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

move by a lashing of the tail. At times, however, they assume so many varying shapes that it is impossible to describe them.

4. Small, round, vesicular bodies, highly refractile, with a central spot, ruby in colour. These bodies are usually at rest, though I have observed slow movement occasionally.

5. Small micrococcal forms, clear and highly refractile, and with the power of very rapid movement. They are never at rest, and appear to have the power of endless motion—a swift, tremulous movement, scintillating like heat rays. (All these bodies have been called “haemoconia,” but their exact origin has never been definitely settled.)

Second Day.

Rouleaux have disappeared. The crenated corpuscle with the fine hair-like processes are now as numerous as the normal corpuscle, and appear to possess a tremulous movement. The uncrenated corpuscle is becoming faintly granular. No. 5 group of haemoconia are more numerous.

Third Day.

Much the same appearance as the previous day; all forms of haemoconia are more numerous and as freely motile as on the first day. Red corpuscles appear to be losing their colour and becoming fainter; the white cells appear to be unaffected.

Fourth Day.

It is apparent that the corpuscular elements are fewer in number. The crenated corpuscles have not so marked tremulous movement. The white corpuscles are becoming irregular in outline and more granular, the nuclei are more distinct. In the spaces there is a large amount of debris composed of irregular masses, some of indefinite shape, greyish-blue in colour. In places there are highly refractile bodies resembling the so-called blood plates. There are also irregular, indefinite-shaped bodies which appear under certain optical conditions as granular, blue in colour, sometimes highly refractile, and which have the power of tremulous movement, slow and rapid alternately. The haemoconia, especially Group 5 (which might be appropriately termed haemococci), are more numerous. It is clearly noticeable that the granules of the leucocytes have now the power of movement, and can be seen moving within the corpuscle, and if observed long enough can be seen detaching themselves from the corpuscle, sometimes singly, at other times in groups of two, three, or four, apparently connected by thin translucent threads. In whatever way they detach themselves or escape from the corpuscle, they always exhibit free movement. These granules are in every respect similar to one of the groups of haemoconia. The red corpuscles also appear to be undergoing a change, some becoming granular, others more distinctly so, while movement can be observed. These granules finally detach themselves, and exhibit a similar movement to those of the white cells. In certain films I examined, it could be observed that a few of the red cells showed signs of division. A constriction appeared at one pole, which ultimately ended in the cell being divided into two or three parts. The parts of this division appeared like a microcyte or a smaller body.

Group 5 of haemoconia appeared to be the most numerous elements in the field, especially near the corpuscles, which were disintegrating. The red cells, which look on a casual glance to be normal in appearance, have really very fine hair-like appendages. They all exhibited power of movement. In some films I observed a number of round amoeba-like bodies with a central spot or nucleus; they are about 1μ in diameter, and are motile and very similar to bodies I have observed in calf lymph.

Without describing in detail the further daily changes, a similar process is to be observed, the corpuscles becoming fewer, while all the groups of haemoconia increase in number. This process is continued till the eighth or ninth day, when disintegration is complete and no movement is visible. About the fifth or sixth day a number of red cells have become shadow corpuscles and microcytes. It is apparent to the naked eye at this time that the film is almost devoid of colour. As disintegration continues movement generally is less marked.

From my observations I have concluded that:

1. Haemoconia are present in all human blood.
2. Crenated corpuscles and shadow corpuscles are degenerated cells.

3. That a certain proportion, if not all, of microcytes are degenerated or altered cells.

4. Blood plates are debris of red and white corpuscles.

5. Leucocytes. Eosinophiles degenerate first; secondly, the polymorphs, and that lymphocytes are the longest lived (and youngest) of the white cells.

6. Haemoconia. Some are escaped nuclei of leucocytes, some escaped granules of leucocytes, others are the result of disintegration or alteration of red corpuscles, and that all are produced by some change in the blood constituents.

It is evident, therefore, that blood cells are destroyed within the vessels, and that under certain conditions they have the power of propagation. In films where pear-shaped cells are present I have observed that these cells are motile, that the apex is the motile part, and is analogous to a pseudopod. If this be observed long enough the pseudopod becomes detached as a free swimming organism. This I believe is propagation on the part of the red cell.

Before concluding I desire to state that I have failed to stain haemoconia, and have also failed to cultivate them, and this has been the experience of other observers.

Whenever I have observed blood cells in lymph, vaccine, urine, pus, etc., those bodies are visible, and exhibit similar changes to those in blood. Calf lymph shows so many bodies which present a very close similarity to haemoconia that I believe some at least are identical.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL

METHOD OF ESTIMATING COAGULATION TIME.

For several months I have used a method of ascertaining the coagulation time very like that described by Dr. McGowan,¹ but even simpler, requiring less apparatus, and yielding results of, I think, much greater accuracy.

In my method, the file or glass knife is not necessary, and the bore of the capillary tube is quite immaterial.

The process is in all respects the same as Dr. McGowan's up to the point of filling the capillary tube. Then, instead of sealing the end of the tube, I blow the drop of blood at once upon a glass surface. Now seal the end of the tube, and use this sealed end as a rod to dip from time to time into the drop of blood. At length it will draw from the drop a fine thread of fibrin, and the very definite moment at which this takes place is noted, and gives the coagulation time.

Dr. McGowan does not record any fractions of minutes, and presumably, therefore, his method does not record intervals of less than a minute. By the method I use, it is possible to ascertain the coagulation time to within a very few seconds—with practice, to a single second.

The glass surface must, of course, be clean, and it is better that it should be the same in every experiment; the temperature, too, should be uniform. But it is as well to recognize that there is no absolute coagulation time. All that we can ascertain, and all that we need, is the relative time, previous to coagulation, taken by different specimens of blood under circumstances as similar as possible.

London, W.

CHARLES MERCIER.

ALBUMINURIA FROM A LIFE ASSURANCE POINT OF VIEW.

THE differentiation of organic from functional albuminuria is of paramount importance. The problem, however, is somewhat more difficult than would at first appear, and in some cases practicably insoluble.

Functional (non-organic) albuminuria may be present in erysipelas, diphtheria, pneumonia, acute rheumatism and gout, consecutive to burns, blisters, and the use of salicylic acid, turpentine, and carbolic acid (Da Costa). Albuminuria has also been observed in young persons consuming large quantities of albuminous food, and after severe exercise. Orthostatic albuminuria, occurring late in the day and not at all in the morning, is, of course, a

¹ BRITISH MEDICAL JOURNAL, November 30th, p. 1580.