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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¹ Koch, *Beiträge zur Biologie der Pflanzen*, 1877, Bd. ii, S. 419. ² Kuntler, *Comptes Rendus*, 1877, Tom. cv, p. 684. ³ Neuhaus, *Centralbl. f. Bakt.*, Bd. v, S. 83. ⁴ Trencmann, *Centralbl. f. Bakt.*, Bd. vi, s. 434. ⁵ Loeffler, *Centralbl. f. Bakt.*, 1890, Bd. vii, S. 630. ⁶ Lubsch, *Centralbl. f. Bakt.*, 1892, Bd. xiii, S. 437. ⁷ Van Ermengen, *Annales de la Soc. de Méd. de Gand*, 1893, June. ⁸ Rémy and E. Sugg, *Caractères distinctifs des bacilles de la fièvre typhoïde*, etc., Gand, 1893. ⁹ Klein, *Centralbl. f. Bakt.*, Bd. xiv, No. 14. ¹⁰ Nicolle and Morax, *Annales de l'Inst. Pasteur*, 1893, p. 555. ¹¹ Delépine, *BRITISH MEDICAL JOURNAL*, 1894, January 20th.

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.

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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.