is far from true that all persons react to tuberculin. In these cases tuberculin treatment was not undertaken.

The cases I have recorded above seem to offer prima facie evidence that there are patients with inflammatory trouble in the eyes who do not benefit by ordinary methods of treatment; that many of these patients react to diagnostic doses of tuberculin; and that treatment with tuberculin produces marked improvement, or even arrest of the trouble, in a considerable number of these reacting patients. Since the use of tuberculin, for both diagnosis and treatment, by the methods I advocate is completely innocuous to the patient, I submit that its employment in such cases is amply justified. The satisfaction of the patients who have been treated at the tuberculin dispensary, coupled with the recorded opinions of the ophthalmic surgeons under whose care they were, encourage me to suggest that wider trial of these methods should be made in the treatment of eye diseases.

ON SPECIFIC ANTITOXINS IN STREPTOCOCCAL INFECTIONS.

BY

HERBERT H. BROWN, M.D., F.R.C.S.,
CONSULTING SURGEON TO THE EAST SUFFOLK HOSPITAL.

WHILE it has long been common knowledge that streptococcal infection was responsible for a number of clinical varieties of disease—for example, cellulitis, erysipelas, tonsillitis, puerperal fever, scarlet fever, ulcerative endocarditis, etc.—it is only in recent years that it has been possible to differentiate and classify special groups of streptococci.

It was found that streptococci could be differentiated by their fermentative action on different sugars, and also by their haemolytic action on blood corpuscles, certain streptococci when grown on blood agar plates producing a clear red halo of haemolysis around each colony. These haemolytic streptococci are of special importance, as they are responsible for some of the most serious infections—for example, puerperal septicaemia, erysipelas, and scarlet fever. In 1924 the Dicks described a soluble toxin, derived from culture of haemolytic streptococci obtained from the throats of scarlatinal patients, and with which experimental scarlet fever had been produced. This toxin when injected intradermally produces a pronounced erythematous blush in the surrounding skin of patients whose blood does not contain enough of the specific antitoxin to neutralize it, and is widely used to test susceptibility to scarlatinal infection (the Dick test), exactly in the same way that the diphtheria toxin is used to test susceptibility to diphtheria (the Schick test).

Similar toxins were discovered in 1926 by Birkhaug in the case of erysipelas, and by Lash and Kaplan in the case of puerperal sepsis, the toxin of which differs from the Dick scarlatinal toxin in being heat labile, whereas the Dick toxin is not destroyed by boiling. These toxins also produce skin reactions similar to those of the Dick reaction in persons susceptible to erysipelas and puerperal fever respectively. The toxin prepared by Lash and Kaplan was made use of for testing the susceptibility of pregnant and non-pregnant women to puerperal sepsis. Antitoxic serums were produced by Birkhaug by immunizing animals with erysipelas toxin. This serum agglutinated haemolytic streptococci from erysipelas, and also had a striking therapeutic effect in erysipelas infection. Similar antitoxins have been prepared from toxin from puerperal septicaemia. Some doubt, however, has been thrown on the specific nature of these toxins and antitoxins during the last few years, especially by some investigators in this country. It would appear probable that there is a factor common to all three groups, that there is also a factor special to each of the toxins and antitoxins, and that to produce the most satisfactory therapeutic effect the specific antitoxin should be injected.

With regard to the specificity of the scarlet fever and erysipelas toxins, the Dicks have lately conducted a series of experiments which should be conclusive.¹ They demon-

strated that there was no direct relation between spontaneous immunity to scarlet fever and erysipelas toxin. It was shown that an attack of scarlet fever does not confer immunity to erysipelas, and that artificial immunization by scarlet fever toxin confers no immunity to erysipelas toxin; also that scarlet fever antitoxin prepared by immunizing a horse with toxin from scarlet fever streptococcus neutralizes scarlatinal toxins, but does not neutralize erysipelas toxin, and erysipelas antitoxin neutralizes toxins derived from strains of erysipelas streptococci, but not scarlet fever toxin. The Dicks conclude, therefore, that the soluble toxins produced by scarlet fever and by erysipelas haemolytic streptococci are immunologically specific and distinct.

Working with scarlet fever, erysipelas, and puerperal fever toxins, and with convalescent serums and antitoxins, Ferry and Fisher found that in low dilutions of the serum there was more or less cross-neutralization of the toxin by the serum, but in high dilutions the serums neutralized only their homologous toxins. If these results are accepted it is evident that to get the fullest advantage from antitoxic treatment the special antitoxin should be employed. In the case of puerperal fever, although the great majority of severe infections are due to the haemolytic *Streptococcus pyogenes*, other organisms are occasionally responsible, and a culture from the cervical canal and from the blood should be taken.

A case which has recently been under my care is a very striking illustration of this specific action.

The patient was attacked by a throat infection with a haemolytic streptococcus, which in the course of two or three days from the beginning of the illness invaded the middle ear and the mastoid cells on the right side. I saw her on the third day; her evening temperature was 101° F., and there was tenderness and slight oedema over the mastoid. A swab from the throat was taken, and 10 c.cm. of polyvalent antistreptococcal serum administered. On the following day an operation was performed upon the mastoid by Mr. K. D. Mackenzie. All the mastoid cells were infected, and a pure culture of a haemolytic streptococcus was obtained. The throat culture showed haemolytic streptococci and *Micrococcus catarrhalis*. The culture was incubated with the patient's blood by Dr. Biddle, pathologist to the East Suffolk Hospital, and the blood was found to have no bactericidal effect upon the streptococcus.

Following the operation there was free suppuration, and the temperature showed no diminution, reaching 101° F. each evening. On the fourth day after the operation 10 c.cm. of concentrated scarlet fever antitoxin was given intramuscularly in the morning, and the injection was repeated in the evening. On the following

A, Operation. B, 10 c.cm. scarlatinal antitoxin. C, 10 c.cm. polyvalent serum. D, 15 c.cm. colloidal silver (intravenous). E, 10 c.cm. erysipelas antitoxin.

day, the fifth after operation, the temperature reached 103° at 2 p.m., and definite erysipelas infection of the pinna of the ear and the skin in the temporal fossa was evident. The pulse rate went up to 110; it had previously ranged between 80 and 100. The leucocyte count was 13,000.

During the next few days the erysipelas continued to spread in the skin of the forehead to the nose. On the eighth day after the operation the temperature was 104° in the morning and 104.4° in the evening; the pulse rate was 116. The patient was given 10 c.cm. of scarlatinal antitoxin intramuscularly in the morning, and a similar amount in the evening. On the next day the temperature was 101° in the morning and 104° in the evening. On the tenth day the temperature was 101°, and 10 c.cm. of polyvalent streptococcal serum were administered. The leucocyte count was 10,000. On the eleventh day erysipelas infection had reached the left side of the face. The temperature was 102.6°, and 15 c.cm. of colloidal silver was given intravenously. No improvement followed, and on the thirteenth day the temperature again reached 103° F. An intramuscular injection of 10 c.cm. of concentrated erysipelas antitoxin was given on that afternoon.

On the next morning the temperature fell to 98°, only reaching 99.4° in the evening, and on the following and subsequent days it remained absolutely normal. All traces of erysipelas had disappeared from the face, the leucocyte count dropped to 7,000, and the patient looked and felt completely convalescent. Suppuration rapidly diminished, and completely disappeared in a fortnight.

The improvement in the patient's condition was remarkably dramatic, and I think undoubtedly due to the specific action of the erysipelas antitoxin on the streptococcal infection.

REFERENCE.

¹ *Journ. Amer. Med. Assoc.*, December 7th, 1929.

PSITTACOSIS WITH ENCEPHALITIC SYMPTOMS.

BY

HENRY J. KRICHEFSKI, M.B., B.S.LOND.,
RESIDENT MEDICAL OFFICER TO THE BRITISH HOSPITAL, PORT SAID.

Dr. A. P. THOMPSON (*Lancet*, February 22nd, 1930, p. 396) describes a case (No. 8) of psittacosis in which the nervous symptoms were marked enough to suggest a diagnosis of encephalitis. Below is a description of a similar case occurring in Port Said. This is the first recorded case of the disease in Egypt.

The patient, Mrs. H., aged 32, a British resident of Port Said, had begun to feel ill on the evening of February 10th, 1930, with headache, cough, and vomiting. She was seen by a local practitioner, and as her condition became steadily worse during the next few days and no definite diagnosis could be arrived at, she was admitted to the British Hospital on February 15th.

On admission the patient looked ill, being flushed and bathed in perspiration. She complained of severe headache, especially at the back of the head, and difficulty in speaking and swallowing. She was also slightly delirious. Her temperature was 102.8° F., pulse rate 114, and respiration rate 28. On examination a few moist sounds were heard at the left apex. The right lung was clear and the heart normal. The abdomen was distended, but not tender on palpation, and the tip of the spleen could just be felt. A trace of albumin was present in the urine. A bilateral Babinski response was elicited, and also Kernig's and Brudzinski's signs. Both knee-jerks were absent, and the fundi were normal. There was no cough or dyspnoea, and no sputum could be obtained.

On February 16th the patient's condition was worse, the temperature being 104° F. and the pulse rate 98. She was still complaining of severe headache. Lumbar puncture was performed; the fluid was clear and not under pressure, and it disclosed no abnormalities on examination. On February 17th she was much worse; the abdominal distension had increased, the temperature was 102.6° F., and the pulse rate 88. The left apex was now solid, and air entry was practically absent. Coarse crepitations were present over the whole of the left chest. The patient was more delirious, very weak, and unable to speak.

Agglutination tests for "O" and "H" agglutinins against *B. typhosus* and *B. paratyphosus* A and B were negative, and it was not possible to demonstrate the presence of specific agglutinins for any member of the biphasic group of salmonella organisms. Blood culture in a variety of media and inoculation experiments were negative. Culture of the faeces and urine resulted in the isolation of *B. faecalis alkaligenes*. It was present in pure culture in the urine. Thompson notes a similar finding in one or two cases. There was a leucocytosis, the number of white blood corpuscles being 15,000 per c.mm.

During the evening of February 17th the patient was seen by another medical man in consultation, and a diagnosis of psittacosis was made. The patient had twenty-three birds at home, including three parrots and two love-birds recently acquired. The husband stated that some of the birds had been fighting furiously. Two had died after this disturbance; probably they had been sick and were killed by the others. All the birds were gassed, and post-mortem examination and a fairly extensive cultural investigation yielded negative results. This does not discount the possibility of the dead birds having been infected with the virus.

During the next three days coma supervened; the abdomen became more distended and the temperature remained between 103° and 104° F., the pulse being relatively slow. Examination of the fundi showed blurring of the edges of the discs, suggesting a rise of intracranial pressure. The condition of the patient was critical. On the evening of February 21st lumbar puncture was again performed; the fluid was clear, but this time it came out under great pressure, and on examination small numbers of diplococci were seen. The same evening an injection of 30 c.cm.

of polyvalent antipneumococcal serum was given intrathecally. After a rather severe reaction the temperature fell the next day to 100.2° F. A further 20 c.cm. of the same serum were then given, intrathecally as before. A mild reaction occurred, during which the temperature rose to 102° F. and then fell to 99° F. The coma now began to diminish, and the patient seemed much better. The fundi were now normal.

On February 23rd 20 c.cm. of polyvalent antimeningococcal serum were given intravenously, and the temperature fell to 98.2° F. in the next few hours. During the following two weeks the patient slowly gained ground and made an uninterrupted recovery. On March 4th she was able to sit up in bed and take solid nourishment. At the moment of writing she still has some slight difficulty in articulation, and the features are rather inexpressive, resembling the mask-like facies seen after encephalitis lethargica. However, both these conditions are improving rapidly, so that in all probability no permanent disability will result.

I have never seen any reference to a case of psittacosis in which the meningeal symptoms and the general nervous symptoms were so pronounced. Although an apical lobar pneumonia is always associated with active delirium and some nervous symptoms, I incline to the clinical diagnosis of psittacosis, for these reasons:

1. After a week's illness the patient appeared to be as ill as if she were in the third week of enteric fever—she had a brown, furred tongue, sordes on lips, etc.
2. The left lung was solid; there was no tubular breathing and hardly any air entry; the patient had no dyspnoea, no cough, and no expectoration; coarse crepitations were present; in fact, the chest condition was more acute than in any condition I know.
3. A meningitis can develop in any acute condition.
4. The specific serum treatment was hardly sufficient to have worked so remarkable a cure.
5. The nervous symptoms were more those of an encephalitis than of a pure meningitis—for example, the mask-like expression of the face, the early loss of knee-jerks, the double Babinski response, and bulbar paralytic symptoms (speech and swallowing) before the cerebro-spinal fluid was even cloudy or contained abnormal cells or organisms.
6. The impression I gained from this case was that it was a clinical syndrome that I had never met before.

I am indebted to Dr. Dolbey and Major Bensted of Cairo for their kind and valuable assistance in enabling me to prepare this case for publication, and to Dr. R. P. Stewart for permitting me to publish this report.

TREATMENT OF MEASLES WITH AMIDOPYRIN.

BY

J. I. COLLIER, Ph.D., B.Sc.LOND., M.R.C.S., L.R.C.P.,
FORMERLY ASSISTANT, BIOCHEMICAL DEPARTMENT,
MIDDLESEX HOSPITAL.

THESE observations are intended as a preliminary communication on the curative effects of amidopyrin in the treatment of measles. This drug is a white crystalline compound, slightly bitter, and easily soluble in water. According to the French *Pharmaceutical Codex* the maximum single dose is 15 grains, the maximum in twenty-four hours is 45 grains.

In the following case of measles drastic measures seemed to be indicated, and I decided to utilize the powerful antipyretic property of the drug. The discovery that it seemed to exercise an almost specific action on the disease itself was fortuitous, and led me to make a search of the literature. I found that Loewenthal¹ had used the same drug in the treatment of measles, but it does not seem to have been generally adopted.

The patient, a girl aged 8, had a history of whooping-cough in 1928, leaving her with chronic bronchitis. In September, 1929, she had lobar pneumonia, and while convalescing, though still weak and coughing, she developed measles. I was called to see her one afternoon when the rash was just appearing behind the ears and on the forehead. Her temperature was 104.5°; there was marked coryza, and Koplik's spots were present. The pre-existing cough was more severe. She was immediately put on amidopyrin, 5 grains four-hourly day and night. The next morning (about twenty hours after she was first seen) the temperature was down to 100°. Instead of the anticipated profuse eruption only a faint morbilliform rash was showing. The drug was continued