HYDROA GESTATIONIS DUE TO STAPHYLOCOCCUS ALBUS.

BY

NATHANIEL W. HOLMES, and W. BULLOCH, M.D.,
L.R.C.P., L.R.C.S., L.M. Edin., Bacteriologist to the London
late Government Medical Officer, Hospital.
Australia.

THE following case is of interest owing to its occurrence at three consecutive confinements, and to the infrequency that one comes in contact with such cases, also the etiology as revealed by bacteriological examination by Dr. Bulloch.

Mrs. O., aged 26 years, was confined of her third child on October 28th, 1901, the following days she complained of severe itching in the palms of the hands and soles of the feet, extending up the forearms and generally over the whole body. There was redness of the palms of the hands and soles of the feet, and a thick elevated papular and confluent rash the size of peas with hardened bases on the backs of the hands, wrists, and on the flexor and extensor parts of the forearms, also on the knees. The rash on the thighs, chest, back, and other parts of the body was either isolated, confluent and semicircular, or clustered in round patches the size of a florin. Temperature normal. She informed me (N. W. H.) that she had suffered from the same thing at each of her two previous confinements and was most anxious to know what could be the cause of it.

The following day, October 29th, bullæ formed upon the wrists and forearms from the size of a pea to that of walnuts, fresh ones occurring daily here and there over the body and legs. Upon inquiry I could obtain no evidence pointing to syphilis in the family, and as the case resembled pemphigus (for which she was treated at a skin hospital for three or four months after the first confinement) some interesting cases of which were reported by Mr. Buxton Shillitoe,¹ and Drs. Hadley and Bulloch,² in which a diplococcus was found, I sought to investigate it further. At the age of 13 years she had a very bad poisoned foot and leg due to an injury to the sole of the right foot by a brass rivet from her boot, which has left a scar on the anterior surface of the leg, and about the same time she had diphtheria.

November 6th.—The pimples appeared on the chin and sides of the face, followed by numerous bullæ daily.

November 8th.—By the kind co-operation of Dr. Bulloch a bacteriological examination was made of the fluid from some recent bullæ, and a pure culture of staphylococcus albus was found.

November 12th.—Fresh bullæ appeared on the forearms, and on the 14th some became pustular, brown scars being generally left behind.

The patient improved daily, and the infant, which continued taking the mother's milk from birth, was quite free from any rash. The treatment consisted in the local application of lot. picis liq., internally a saline mixture with liq. arsenicalis, and latterly sulphur tablets only were prescribed. There has been no return of the disease for the past six months, and it will be interesting to note if there should be any recurrence.

REFERENCES.

¹ *Lancet*, November 26th, 1898, p. 1397. ² *Lancet*, May 6th, 1899, p. 1219.

NOTE ON A METHOD OF QUANTITATIVELY ESTIMATING THE PHAGOCYTTIC POWER OF THE LEUCOCYTES OF THE BLOOD.

By MAJOR W. B. LEISHMAN, M.B., C.M., R.A.M.C.,
Assistant Professor of Pathology, Army Medical School, Netley.
(From the Pathological Laboratory, Netley.)

THE question as to the relative value of the parts played by the fluid constituents and the cellular elements of the blood respectively in combating an attempted invasion of the system by pathogenic micro-organisms is still the subject of much experiment and discussion. I have thought therefore that the following preliminary note on a method of approximately estimating *in vitro* the part played by the leucocytes in this struggle for mastery may be of interest.

In the recent work which Professor Wright and others in this laboratory have been doing in the estimation of the bactericidal power of the fluids of the blood, a striking feature has been the extremely feeble power that these fluid constituents possess for the destruction of the common staphylococcus pyogenes, the spirillum of cholera, the micrococcus of Malta fever, and the bacilli of anthrax and plague, in comparison with that displayed for the bacillus of typhoid. Even when imitating the conditions of life as closely as possible *in vitro* with regard to temperature, anaërobiosis, the use of fresh blood serum as a diluting medium for the culture em-

ployed, etc., the results have proved almost completely negative; in other words, the blood fluids alone cannot be shown by experiments *in vitro* to have more than a trace of bactericidal power against these organisms. In the methods referred to the leucocytes have mostly been excluded by clotting or centrifugalisation and the clear serum or plasma used, so that the part played by these corpuscles, if any, has not been taken into account. The well-known phagocytic power of these white cells, though universally acknowledged, is allotted a very different value by the French and German schools respectively, and the method described below seems to promise a possible means of elucidating some of the many difficulties in determining the share taken by these phagocytes, especially if used as a supplement to an estimation of the bactericidal power of the blood fluids such as that of Professor Wright.¹ In any case the method has, I think, a certain value in the ease with which, *in vitro*, beautiful examples of phagocytosis may be demonstrated to and carried out by a class without the necessity for employing animals such as the frog, guinea-pig, or rabbit.

While the power of phagocytosis (the ingestion of living or dead germs or of particles of inorganic matter) is possessed in common by all the white cells of the blood except, with very rare exceptions, by the lymphocytes; the polynuclear or fine-grained eosinophilous cells are endowed to the greatest extent, and I have, partly on this account, partly because of their preponderating number, confined myself to determining their absorptive capacity, leaving out of account that possessed by the mononuclears and coarse-grained eosinophiles.

Briefly, the method aims at enumerating the number of bacilli or cocci phagocytized within a definite time by the polynuclear cells of the blood under examination, obtaining an average of these values, and comparing the result with that of a control blood, preferably that of the observer, put up under identical conditions.

An emulsion of a portion of an agar culture of the germ whose action is being investigated is first made in a few drops of normal salt solution in a watch glass. Even distribution of the germs is ensured by assiduous stirring with a platinum loop or needle, at intervals of a few minutes, until the emulsion presents an even turbidity. A well-marked but not too dense opacity is aimed at, and the culture used should be a fresh one. A well-polished microscope slide and a couple of perfectly clean cover glasses are prepared. A measured volume of blood is now to be added to and mixed with an equal volume of the emulsion of germs. This may conveniently be done by means of a small capillary pipette, fitted with an india-rubber teat and having a mark near the point corresponding to the desired volume. A little practice enables one to judge of the volume necessary to spread itself out in a thin even film between cover glass and slide; it is, approximately, 5 c.mm. A small drop of blood is obtained in the usual way by means of a needle prick, and one volume, or 5 c.mm., is at once taken up by the pipette and allowed to run slightly up to the tube so as to admit an air bubble to serve as an index; the pipette is then dipped in the emulsion of germs, and a similar volume (5 c.mm.) admitted. Both volumes are now blown out into a clean watch glass or on to a slide, and the blood and emulsion well mixed by stirring and drawing in and out of the pipette. One volume of the mixture is now taken up in the pipette and gently blown out on one end of the prepared slide and at once covered by a cover glass, very gentle pressure with the forceps being used, if necessary, to ensure the film spreading evenly to the whole circumference of the circle. A precisely similar preparation is then made of the control blood from the observer's finger, the drop being placed and covered at the opposite end of the same glass slide. The slide is now placed in a moist chamber, and left in an incubator at 37° C. for half an hour. As a moist chamber a Petri dish with a few layers of damp filter paper at the bottom may be used, the slide being placed in it, resting on a couple of wooden matches. The vapour condenses on the under surface of the slide and the walls of the dish, but not on the upper surface of the slide, which remains dry. A small amount of drying takes place at the edge of the cover glass, but the blood under it remains liquid for hours, and the phagocytes, by reason of the temperature and the close apposition of the two glass surfaces, have every facility for