tered and incisions made dorsally and ventrally over the distal interphalangeal joint, but only a bead of pus was liberated. Further incisions were made two days later without finding pus. The temperature had now risen to 103° and the patient had acute pain, was extremely weak and had lymphangitis to the level of the shoulder. A mixture of tincture of digitalis and liquor strychninae hydrochloratis was given every four hours and morphine at night.

On May 9th the pus yielded a pure culture of streptococcus, and 10 c.cm. of antistreptococcal serum (Parke Davis) were injected into the left flank at 6 p.m. The temperature at time of injection was 103.8°. The same evening the patient had a severe syncopal attack, but it passed off after brandy had been administered. The following day another injection of 10 c.cm. of serum (Parke Davis) was given into the right flank, and two incisions were made over the metacarpo-phalangeal joint, and again the next day another 10 c.cm. of serum, this time of the Lister Institute.

From this date the patient's general condition steadily improved, with the exception of a second severe syncopal attack on May 12th after a soap enema. No serum was injected after May 11th.

x = time of injection of antistreptococcal serum (10 c.cm.).

The various incisions soon closed with the exception of that on the palmar surface of the metacarpo-phalangeal joint, from which pus continued to discharge in spite of gauze drains, hot fomentations, hydrogen peroxide spray, hot boracic, carbolic and mercury perchloride baths. The finger remained exceedingly painful, especially at the interphalangeal joints, and grating on movement was observed. Ethyl chloride was applied locally, and a dorsal incision made again down to the bone over the mid-interphalangeal joint to see if any deep pus was present. None, however, was found.

About an inch and a half of the tendon of the flexor sublimis digitorum sloughed out on May 27th, followed three days later by about $\frac{1}{2}$ in. of the tendon of the flexor profundus, and the finger was then amputated at the metacarpo-phalangeal joint after the discharging wound had been well swabbed out with pure carbolic; a rubber and gauze drain was inserted on the palmar surface, the wound being otherwise sewn up.

There was considerable pain on the day after amputation, and on the second day oedema to the level of the wrist. All the stitches were consequently removed and the wound was allowed to gape. Very thick and gelatinous pus was discovered. Hot boracic fomentations were applied every two hours. The rate of coagulability of the patient's blood was now found to be very much above the normal, and he was accordingly given citric acid (gr. xxx) with syrup of lemons (℥ xl) every four hours for two days. After an interval of two days citric acid was again administered and then an extraordinarily rapid recovery ensued. The wound healed completely, and although it was by granulation, it appeared almost as though it had been by primary union. During convalescence the patient peeled as though recovering from scarlet fever.

Since his illness the patient has been able to operate, thus showing recovery of the use of his hand minus the finger. He has also been on a walking tour, but finds some shortness of breath on going up hills, due probably to some myocardial degenerative change from which recovery is as yet incomplete.

The especial features about the case are: (1) The extreme virulence of the infection. (2) The general symptoms became progressively worse until the use of the antistreptococcal serum, which almost at once acted beneficially. (3) Brandy was without doubt of great benefit when given in the two syncopal attacks, but, when the patient was given brandy four-hourly, it was found to raise both temperature and pulse, and made him more restless, and was therefore discontinued. (4) That, although the temperature and pulse had been normal or subnormal for nineteen days after the abatement of the general symptoms, yet, when the amputated finger was examined, it was found that not only had all the cartilage of the interphalangeal joints been eroded, but the bone was also eroded into the cancellous tissue, thus

proving that temperature and pulse in such a case are no guide to active disease, but that the presence of continuous pain is far more important. (5) The citric acid mixture proved of wonderful efficacy in lowering the abnormally high coagulability of the blood, and seemed directly responsible for improving the character of the pus, and bringing about the rapid and thorough recovery of the wound.

THE POST-MORTEM STATISTICS OF MIDDLE-EAR DISEASE IN YOUNG CHILDREN.

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THE frequency of middle-ear disease amongst apparently healthy children is well known. Cheate, examining 1,000 school children, found that 335 of these had a discharge from one or both ears. That such a condition constitutes a menace to the health of the child, and that it may lead to fatal cerebral complications, is universally admitted. The results of investigations in the post-mortem room as to the frequency of these cerebral complications and the relationship which middle-ear inflammation bears to other diseases are, however, not so well known. It was in the hope of adding to our knowledge on this subject that I have been investigating these questions by observations on the material at my disposal at the General Hospital during the last twelve months.

The material comprises 50 cases in children whose ages varied from 12 days up to 4 years. In every case the middle ear was opened through the "tegmen tympani." If the fluid in the cavity was clear no further examination was made. If pus were present, or if there was a doubt as to its presence, films were made and stained for bacteria. The presence of considerable numbers of polymorphonuclear leucocytes along with organisms was taken as the criterion for the existence of an acute inflammatory condition of the middle ear (suppurative otitis media). In most cases, however, there was no difficulty, pus welling up at once on the bone being ruptured.

Out of the 50 cases examined, 37 showed pus in one or other or both middle ears. In 20 of these the disease was bilateral; in 11 of the remainder the condition was restricted to the left side.

Previous observations on this question are not numerous. Preysing¹ gives the results of an examination of 100 children whose ages varied from 1 day up to 3 years, and who had died from various causes. Of these, 81 showed middle-ear disease, which was bilateral in 73. Bacteriological examinations brought out the fact that by far the most common organism present was the pneumococcus. Out of 121 positive results, Preysing found the pneumococcus present in 112.

Although cultural methods were not adopted in my own series, a Gram-positive, lanceolate, and capsulated diplococcus was found in practically all the films examined. Further, in 3 cases of acute miliary tuberculosis tubercle bacilli were found along with diplococci. This predominance of the pneumococcus does not appear to obtain when all ages are included. Supple² states that in a series of cases of middle-ear disease examined clinically, the *Streptococcus pyogenes* was found in 50 per cent. of all cases, but only in 30 per cent. of cases under 10 years, whereas the *Streptococcus lanceolatus* (pneumococcus) was found in 18 per cent. of all cases, and in 85.7 per cent. of cases under 10. We may therefore assume that, although not the commonest organism in otitis media of adults, the pneumococcus predominates in children, and that this predominance becomes more marked the younger the age limits selected.

With regard more particularly to the age of the children in my series, 43 were under 2½ years, 32 were under 1 year, and 17 under 6 months; 1 was only 12 days old, and yet showed bilateral otitis media.

The relationship of the cases with middle-ear disease to other pathological conditions is of considerable interest. Meningitis was found in 10 cases out of the 50; 8 of these showed middle-ear suppuration. Four out of the 10 were cases of pneumococcal cerebro-spinal meningitis, and in all these cases suppurative otitis media existed

with a Gram-positive, lanceolate diplococcus present in the pus. One was a case of tuberculous meningitis, and in the left middle ear tubercle bacilli along with a Gram-positive diplococcus were found. There were no cases of sinus thrombosis or of cerebral abscess, although I had several such in children over 4 years of age.

Five of the cases had enteritis or colitis put down as the cause of death, and 4 of these showed otitis media. Preysing lays stress upon the association of diarrhoea with middle-ear suppuration, and considers that organisms absorbed from the ear may be carried to the intestines, and set up inflammatory changes there. Such a method of infection is not improbable, but a more direct path would be the intestinal tract itself.

The most constant concomitant is undoubtedly bronchopneumonia. Out of the 50 cases 37 showed bronchopneumonia, and out of the 37 cases with middle-ear suppuration 29 showed this condition. Thus pneumonia was present in 74 per cent. of the cases, and in 78.3 per cent. of cases with middle ear disease. This connexion between middle-ear disease and pneumonia is not generally recognized. Stacey Wilson¹ lays stress upon it, and records a series of 71 cases of pneumonia, occurring in individuals between the ages of 3 and 25 years, in which 8 per cent. showed well marked otitis media clinically. Out of 7 fatal cases the middle ears were examined in 5, and of these 3 had suppurative otitis media. He considers that there are four ways in which the two conditions are related (1) the merely accidental occurrence of pneumonia in a child with otorrhoea; (2) otitis secondary to pneumonia, which he regards as the commonest relationship; (3) otitis media the primary manifestation of pneumococcal infection; and (4) an ordinary attack of otitis media giving rise to general pyaemia accompanied by pneumonia of the ordinary septic type.

Preysing found pneumonia present in almost all his cases, and he considers that it represents an infection of ear and lung at one and the same time from mouth or nose. My own observations, as already stated, show a large majority (78.3 per cent.) of cases of young children dying with bronchopneumonia as the only or as a prominent condition present in which there is at the same time suppurative otitis media. It would seem, from the investigations of Preysing and Supfle, that the pneumococcus is the predominant etiological factor in middle-ear disease of young children. It is difficult from *post mortem* observations alone to be certain upon this point, but my own impression is that—at least, in a majority of cases—the lung lesion is of more recent date than the inflammation of the middle ear. The lesion in bronchopneumonia of young children represents such a very early stage of the inflammatory reaction that a purulent condition, such as that of otitis media, is almost certainly of earlier origin. In other words, the suppurative otitis media probably precedes the pneumonia, the middle ear forming a nidus where the pneumococcus acquires a heightened virulence. This organism exists in the mouth and throat of a considerable proportion of healthy individuals, but its virulence is of a low degree. By way of the Eustachian tube, it gains access to the middle ear, where it can, and apparently does in a large proportion of children, produce suppurative inflammation. The passage of the organism, greatly increased in virulence, down the Eustachian tube and into the air passages is a natural sequence. If this view be correct—and it is true in a percentage of cases, in the opinion of Stacey Wilson—then the menace of middle-ear suppuration to the life of the child is greatly increased.

REFERENCES.

¹ Otitis media der Säuglinge, *Schmidt's Jahrbücher*, 1906. * *Centralbl. f. Bakt.*, vol. xlii, p. 414. * *Birmingham Medical Review*, July, 1901.

THE late Dr. William Jacks, of Callander, N.B., who died on August 9th, bequeathed £1,500 each to the Glasgow Royal Infirmary, the Western Infirmary, Glasgow, and the Royal Hospital for Sick Children at Glasgow; £500 to the Glasgow Samaritan Hospital for Women, and £250 to Sunderland Infirmary.

THE German Central Cancer Research Committee has invited the Russian Medical Council to establish a Cancer Committee which could be affiliated to the International Association. A Committee consisting of Professor Podwysotski, Director of the St. Petersburg Institute of Experimental Medicine, and Professors Sirotinin and Trojanoff, members of the Medical Council, has been appointed to report on the matter.

OBSERVATIONS ON BLOOD FILMS, WITH SPECIAL REFERENCE TO THE PRESENCE OF HAEMOCONIA.

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BEFORE describing the observations I have made on fresh blood films I should like to refer any one interested in this subject to certain articles which have appeared recently, as I feel they have a certain relationship to the above.

In the *BRITISH MEDICAL JOURNAL* of March 17th, 1906, there is the report of a demonstration by Dr. H. Charlton Bastian on the origin of life, with the question, Could bacteria be made to appear where previously they were non-existent? In the *BRITISH MEDICAL JOURNAL* of May 5th, 1906, Surgeon H. C. Ross wrote on the diffusion of red blood corpuscles through solid nutrient agar; in the *BRITISH MEDICAL JOURNAL* of December 1st, 1906, there is a paper on the virus of small pox *v. vaccinia*, by W. E. de Korté; in the *Lancet*, December 24th, 1904, on haemoconia, by Dr. A. Love; and in the *BRITISH MEDICAL JOURNAL* of November 16th, 1907, on some motile elements seen in certain cerebro-spinal fluids, by Dr. Frank C. Eve.

My observations were made on blood films taken from persons who were apparently healthy, and I employed the following method in every case:

The point of the little finger or lobe of the ear is sterilized in the usual way, a puncture is made, and the first drop of blood discarded. A cover glass and slide thoroughly cleansed and sterilized are at hand, the drop of blood is lightly touched with the centre of the cover glass, and is immediately inserted on the slide film downwards. This is at once protected from the air by rubber solution. The solution I use is the one employed for mending bicycle tyres, as I find it lasts better than vaseline and the film is kept steadier. Care must be taken not to put on the solution until it slightly thickens, as it will tend to run below the cover-glass and spoil the film. I paint on a fresh coat daily to insure as great protection from the air as possible. I try to get as thin a film as possible. I find that a film so protected will last till disintegration is almost complete, about the eighth or ninth day. The film is kept at ordinary room temperature, is examined with an oil immersion lens, and a clear strong light is essential.

The appearances noted after the film is prepared are:

First Day.

Red corpuscles run into rouleaux and appear pale salmon pink. White cells appear greyish-blue, the nuclei are distinct, indistinct, or invisible. A few of the red cells are crenated with fine hair-like processes, the matrix of these cells is apparently finely granular, and under certain optical conditions these granules are highly refractile and of a bluish tinge. These cells appear to move by a pendular or rotary movement of the whole body. The so-called "blood" platelets can be seen as highly refractile round, egg-shaped, or indefinite-shaped bodies, which quickly aggregate or coalesce as a granular mass, and appear of a greyish-blue colour. In the intercorpuscular spaces other moving bodies are to be seen of varying shapes and ranging in size from a small micrococcus to a small microcyte. I have attempted to classify these bodies into five groups according to their shape and size, but I may here state that I have not found all present in every blood film, though I have found the five species in one film. Some films contain (on the first day) very few, and it requires long careful search to find them, while in others they are numerous.

1. The largest of those bodies appear greyish-blue and possess flagellae, are of indefinite shape, and apparently move by the twisting of the whole body or a rotary movement.

2. Bodies of the size and resembling a large diplococcus with the power of rapid movement.

3. Bodies of indefinite shape, from 2 to 4 μ . These have slower movements than Group 2. At times they resemble dumb bells, at other times they appear as thin protoplasmic rods, and, again, they appear with a knob-like process at one end, while the rest of the body is like a tail. They are not unlike a tadpole in appearance, and