that had been found to be satisfactory, and on December 7th tried a new brand in 6 cases. To our surprise all of these gave negative results, a finding that was shown, by comparison with some that Dr. Noguchi kindly placed at our disposal, to be due to impure butyric acid.

The second test referred to is as follows: 2 c.cm. of a saturated solution of ammonium sulphate are placed in a test tube, and 1 c.cm. of the cerebro-spinal fluid is gently run on to the surface in the way done in the Heller nitric test for albumen. The formation of a ring at the junction of the two liquids constitutes a positive reaction. The ring is clear-cut, thin, greyish-white, and has the thickness of a thin piece of paper. It should form within three minutes, and within half an hour it may be observed that the surface of the ring shows a delicate mesh appearance resembling a fine cobweb. Indirect illumination must be used, or it may escape detection. For this purpose we have constructed a black-lined box into which the test tube can be inserted and viewed at right angles to an electric bulb which is fixed within the box a few inches away. In applying the test it is essential to see, first, that the ammonium sulphate is pure, so that the solution is neutral and not acid; and, secondly, that the solution is quite saturated, which is best ensured by the use of heat in its manufacture.

We come now to the question of results. Up to the present we have examined only 27 cases, but the paucity of our material is partly compensated for by the uniformity of our findings, which has encouraged us to believe that the tests in question will prove to be of considerable utility.

The Noguchi test was applied in 15 syphilitic cases and 12 non-syphilitic. It was negative in all of the latter except in 1 case of tuberculous meningitis. Among the negative cases were 5 of dementia praecox and 4 of tumor cerebri, conditions which are frequently very difficult to distinguish from general paralysis. Among the 15 syphilitic cases were 12 untreated and 3 treated cases. None of the latter gave a positive reaction, while all of the former did so. The 12 positive cases comprised 3 of tabes, 5 of general paralysis, 1 of tertiary syphilis, and 3 of syphilis of the nervous system. The test was thus positive without exception in all cases of syphilis or parasyphilis that had not had recent treatment, and negative in all other cases examined.

The effect of treatment was shown not only by the non-reaction of the cases under treatment, but also in the disappearance of the reaction seventeen days after initiating treatment in a case that had previously shown a marked positive reaction. It is known that there is an excess of proteid in the cerebro-spinal fluid in no chronic disease of the nervous system apart from syphilis, and that agrees with our findings. In cases of acute infection, on the other hand, there is often an excess of proteid present, whatever be the nature of the infection. This was so, for instance, in the only case of this kind—one of tuberculous meningitis—that we have been able to examine.

The ammonium sulphate ring test was applied in all of the above cases except two of tabes. The results agreed absolutely with those obtained by the Noguchi test, being positive whenever this was positive and negative whenever this was negative, so that the list of cases need not be repeated. The amount of proteid present in normal cerebro-spinal fluid is insufficient to give a ring with ammonium sulphate, though it commonly gives one with pure nitric acid. In general paralysis the amount is increased tenfold, and far exceeds that reached in any other disease, except of course acute meningitis. In the differentiation of general paralysis from syphilis with no nervous manifestation, we would rely not on the mere excess of proteid in the former, for that occurs in both conditions, but upon the striking extent of the excess. This can be roughly estimated with the ammonium sulphate ring test in three ways—by noting first the density of the ring, secondly the time that elapses before its appearance, and thirdly by the dilution with which it appears. The last point has greatly interested us, particularly, however, in connexion with the globulins of the blood serum in syphilis, a matter with which we are not here concerned. Our observations on the point are as yet incomplete, but it would seem that we have in the dilution test a means of readily estimating the amount of globulin present, and therefore the degree of certainty of the

diagnosis. We have several times, for instance, obtained a positive reaction in fifteen minutes after diluting the cerebro-spinal fluid eightfold, a phenomenon that certainly never occurs in the normal.

To sum up, we consider that we have in the Noguchi reaction and in the ammonium sulphate ring test two new methods of considerable value for readily recognizing an excess of globulin in the cerebro-spinal fluid, and thus for determining the presence of some parasyphilitic affection of the nervous system.

TREATMENT OF FACIAL PARALYSIS DUE TO MASTOID DISEASE OR TO THE MASTOID OPERATION.

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In the performance of a series of mastoid operations one is certain sooner or later to have the misfortune to divide the facial nerve during the course of the operation—it has occurred to me three times in over one hundred operations—as it may be found either completely exposed or surrounded by granulations, the curetting of which may completely sever it; or the paralysis may be present before operation, due to destruction of the nerve by the diseased process.

As far as I am aware, the treatment hitherto adopted has been facio-spinal accessory, or facio-hypoglossal anastomosis, the latter being the favourite. I have had two of the latter, and both were successful as far as recovery of the facial muscles was concerned; but the resulting disfiguring scar was objectionable, and the thought occurred to me of trying to join the two ends of the divided nerve in the course of the aqueduct of Fallopius at the site of injury. The following is a short summary of a case which was shown, together with one of my facio-hypoglossal cases, for the purpose of comparison at a meeting of the Stourbridge and District Medical Society on February 18th last:

John P., aged 5, admitted to the Walsall and District Hospital on May 12th, 1908, with chronic middle-ear suppuration and symptoms of cerebral irritation. The mastoid was opened on May 13th, and was found to be extensively diseased, a large part of the outer wall of the lateral sinus being covered with foul granulations. In following out the diseased bone the facial nerve was divided and recognized as such at the time of the operation, and upon recovery from anaesthesia the whole of the side of the face was completely paralysed. The operation was finished in the ordinary way, the wound being stitched up at the back, and the external meatus being thrown into the general cavity. The idea of end-to-end anastomosis occurred to me, and upon the second day after operation the child was again anaesthetized, the wound at the back reopened, the severed aqueduct exposed, and the proximal and distal ends defined, the distance between them being about from $\frac{3}{4}$ to $\frac{1}{2}$ in. As a scaffolding for the regenerating nerve silkworm gut was used, as it was thought it would better resist the phagocytic action of the tissues, and by its rigidity be more easily introduced into position, and retained there during subsequent dressings. A piece $\frac{1}{2}$ in. longer than the interval between the two openings in the bone was used, $\frac{1}{2}$ in. being inserted into each end of the bony canal. The case was dressed daily for a period of one month through the wound at the back, which was not again closed, mainly for convenience in dressing, but also for better drainage. The whole of the area of the anastomosis was carefully covered at each dressing with gutta-percha tissue to prevent any disturbance to the underlying silkworm gut, until the latter became covered with granulations. The battery was used from the first, but no movement of any kind could be produced by the patient for three months, when slight movements of the alae nasi of the affected side were observed upon forced sniffing, the other facial muscles afterwards gradually coming into use. The child was discharged on September 11th, with the wound epidermized and clean, a small fistula remaining behind the ear leading into the operation cavity. The boy has now recovered his normal expression when at rest, and when his facial muscles are thrown into action it is difficult to tell that there has been any facial paralysis at all.

I think I can lay claim to originality in this method of treatment, but I bring it forward for two reasons: first, because of the avoidance of an unsightly scar, which is no small matter in the case of a girl, and which is inevitable in the facio-hypoglossal method; and, secondly, because—as far as my experience of the latter operation goes—of the longer period of time taken for recovery of

the paralysed muscles, which, I think, is due to the fact that for union with the hypoglossal one has to wait until the operated ear has become quite clean and healed, as asepsis is here essential to success, whereas in the method above described repair of the nerve may commence at once.

The operation, also, is no more difficult than the facio-hypoglossal anastomosis; indeed, I believe it to be the easier of the two, for the recognition of the atrophied facial has been to me a matter of considerable trouble, and the difficulty of keeping the operated surface aseptic during the operation is also very great, the anaesthetist being necessarily more or less in the way the whole time the search is being made. The dissection of the hypoglossal nerve, however, is certainly easy, but the greater ease with which the already more or less exposed bony canal in the mastoid—much larger than the atrophied nerve in the substance of the parotid—can be recognized renders this procedure the simpler of the two.

EPIDERMOLYSIS BULLOSA.

THREE CASES: WITH HISTORY OF THE DISEASE IN FOUR GENERATIONS OF THE SAME FAMILY.

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EPIDERMOLYSIS BULLOSA, sometimes described as congenital traumatic pemphigus, though a somewhat uncommon complaint, is one of considerable interest.

It is characterized by an extraordinary vulnerability of the skin, so that on the slightest injury superficial bullae are produced, which are often of considerable size and occasionally haemorrhagic.

The condition is present at or soon after birth, and generally persists in varying degrees of intensity throughout life. It seems to be in nearly every case congenital, and usually, though not always, hereditary.

A case has been reported in which the development of the disease was apparently even antenatal.¹ There were at birth firm adhesions of various parts of the body, which had to be separated by operation, and on the sites of which bullae appeared within a few weeks, and continued to some extent throughout life.

In the *Lancet* of August, 1893, under the heading Congenital Traumatic Bullous Disease, Payne² sums up the characters of the affection thus:

1. Bullae, varying in size, are produced on various parts of the body by friction or any injury, but not otherwise.
2. The bullae are often haemorrhagic.
3. The nails are often affected by similar injuries, becoming deformed or even quite destroyed.
4. There is no disturbance of the general health.
5. The affection is congenital, or at least dates from infancy, and sometimes occurs in several members of the same family; and
6. It is quite unaffected by drugs or other treatment, though its severity seems to depend partly upon the state of the general health.

The etiology is uncertain. Tilbury Fox³ classed his cases with ichthyosis; Kaposi,⁴ Lustgarten,⁵ Norman Walker,⁶ and others with urticaria; and Crocker,⁷ in common perhaps with the majority of the more recent observers, described it as a form of pemphigus.

Various constituents of the skin have by independent observers been found to be altered, deficient, or absent. Engman and Mook,⁸ followed in this country by A. F. Savill⁹ and others, have found the elastic tissue in the papillary and subpapillary regions defective; Elliot¹⁰ an imperfectly developed stratum basale; and Bukovsky¹¹ a loss of continuity of epidermis and corium.

Petrini-Galatz,¹² and others favour a peripheral nervous origin, on the analogy of the changes in tropho-neurotic leprosy; whilst Blumer¹³ compared the affection with haemophilia, pointing out that both diseases are congenital and hereditary, and both due to defective formation of the blood vessels, "dysplasia vasorum," but that in the one bleeding occurs, whereas in the other merely exudation.

The fact that the bullae are always more prominent in warm, moist weather would seem to indicate an "acquired or hereditarily exaggerated irritability of the cutaneous

vascular system." The exudation appears to vary in position, not only in different subjects but in different parts of the body of the same subject.

Another interesting feature fairly constantly reported is the presence of small groups of milia—little yellowish, cyst-like bodies—round the edges of bullae or of scars from previous bullae. In none of my cases was this condition prominent, but detailed accounts, with diverse hypotheses as to their nature, may be found in reports of cases published by Darier,¹⁴ Grouven,¹⁵ Csillag,¹⁶ Petrini-Galatz,¹⁷ Beatty,¹⁸ Scott,¹⁸ and others.

Table 1.—Showing the incidence of epidermolysis bullosa in the family.

The chief interest, perhaps, in the cases under consideration is the evidence of heredity. A definite history has been obtained of blisters lasting more or less throughout life in 6 persons, representing four generations in direct descent, of whom 3 are alive to-day, and form the subject of this paper.

The exact family record can be traced back through nearly two hundred years and embraces six generations, though in neither of the two earlier generations can any information, either positive or negative, as to its incidence be elicited.

Table 2.—Showing that Eliza G. (the youngest of seven children) married twice, but did not transmit the disease to her children or grandchildren by her second marriage.

In the "third" generation only one member is definitely known to have suffered from persistent blisters throughout life, and from him this weakness in the skin has been transmitted to the cases now recorded.

In the diagram the genealogy will be seen at a glance, the members definitely affected being denoted by black discs, those definitely free by the clear discs, and those about whom the evidence is doubtful or negative by the crossed discs.

Norman Walker⁶ states that the disease, like some other hereditary complaints, often affects only one sex in a family; but in this instance no such regularity is found,