, she passed a

small quantity of urine. Four grains more chloral were injected into a muscle, the left pectoral.—At 8 o'clock, the temperature was 98 degs. Fahr.—Soon after 9 o'clock, she had a motion of serum slightly tinged with bile. The pulse was now felt for the first time in the brachial artery, and the heart-sounds were louder. She complained of intense thirst all the time, for which she had as much cold water to drink as she liked, quite irrespectively of the vomiting; at times, she had a little soda-water for a change. On a few occasions, the water she drank was slightly acidulated with dilute sulphuric acid. This she liked, at intervals, as she said "it cleaned the mouth".—At 10 o'clock, the temperature fell a little, being recorded at 97.8 degs. Fahr.; and, shortly afterwards, six grains more chloral were injected into one gluteal muscle.—At midnight, four more grains were injected into the other gluteal muscle; so that, within eight hours, she had thirty-two grains of chloral injected altogether.

At 4 o'clock, A.M. (Oct. 28th), the temperature was marked 98.2 degs. Fahr., and she had some sleep. The liquid motions were now pretty well covered by bile.—At 7 o'clock A.M., the pulse could be felt in the radial artery, 82 per minute; respiration 20. She was drowsy, apparently from the effects of the chloral, but could be easily roused, and answered questions. The voice was still very sepulchral and eyes sunk; tongue and breath not so cold. She was drinking water continually, most of which she retained. The temperature, which was now taken every two hours, varied between 97.4 and 98.2 degs. Fahr.—At 1 o'clock P.M., she passed some urine. Liquid bilious stools were repeatedly passed during the afternoon.—At 6.30 P.M., she said she would like "a good sleep", and one scruple of chloral in three ounces of water, and some syrup, was given by the mouth, which she kept down. She had two hours' sound sleep.—At 8.30 P.M., the temperature was normal; she had, altogether, a good night. The urine that she passed was tested, and found to contain a quantity of albumen. She continued to pass loose bilious stools for some days. The heart-sounds had gradually become normal.

On the sixth day after the attack, the temperature rose to 100.6 degs. Fahr., but never higher, so that she can hardly be said to have had any secondary fever. Some quinine, however, in five-grain doses was given, but more as a precautionary measure. She was fed with plenty of milk, chicken-broth, and beef-tea, when reaction was established, but had no stimulant whatever until a few days before she went out of hospital (on November 13th), when a little brandy and soda-water were allowed. At the places where the injections had been given, there was a little superficial redness and tenderness for a few days; but some mild arnica lotion was applied to the skin, and no further inconvenience resulted. She made a very good recovery; and, more than four months afterwards, is in good health, and has shown no ill effects whatever on the result of the disease.

REMARKS.—Although the particulars here given are only those of a solitary case, still they may be worth publication in the pages of the *BRITISH MEDICAL JOURNAL*. At all events, they apparently show, that a very considerable quantity of a powerful vascular depressant, like chloral-hydrate, can be introduced into the system during the cold stage of cholera without doing any harm. And this, taken in conjunction with the fact now generally recognised, that alcoholic stimulants do positive injury in that stage, may give some indication as to the correct principle of treatment that is required.

Without going into the different symptoms enumerated above in this paper, the writer desires to invite particular attention to two of them, viz., the resonant sound emitted by the usual area of cardiac dulness, and the almost total absence of the sounds of the heart, and ventures to give the following attempt at an explanation of their causation.

From personal experience of an attack of cholera, the writer feels convinced that at the commencement the contractions of the heart become more forcible, the calibre of the arteries become smaller, and there is generally increased arterial tension, probably caused by excessive stimulation of the vaso-motor centre. As the cold stage becomes intensified, the spasm of the muscular walls of the heart is so strong that there is almost a continuous systole, the diastole not being allowed to take place so as to dilate the cavities as in health. It, therefore, occupies a smaller space than usual, and the first sound is only faintly heard, the second being indiscernible. Then, the whole of the arterial muscular fibres being also in a state of contraction, it has occurred to the writer that the heart may be pulled upwards and backwards to a slight extent by the aorta, thus allowing a portion of the lung to occupy its usual position. We are told by minute anatomists, that the small arteries are very contractile, and that the large ones are very elastic, but possess little contractility. But it may happen, that the intense stimulation to which the aorta is thus supposed to be subjected, may cause it to contract the heart in the manner indicated. The heart, therefore, may be so contracted, and occupy such a much

smaller space than normal, that a portion of the lung may get in front of it, and occasion the resonant sound heard on percussion.

However, whether this may be an approach to the truth or not, the fact may be tested repeatedly, that, in deep cholera collapse, the heart-sounds are not heard. There are, in addition, the cold skin, and no pulse, or very little, felt in the usual localities. Now this state might be brought about if the heart were in a state of diastole when there would be true syncope. But if this were the actual condition in cholera, it may be affirmed that alcohol would do good instead of harm; as it is universally admitted that, where there is real atony of the heart, alcoholic stimulants produce a temporary benefit. But if, as is supposed here, the heart be in a condition of almost continuous systole, not dilating sufficiently to allow much blood to enter its cavities from the gorged veins, and the arteries be so reduced in diameter as not to allow that little blood to flow properly through them, then the administration of alcohol would, it is presumed, do harm, which experience has shown to be the case. Hence, apparently, a state of pulselessness may be produced by two opposite conditions: in one of which, where there is syncope, stimulants do good; in the other, as cholera collapse, they do absolute harm.

Turning now from theory to practice, there are a few points which must be attended to by those who may use chloral subcutaneously in cholera. The strength of the solution employed may be laid down at one in ten; if it be stronger than this, it will probably cause great irritation, ulceration, or even sloughing (as it has done in some cases). Besides, if the specific gravity of the solution be too high, it will probably not be absorbed as it ought to be.

Then, as to the mode of injecting: it is most strongly recommended that the solution should be put, not merely under the skin, but into the substance of a muscle. In cholera-collapse, where the skin is cold, absorption may be said to be reduced to a minimum, and the drug employed may lie inert, if it be not introduced as deep into a muscle as is consistent with safety. Mr. Higginson, lately chief surgeon of Kheri, in Oudh, in his report of cases treated by him, published in the *Supplement to the Gazette of India*, February 14th, 1874, of which seventeen out of nineteen recovered, writes, "The injections were made in the arms and thighs, the cannula of the syringe being plunged pretty deeply into the flesh"; and, in a letter to the *Indian Medical Gazette*, which appeared in the October number for 1873, he writes, "I think it is essentially necessary to plunge the cannula deeply into the flesh; merely inserting its point underneath the skin will not do". It does not appear, even after this advice, that this precaution has been taken by those who have used chloral hypodermically.

In conclusion, the writer emphatically recommends the following course of treatment in cholera. When premonitory diarrhoea is observed, let all alkalies and opium be specially avoided, as well as alcohol. Dilute sulphuric acid, in half a drachm to drachm doses, in a bottle of gingerade or some syrup and water, diluted as much as will only give a strong, but not disagreeably acid flavour, will probably be found the best thing to take, as often as may be required.

If collapse should set in, or the patient be first seen in that stage, inject at once. Let the clinical thermometer determine the amount of chloral to be administered. The lower the readings, the faster the injections. It may be yet proved, in very severe cases, when the temperature is down nearly to 90 degs. Fahr., that as much as one drachm of that drug may be necessary before a decided effect is produced. Take frequent observations with the thermometer, and be guided by it. Give the patient plenty of cold water (not iced) to drink. Never mind if it should be rejected; it relieves the great thirst. But do not, under any circumstances, give any wine, spirits, or opium. We sometimes hear of the sedative action of opium; but, perhaps, this term may tend to mislead as to its real therapeutic effects. Poisonous doses of true sedatives, as pointed out many years ago by Dr. Headland, produce death by syncope. Opium causes death by coma and apnoea. It is a stimulating narcotic, according to Dr. John Harley.

Should reaction be established, milk, nourishing soups and broths, and afterwards more solid food, may be constantly given in gradually increasing quantities. Not even then it is recommended that alcohol be prohibited until convalescence is assured.

If secondary fever should manifest itself, then quinine, according to circumstances, by the mouth, or hypodermically, if the stomach will not bear it. The neutral sulphate is now always used in India for injections. Again, let the clinical thermometer be the guide; the higher the body-heat, the more quinine.

The writer earnestly begs those of the readers of this paper who may have opportunities to carry out all the details recommended above, and hopes, in spite of adverse statements, that the treatment advocated may be attended with success. At all events, he trusts that these remarks may be the means of inducing medical men to give the method

a complete trial, and that reports that may be published before long may settle definitely the question whether in chloral-hydrate we have, or have not, a remedy of efficacy in malignant cholera.

ON ULCERATION OF THE FRÆNUM LINGUÆ IN PERTUSSIS.

By WILLIAM N. MACCALL, M.D.,

Surgeon to the Clinical Hospital for Children, Manchester.

THE occurrence of this ulceration, and its value as an aid to the diagnosis of whooping-cough, have received so little notice in this country, that I read with pleasure the observations of Dr. Elliott of Bristol in the JOURNAL of September 7th. Essentially, his experience confirms my own, and the only point of material difference between us is that I do not agree with his theory as to the relationship existing between this ulceration and whooping-cough. To this point, which has little or no practical bearing, I shall refer later.

The subject was written upon as far back as 1844 in Germany, and about ten years later in Italy and France. Since then, frequent references have been made to it by Continental writers. It first came under my notice during an epidemic of whooping-cough which prevailed here in the winter of 1869-70. I then carefully noted the condition of the frænum linguæ in all children suffering from coughs brought to the Clinical Hospital, where I was at the time house-surgeon. The results are to be found in a paper published in the *Glasgow Medical Journal* for February 1871. Since that time, I have usually observed the condition of the frænum linguæ in cases of pertussis. The result has been to confirm the conclusions I then formed, but, as I have not kept any statistical record, I may be pardoned for making a few extracts from my paper, bearing upon the observations of Dr. Elliott; the more so, because, if the paper have escaped the notice of Dr. Morton and Dr. Elliott, I may, *à fortiori*, assume it to be unknown to most of the readers of the BRITISH MEDICAL JOURNAL.

"I may premise that I did not find the ulceration in any case which did not prove to be pertussis, and therefore in the numbers given I have confined myself entirely to cases of that disease. Out of 252 children suffering from pertussis, in whom, without any selection, the condition of the frænum linguæ and adjacent parts was noted, the ulceration was found in 111, or about 44 per cent. In the great majority of the cases (*i.e.*, in 105 out of the 111) it was situated on the front of the frænum, and its presence in another situation was usually associated with some irregularity of the teeth. In three of the exceptional cases, the ulceration existed on the under surface of the tongue at the side of the frænum; in one of these, the central lower incisors were absent; and in another, they were very stunted; in the third, the condition of the teeth is not noted. In another case, where these teeth were set widely apart and the right was more prominent than the left, the ulceration appeared only on the right side of the frænum. In the remaining two cases, it existed under the tip of the tongue anterior to the frænum, the teeth being normally placed. One child presented, in addition to the ordinary affection of the frænum, a longitudinal abrasion on the dorsum of the tongue, corresponding with two decayed and rough upper incisors."

The theory as to the nature and cause of this ulceration, upon which I do not agree with Drs. Morton and Elliott, is stated in the next quotation.

"Bearing in mind the peculiarities of situation and the limited character of this ulceration, the observation of children during the paroxysms of coughing, forcibly suggests to us that it is due to a purely mechanical cause, and is not, as some observers maintain, a specific eruption. In most children suffering from pertussis, the tongue is protruded from the mouth, and the frænum becomes stretched, and rubbed in a slightly sawing manner upon the lower incisors, during the succession of rapid violent expiratory efforts, with occasional imperfect inspirations, and the final *reprise* which constitute the paroxysm. By the frequent repetition of this action, abrasion or vesication, and then ulceration, are produced."

"This idea of the causation is supported by other facts observed, which tend to show that the phenomenon is in some way connected with the presence of the teeth. Thus it is very rarely, in my own experience never, found in children before the appearance of the teeth, although pertussis affects them as characteristically, and often as severely, before the period of dentition as after it. On the other hand, it may be present at the earliest age after the appearance of the teeth, several of the children in whom I found it being from eight to nine months, and two of them only seven months old. And further, if present at all in older children who have lost the lower central incisors, it is not

on the frænum, but on some part of the tongue corresponding with the prominence of a particular tooth or teeth."

Dr. Morton has found the ulcer in one case where the child had not yet cut any teeth, and it is quite possible to understand its production in the manner described by me, even without teeth, under peculiar conditions of frænum or gums. But this is certainly very rare, and I myself, out of hundreds of cases that I have examined, have not yet met with it. It may be urged that if the mechanical theory be correct, we ought to find the ulcer in a larger proportion of cases; but its production in any one case would depend on the form of the frænum, the condition of the teeth, the severity of the paroxysms, etc. The manner of coughing is also an important element. All children do not protrude the tongue between the teeth in the way described; especially is this so with older children, who exercise more voluntary control over their efforts, and accordingly we find it less frequent among them.

The value of this sign as an aid to diagnosis may be briefly stated. Not unfrequently, from imperfect description of symptoms, or the existence of complications, we may be left in doubt as to whether we have pertussis to deal with or not. In such circumstances, the discovery of this ulceration gives certainty to what would otherwise remain only a probability.

"For, even granting its cause to be mechanical, in the sense I have explained, it is such a very rare thing to find in a child a cough, other than pertussis, of such a nature as to cause it, that we may regard it as characteristic of that disease, and accept without much reserve Bouchut's dictum 'that a child which coughs, and has this ulceration on or near the frænum linguæ, certainly has whooping-cough'. It has not, however, an equal value as a negative sign; being found only in a certain proportion of the children suffering from pertussis, and not in all, its absence does not prove that the case is not one of that affection."

Those who are interested in the subject will find details in the paper from which these extracts have been made, and in the writings of various authors there referred to.

ATTEMPTED SUICIDE BY CHLORAL-HYDRATE: RECOVERY.

By HENRY TIZARD, M.D., Weymouth.

I WAS requested on August 15th, at 12.30 P.M., to see Miss —, who was said to have taken poison of some kind between 8 and 9 o'clock the same morning. I was told that Miss — had been suffering from religious monomania for some time, her particular delusion being that her sins were so many and so great as to leave no possible hope of her salvation. I found my patient in bed, lying on her back, apparently in a sound sleep; pulse 80, regular, but small; respirations 28 per minute; pupils moderately contracted, but not altogether insensible to light. She had vomited some viscid yellowish-looking fluid, having no perceptible odour; and a frothy mucus was constantly oozing from her mouth. The symptoms somewhat puzzled me; but I considered they pointed more to poison by some salt of morphia than by any other drug.

By placing strong solution of ammonia under the nostrils and very forcibly pinching her, I could slightly rouse Miss —; but, on desisting, she immediately relapsed into insensibility. I attempted to give her strong coffee by the mouth, but found that my patient could not swallow, the muscles of deglutition being apparently paralysed. The urgency of the case induced me to send for assistance; and, on Dr. Griffin's arrival, I suggested that we should use the stomach-pump and employ electricity, to which he assented; and, whilst the necessary instruments were being procured, the fauces were tickled with a feather, and we further attempted to give an emetic of sulphate of zinc, but without success. We then used the stomach-pump, finding but very little in the stomach, which was freely washed out with tepid water; and at the same time we employed a Maw's electro-magnetic machine. Mustard poultices were also applied to the calves of the legs; and a pint of strong coffee was pumped into the stomach, but this was very soon rejected. Coffee was also given by the rectum. After the persistent use of faradisation for about an hour and a half, we had the great satisfaction of restoring our patient to consciousness; and, when able to speak, she told me she had swallowed, at 8 o'clock, two ounces of Corbyn's syrup of chloral-hydrate. This syrup contains, as is well known, ten grains to the drachm; so that Miss — must have taken one hundred and sixty grains of chloral-hydrate—almost one hundred grains more than is considered a full or, in many instances, a very dangerous dose.

I cannot but think that faradisation was the chief factor in averting