many cocci in a great number of the pus cells, and yet the cultures obtained showed a marked paucity of colonies—under twenty on a Petri dish.

The meningococcus was also recovered from the blood in 3 out of 15 cases.

The blood was taken from the bend of the elbow; the skin having been washed with mercuric iodide, being prepared as for operation, then a sterile needle was introduced into the vein and about 10 c.cm. of blood allowed to run directly into 300 c.cm. of peptone water. This was incubated for twenty-four to forty-eight hours at 37°, and loopfuls were then smeared over chapsagar. The first successful case was that of a boy whose blood was taken on the eleventh day of his illness. He died sixty-three days afterwards. The second case was a girl of 15 years, whose blood was examined on the second day of illness; she died twenty-four hours afterwards. The meningococcus was still living in the flask of peptone water nineteen days after the blood was added.

In the third case the blood was taken on the fourth day of disease; this patient died ten days later.

SUMMARY.

The meningococcus in the present Belfast epidemic has so far been isolated from cerebro-spinal fluid in 52 cases out of 75 examined, and from the blood of living patients in 3 out of 15 cases.

The organism is Gram-negative, does not peptonize gelatine, produces indol, forms acid from glucose and maltose, but not from galactose, gas is never produced, grows well in media containing raw ascitic fluid, lives for at least a week on "chapsagar," lives from two weeks to a month on ascitic bouillon, lives for two weeks to two months in fluid sugar media.

We are very greatly indebted to Drs. Ernest H. M. Milligan, W. J. Leighton, and Wm. Patton, house-physicians at the fever hospitals of Belfast, for supplying us with most of the lumbar-puncture fluids, and especially for the promptitude with which the samples were sent to the laboratory. To Dr. Gardner Robb, chief physician of the fever hospitals, we wish to extend our sincere thanks for many favours.

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THE RÔLE OF THE VARIOUS ELEMENTS IN THE DEVELOPMENT AND REGENERATION OF BONE.

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[Abstract of a Paper communicated to the Royal Society.]

THE present inquiry has been undertaken with the view of obtaining data, chiefly by direct experiment, as to the rôle which the various elements play in the development and reproduction of bone. This communication deals with a part of the subject under two heads: A, the potentiality of the periosteum as a factor in the production of bone; and B, the regeneration of bone from proliferation of osseous tissue. The following is a brief summary of the paper:

A.—POTENTIALITY OF PERIOSTEUM AS A FACTOR IN REPRODUCTION OF BONE.

(1) To test this, a complete cylinder, constituting a portion of the shaft of a long bone, was removed while the periosteum was preserved intact. This showed, ten weeks afterwards, an osseous defect, constituting a gap in the continuity of the shaft.

(2) Periosteum free from osseous plaques was removed and transplanted. This was not followed by reproduction of bone, but by absorption of the periosteum.

(3) Duhamel's silver ring experiments are discussed, and the correctness of the deductions drawn therefrom are questioned.

In order to test whether the bone cells or the periosteum produces the bone which covers the silver rings, three experiments, each differing from the other, were performed, in which silver rings were placed on bone deprived of its periosteum, with the result that in each case the rings became covered with bone.

B.—THE REGENERATION OF BONE, FROM PROLIFERATION OF OSSEOUS TISSUE.

The periosteum is shown to be a limiting membrane controlling the osteoblasts, as illustrated in fractures, when the periosteum is intact and when it is torn. The production of callus is not inherently greater in the lower animals than in man—the amount of callus in both depends on the limitation of the periosteum and the amount of movement. (4) Direct experiment, showing that a long bone deprived of its periosteum continues to grow; (5) so also do the flat bones of the skull. (6) Bone may be made to grow in the midst of lacerated muscles by the mechanical distribution of osteoblasts. Observation. Rider's Bone. Suggestion as to the production of myositis ossificans.

(7) Can shavings of nude bone grow on being placed between muscles in a gap in the continuity of the shaft? Experiment and result seven weeks after show that not only do they grow but that they also proliferate to a very marked extent.

Is there any direct evidence to show that transplanted living bone actually grows and proliferates instead of forming, like blood clot, a passive framework for the granulation tissue to penetrate, which framework will then become absorbed? There is, as may be illustrated (8) in an instance of bone grown in sponge filled with granulation tissue.

(9) To test the osteogenic power of bone cells constituting the shaft of a long bone, they were grown inside of a glass tube. Result.

(10) Intrahuman transplantation of bone. Result 28 years after. Data are obtained from this experiment as to the growth of the humerus from the proximal and distal epiphyseal cartilages respectively. Also as to interstitial osseous increase—evidence of the increase in length of the diaphysis from the epiphyseal cartilage toward which the nutrient vessel runs.

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL.

DYSTOCIA FROM ENCEPHALOCELE.

BEING summoned to Mrs. X., 38, 8-para, I found her in the second stage of labour, with inefficient pains. The child was in the fourth face position, and the waters that had come away were meconium stained; no sign of fetal life was made out. Rotation by hand and subsequently by forceps—under chloroform—failing, podalic version was done with much difficulty, being obstructed by a curious fluctuating tumour near the head. While preparations were being made to exercise traction on the after-coming head, a sudden sharp uterine pain shot it out, accompanied by a gush of sanious fluid and the disappearance of the "tumour" from the uterus. The swelling was then seen to be due to a large encephalocele. The child was dead. The mother subsequently did well.

Necropsy.—Full-time female child, normal size; very thick neck and small chin. Fronto-parietal part of skull normal in size; occiput smaller than usual. From occiput there sprang mesially a large encephalocele, which when empty and pendent reached to the sacrum, and without undue expanding held some 30 oz. of water. The sac walls were formed of skin, brain membranes, and thinned-out and expanded brain-cortex. The sac cavity was in free communication with the cerebral ventricles, by an opening roughly circular in shape and 1½ in. in diameter. The cerebral tissue entering into the sac formation appeared to consist of occipital lobes only; the remainder of the cerebral hemispheres was of normal size. The tentorium was absent. The cerebellum was represented by a peculiar tongue-shaped prolongation (perhaps the vermis only) extending 2 in. downwards on the dorsal aspect of the cord. Sections taken from this process, when cut and stained, showed a modified cerebellar tissue. All the organs of the body were examined, but no other abnormality was found.

REMARKS.—The mother informs me that three and a half years ago she had, what must have been from her description, a similar pregnancy, being a male child with a frontal meningocele, the size of a large orange. Her description of the child indicated also a spina bifida in the dorso-lumbar region, a small apple in size. This child lived seven weeks. Between these two abnormal pregnancies a healthy (girl) child was born, and is now 2 years old. No