and other observers. By the differences in the character of their flagella Nicolle and Morax divide the spirillum of cholera and its allies into three types:

Type I. A non-motile Indian spirillum from Koch's laboratory not having flagella.

II. Motile spirilla having flagella.

Type A. Having one flagellum at one end or two flagella one at each end. (Sources—Shanghai, Hamburg, Courbevoie, Seine water, and sp. Deneke.) Loeffler, Trencmann, Neuhaus, and Straus had already noticed this.

Type B. Having four flagella two at each end, or three at one end and one at the other, or having four at one end. (Sources—Massowah, Calcutta, Paris, 1884.)

They never found more than four flagella, and the flagella were often incomplete, being very fragile. They found the character of the flagella to be constant through successive cultures, after passing through animals and man and in the attenuation cultures described by Hueppe as resistant forms. They consider this constancy in the character of the flagella of some value as being the only means of differentiation of spirilla which are isolated from cases of cholera in different places, and analogous in their cultural and pathogenic properties. In *B. coli communis* they found a maximum of from eight to ten flagella, and these were much more fragile than those of the typhoid bacillus, which were ten to twelve in number. Lubsch⁶ says that *B. coli communis* has only one to three flagella, and the typhoid bacillus eight to twelve. My observations agree with those of the former observers, but possibly the organisms are different from those of Lubsch. At present therefore the character of the flagella does not afford a means of diagnosis between *B. coli communis* and the bacillus of typhoid.

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A MODIFIED GOLGI'S METHOD FOR THE STUDY OF THE HUMAN BRAIN.

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GOLGI's¹ original and later² methods give good results with young and embryonic animal brains, but not with adult or human brains. The following method, gradually evolved during the course of a systematic research with various modifications, has given in my hands good results, which are almost constant for the human brain. It is as follows:—

(a) Thin slices (2 to 4 mm. in diameter) of brain, with the pia-arachnoid intact, are suspended by a thread or a glass (or platinum) hook, in K. bichromate 2 p. c. — 95 cc., to which, after 10 to 15 minutes, add 5 c.c. of 1 p. c. osmic acid, keep in the dark for 24 hours, (b) then change into K. bichromate 2½ p. c. — 90 c.c., osmic acid 1 p. c. — 10 c.c., in which keep specimen (suspended) for 2 days; (c) finally change into Golgi's mixture of K. bichromate 3 p. c. — 80 c.c., osmic acid 1 p. c. — 20. The total fixation and hardening of 3½ days shows nerve cells and the two types of glia cells (fibre cells and protoplasmic cells) well; 4½ days show more nerve cells, especially cell bodies; 6 days are needed to show axis cylinders, nerve fibres, and collaterals. On an average it is well to have two specimens, hardened 3½ and 4½ days respectively; (d) rinse in distilled water for 1 or 2 seconds, and plunge into AgNO₃ solution (½ p. c.) in the dark for 5 to 15 minutes, (e) then change into 100 to 120 c.c. of AgNO₃ solution, to which 1 drop, not more, of formic acid has been added, and (f) place in incubator, in the dark, at T. of 25 to 27° C., changing it for fresh silver solution after 24 hours; (g) the total staining in the silver solution should be 3½ days or 4½ days respectively, often 3 days suffice; (h) rinse in methylated spirit and fix in wax, or spirit 15 min. followed by absolute alcohol 15 min, thin celloidin ½ hour, and fix on

cork; (i) cut under spirit; (k) pick out the best sections and place in large quantity of distilled water till nearly freed from spirit, about 5 minutes, (l) then place sections in ½ p. c. solution of AgNO₃ for ½ to 1 hour; (m) dehydrate in spirit, then in xylol-piridine, equal parts; (n) clear in xylol (twice), and mount, after blotting, in xylol dammar, without a cover-glass, hastening the process of drying by placing the slides in the incubator at T. of 37 to 40° C. for 1 day or a little longer. This procedure (n) is necessary, otherwise, even after months, the specimens may begin to spoil.

Successful preparations show the nerve cells and their processes down to their finest ramifications and endings, and the same holds with regard to the glia cells, both protoplasmic and fibre cells, and all these cell elements are sharply differentiated from one another and from the clear ground substance. Axis cylinders and collaterals are seen, somewhat abundantly, also nerve fibres ascending and ending freely by branching fibrils in the cortex. The method is applicable to brains provided *post-mortem* changes are not too advanced, or the tissue disintegrated or softened. Results obtained from human and animal brains have been noted in two previous papers, namely, *BRITISH MEDICAL JOURNAL*, July 29th, 1893, and *Internat. Monats. f. Anat. u. Physiol.*, 1893, Bd. 10, Heft. 11; in the latter of which the author gives special details for the study of the perivascular neuroglia in the human brain.

THE USE OF A COMBINATION OF CARBOLIC ACID AND CHLOROFORM IN ENTERIC FEVER.

By SURGEON-LIEUTENANT-COLONEL R. H. QUILL,
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In the early part of last year there appeared in the *BRITISH MEDICAL JOURNAL* two very interesting communications by Drs. Charteris and Wiglesworth, on the effect of the internal administration of carbolic acid in zymotic diseases. As bearing on the same subject, I venture to hope that the following remarks will be of interest to the readers of the *JOURNAL*.

In the year 1892, 24 cases of enteric fever were treated in the Station Hospital, Kirkee (India), with 9 deaths, that is, the high mortality of 37.5 per cent. In the year 1893, 18 cases of this fever were treated in the same hospital, with only 2 deaths, that is, a mortality of 9 per cent. Of these 18 cases, the last two were under my care from first to last. All recovered perfectly without complication of any kind, or occasion for anything beyond a minimum of anxiety.

None of these cases were diagnosed as examples of enteric fever without a consensus of opinion among the medical officers serving with me as to the unmistakable nature of the fever. All twelve cases had practically the same treatment. This communication being principally concerned with the medicinal treatment of enteric fever, I will not take up space with any remarks regarding the important details of diet and nursing, beyond saying that the greatest care was taken as to the suitability of the former and the efficiency of the latter. On admission, if the fever was within the first week, 3 grains of calomel was ordered at bedtime, and this dose was twice subsequently repeated at a few days' interval. The following combination of pure carbolic acid and chloroform was at the same time prescribed, and administered according to the following directions:

Five doses of the mixture to be given every second hour on the first day. Seven doses on the second day. Ten doses on the third and following days, until a distinct improvement is observed in the general condition of the patient, with a fall of temperature. The doses then to be gradually reduced to seven, five, and three in the twenty-four hours, until the medicine is finally abandoned.

It is important to continue giving the mixture in from three to five doses daily for at least a week after the temperature has fallen to normal; doing so renders the patient less liable to a relapse. The combination I advocate is composed as follows:

R. Acid. carbol. pur. (Calvert's) mxxxvi; spt. chloroformi 3ij; tr. cardamom. co. 3ij; syrup. hemidesmi 3ij; aquæ chloroformi ad 3xii. M. Ft. mistura. Sig. The carbolic mixture one ounce, with an equal quantity of iced water, every two hours as directed.

In past years carbolic acid has been more than once recommended as an intestinal antiseptic in enteric fever, but has been never generally adopted. I believe that this neg-

¹ Golgi, *Sulla fina anatomia degli organi centrali del sistema nervoso*, 1885-6.

² Sala, in *Zeitsch. für Wissensch. Zool.*, 1891.

lect would not have occurred had the acid been given in sufficient quantity. The usual plan of prescribing the acid in 2- or 3-minim doses three or four times a day is quite futile. To be effectual the acid must be given in full doses at short intervals, freely diluted and suitably combined.

In the series of cases treated by me several took a large quantity of carbolic acid before convalescence was established; yet in none were any ill-effects noticed which could be ascribed to the acid. One patient took, from first to last, over 2 ounces of carbolic acid, with the same quantity of chloroform, and in other cases $1\frac{1}{2}$ ounce of each of these drugs was taken; yet the urine never became black or anything approaching that colour; occasionally it became high coloured, that was all.

The combination of carbolic acid and chloroform was adopted for the following reasons. In 1892 Dr. McIntyre, of Glasgow, conducted some experiments in regard to the action of carbolic acid on the enteric bacillus (Gaffky's), and found that in addition to an antiseptic action on the intestinal contents, the acid controlled the development of the enteric bacillus. Previously to this, in 1890, Werner, of St. Petersburg, made similar experiments with chloroform, and found that a $\frac{1}{2}$ per cent. solution of chloroform killed the enteric bacillus.

Reflecting on these experiments it occurred to me that a combination of these drugs, both of which had a distinctive effect on the specific micro-organism of enteric fever, and one of which had as well a wholesome intestinal antiseptic action, ought, if given with judicious freedom, to be effectual in rendering immune the enteric bacillus and its septic products. So far my expectation has been realised.

I have treated with the carbolic acid and chloroform combination during the past year all the cases of enteric fever that have come under my care, and in each case perfect recovery has followed, without the advent of any symptom calculated to cause anxiety.

It is a gratifying experience to be able to make this record regarding a fever which, in India, has a mortality very considerably higher than that usually experienced in temperate climates.

The following are the effects I have observed as resulting from the use of the carbolic acid and chloroform combination:—1. A reduction in the average duration of the fever. 2. A continuous depression of the febrile temperature. 3. Early cleansing of the tongue, dryness of which was rarely observed, and was then evanescent. 4. An almost complete deodorisation of the stools. 5. Abdominal distension kept in entire abeyance. 6. Tendency to diarrhoea checked. 7. Intellectual clearness of patient preserved, with no tendency to stupor or delirium. 8. Secondary complication of any kind never occurred. 9. Relapses rare; when they occurred they were of short duration. 10. Food invariably well assimilated. 11. Convalescence rapid.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

A COMPLICATED CASE OF FRACTURE OF THE BASE OF THE SKULL.

As the following case has several points of interest, I send it to you for publication.

Miss G., aged 30, on December 13th, 1893, was thrown from a high dogcart, and struck her head on a kerbstone. She was unconscious for about ten minutes, and bled very profusely from a scalp wound, and from the nose and mouth. She was carried immediately into a house within a few yards of where the accident happened, and put to bed as soon as possible.

The following was her condition: There was a contused linear wound 3 inches long over the right temporal region, hæmorrhage from left ear, nose, and mouth, wounds over the bridge of the nose, and on the buccal mucous membrane on both sides of the mouth, severe ecchymosis of the right eyelid, and excoriations from gravel over the whole face. The pupils were equal, moderately dilated, and reacted to light.

She could answer "Yes" or "No" to questions, and would move any limb when asked to do so. She vomited a large quantity of blood one hour and a-half and again four hours after the accident, but there was no vomiting subsequently.

The bleeding from the left ear ceased three hours afterwards. It was accompanied by thin serous fluid, presumably cerebro-spinal, and after bleeding ceased about $1\frac{1}{2}$ drachm of this fluid escaped.

On December 14th, twitching of the left forearm, hand, and leg was noticed. There was ecchymosis of the left eyelid as well as the right, but no subconjunctival hæmorrhage. She complained of considerable pain and throbbing on the left side of the head and in the left ear. She could hear a watch tick with both ears. Smell and taste were lost.

On December 16th there was well-marked amnesia; she could not name simple objects, that is, spoons, pencils, etc. She called her eyelids her gums; did not know her right side from her left, but could remember matters foreign to herself and her condition. She could not sustain a conversation owing to loss of words.

On December 19th, for the first time, no recent bleeding was seen in the pharynx.

On December 22nd, crossed diplopia was first noticed. The false image was to the right and below; there was partial paralysis of left internal rectus and superior oblique muscles. Amnesia was slightly less marked. She realised for the first time that she had had some accident.

On December 30th, proptosis of the left eye was first noticed. This increased slightly for two days, and then gradually diminished, but had not entirely disappeared four months after the accident.

This condition is said by some authors to occur from third nerve paralysis, but as the paralysis had begun to improve, and the images to approximate before the proptosis occurred, it must have been due to other causes, probably a lesion of the cavernous sinus.

On January 22nd, 1894, she was removed home convalescent.

On March 12th, she was able to walk about the house, and got out daily in a bathchair. There was slight amnesia when excited, and she complained occasionally of nausea after exertion, but otherwise her condition was most satisfactory.

The temperature remained between 100° and 101° for the first nine days, and then gradually settled to normal, but did not become constant for at least two months. The pulse rose to 112 a few hours after the accident, and then settled to between 70 and 80. This remained very constant. Constipation was most obstinate for a month.

It is interesting to sum up the apparent injuries sustained: (1) A fracture of the middle and anterior fossæ of the base of the skull; (2) intracranial effusion, causing twitching of left leg and arm and proptosis of left eye; (3) injury to left third nerve causing crossed diplopia; (4) well-marked amnesia; (5) loss of smell and taste; and (6) severe scalp wound over right temporal region.

I consider that the severe hæmorrhage at first proved most beneficial, and lessened the chances of intracranial hæmorrhage. Well did Hippocrates say that no head injury was sufficiently slight to be disregarded or sufficiently severe to be despaired of.

Oxted.

EDWD. P. FURBER.

INCISED ABDOMINAL WOUND: WOUND OF INTESTINE: RECOVERY.

I THINK the following case is of sufficient interest to justify me in asking you to insert it in the BRITISH MEDICAL JOURNAL.

G. A. W., aged 7 years, fell down twelve steps, which are very steep, with an ordinary chamber utensil in his hand. At the time of the accident he had on only his shirt. The accident happened at about 7.45 p.m. on February 19th. When I arrived shortly afterwards I found the child lying on a couch, with a wound of about three to four inches in length, just above the anterior superior spine of the ilium, and from the wound about four feet of small intestine protruded. On examining the bowel I found a small wound, which was more or less circular, about the size of a sixpenny piece, through which a quantity of fluid fæcal matter flowed. The child was