the lichenification disappeared. There was great improvement, also, in the patient's general condition, and she gained 7 lb. in weight.

REFERENCES.

- ¹E. Vidal, *Considérations sur le prurigo de Hebra*, II. *Internationaler Dermatologischer Congress abgehalten in Wien im Jahre 1892*, S. 192. ²E. Besnier, *Sur la question du prurigo*, *Transactions of the Third International Congress of Dermatology*, London, 1896, p. 24. ³L. Brocq, *Traité élémentaire de dermatologie pratique*, Paris, 1907. ⁴J. Darier, *Précis de dermatologie*, Paris, 1909. ⁵J. C. White, *Transactions of the Third International Congress of Dermatology*, London, 1896, p. 46. ⁶Moritz Kaposi, *Pathologie et traitement des maladies de la peau*, traduction par E. Besnier et A. Doyon, Paris, 1891. ⁷P. G. Unna, *Histopathology of the Diseases of the Skin*, translated by Norman Walker, Edinburgh, 1896. ⁸T. Colcott Fox, *Prurigo*, in Allbutt and Rolleston's *System of Medicine*, vol. ix, second edition, 1911. ⁹H. Radcliffe Crocker, *Diseases of the Skin*, London, 1905. ¹⁰G. Thibierge, *La ponction lombaire dans les dermatoses prurigineuses*, *Comptes-Rendus de Xme Congrès de Médecine*, 1908. ¹¹A. Bavel, *Le traitement des névroses par le radium*, Bruxelles, 1910. ¹²J. M. H. MacLeod, *Pruritus*, in Allbutt and Rolleston's *System of Medicine*, vol. ix, second edition, 1911.

CERTAIN FORMS OF FEVER OF OBSCURE ORIGIN IN INFANCY AND CHILDHOOD.*

BY

C. PAGET LAPAGE, M.D., M.R.C.P.,

PHYSICIAN TO THE MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY.

FEVER of obscure origin is not uncommon in most forms of medical practice, but it is in dealing with children that this puzzling symptom is most often seen.

Those who are called upon to solve the riddle and point out the cause of the fever do not find the solution any the less difficult because of the inability of the child to give reliable information about symptoms, or any the less urgent if there is an over-anxious mother armed with a thermometer of almost uncanny efficiency.

In children the heat-governing mechanism is under unstable nervous control, and rises of temperature follow comparatively trivial causes, while the normal temperature taken in the rectum is, according to Finlayson, subject to considerable variations, and shows a very rapid fall between the hours of 6 and 8 p.m. I should like in passing to draw attention to the well-known fact that a temperature taken four-hourly often shows rises which are not shown on the morning and evening chart.

When confronted with a case of fever in a child—fever which has no obvious cause on clinical examination, and which is not merely temporary, passing off with a purgative—it is best to proceed by a process of exclusion. We must examine carefully first for chest conditions, such as deep-seated or apical pneumonia, localized empyemata, collections of pus; then for tonsillar, pharyngeal, or nasopharyngeal conditions, and for otitis media (this last a by no means uncommon cause of fever, and one needing some skill to diagnose); and, finally, for abdominal conditions, such as appendicitis. Usually these causes of fever can be diagnosed after careful examination and due attention to the history.

Post-influenzal conditions may give rise to much anxiety, because there may be so little to show for the temperature, and visions of many far more serious conditions pass across the mind of the medical attendant, who can only have recourse to the process of elimination.

Another common but obscure cause of fever is the presence of caseous glands, either bronchial, mediastinal, or mesenteric. In some cases they are so marked as to be obvious on palpation or percussion, but in most cases they are by no means easily diagnosed, the only symptoms being of a general nature. The cutaneous tuberculin reaction and the history are both valuable, while careful palpation of the abdomen is needed, and examination by the x rays is a very important asset to our means of making a diagnosis. By the last method we can see bronchial or mediastinal conditions which were formerly inaccessible. The temperature does not necessarily rise more than one or two degrees, but may be quite high enough to cause anxiety.

Rheumatism.

Rheumatism is perhaps one of the most important of the causes of fever in children, and, what is more, its ravages may be of an obscure nature. A noticeable

feature of this disease in children, as distinguished from adults, is that it rarely takes the acute articular form, except, perhaps, in older children. Much more often there are only sore throat, some vague shooting pains, and some heart lesion. This may be definite endocarditis or myocarditis or pericarditis. Both myocarditis and endocarditis may give a systolic murmur (often soft, blowing, and easily missed) and an increase in the size of the heart. Myocarditis is much more common than endocarditis, and, with proper treatment, recovery should be complete, but while it lasts the temperature may be high enough to cause anxiety. Endocarditis may be difficult to diagnose and give few signs at the heart, and yet the rises of temperature may be considerable. Not all such cases are of rheumatic origin. I have under my care one case of septic origin and have seen several following scarlet fever.

I will now quote a case illustrating difficulty of diagnosis:

Girl, aged 9. Symptoms: pallor, bronchitis, persistent unexplained fever of an irregular nature, sometimes reaching 103° and often 102° or 101°. History of three weeks' illness of an indefinite nature. The only sign discoverable was an indefinite systolic apical bruit, indefinite because the child was anaemic and the heart was neither irregular nor enlarged. The cutaneous tuberculin test was negative and the urine normal. Her brother, who was in another ward, had a similar illness. She finally recovered, and the most likely cause of the illness was rheumatism.

Perhaps, whilst dealing with rheumatism, I might mention that, though in cases of osteomyelitis the localizing signs are usually sufficient to establish the diagnosis at once, still I have seen cases in which the pains near the joints and the fever led to a diagnosis of rheumatism.

Again, the eruption of erythema nodosum is often preceded by an irregular temperature and pains in the limbs, while poliomyelitis may give rise to fever and pain, and, if no symptoms of paralysis supervene, the diagnosis is obscured.

Leukaemia and Hodgkin's Disease.

These diseases may run a chronic course with exacerbations, during which there is high fever. In both conditions there is usually sufficient evidence in the way of glandular or splenic enlargement, but this is not always the case, and the lesson to be learnt is that, when in doubt, the blood should be examined. There are not always marked changes in the blood, but sometimes a diagnosis can be cleared up in this way. For example:

B. T., aged 5; illness began one week ago—weakness, irritability, vomiting, and headache, with a temperature of 100° to 101°. The temperature gradually rose irregularly until it reached 105°. On examination Kernig's sign was present; there was no *tache cérébrale*; the heart and chest were negative, but the liver and spleen were big. This led to an examination of the blood, and on the result of that lymphatic leukaemia was diagnosed.

In this case the illness with high temperature had been a source of considerable worry to the medical man in attendance, and only the examination of the blood definitely established the diagnosis, though the large spleen pointed strongly to acute leukaemia.

I have also a case, F. R., aged 3, of Hodgkin's disease, in which the temperature was irregular, often reaching 101° and 102°, and the glands, though obvious enough, were not readily distinguished from other forms of adenitis until the case had been watched and the temperature had been irregular for nearly one month.

Bacilluria.

I now come to an obscure cause of fever to which I wish to draw special attention—infection of the genito-urinary tract with the *Bacillus coli communis*, either in the form of acute pyelitis or in a less severe form of bacilluria. I shall deal almost entirely with those cases occurring in infants or very young children. Perhaps I can best illustrate the condition of pyelitis by describing the two cases which first drew my attention to the importance of recognizing this infection.

Girl, aged 11 months. Illness began four days ago with a temperature of 104° and vomiting; temperature sustained and stools foul, but soon became normal. Blotchy, dull-red erythema on face, and few pustules on buttocks and groin. Child seems quite comfortable, but shows slight tenderness in the left kidney region. Pulse 144. Urine foul but plentiful. No specimen available. Child curiously quiet and happy, but

* A paper read before the Manchester Medical Society.

acutely ill, and the high temperature naturally caused great anxiety. The urine was found to contain pus and albumen and to be acid. The child was put on potassium citrate to render the urine alkaline, and the temperature gradually fell, though it remained of a swinging type for some time.

Boy, aged 2. Breast-fed to 1 year. Six months ago began to have summer diarrhoea and had it off and on for four months. Then his feet and hands started to swell. When seen he was wasted, but the wasting was obscured by oedema. Soon after admission he had another attack of diarrhoea with a swinging temperature and an enlarged liver. Then pus was found in the urine and a mass developed in the right renal region and the diagnosis of perinephritic abscess was made. At the operation the child had a large perinephritic abscess communicating with the pelvis of the kidney, but the pus was not at all offensive.*

These two cases in themselves serve to show the importance of being on the watch for this condition, though perhaps it is only fair to state here that the complication of a perinephritic abscess is probably unusual. Further experience shows that the condition is not at all rare, especially after the summer diarrhoea months, and I have had quite a large number of cases of moderate severity in my ward since last summer.

We must not think that all cases of bacilluria necessarily show alarming symptoms, nor can we say that all cases in which a bacterial growth is obtained from the urine are cases of this nature unless we are sure of there having been no possibility of accidental contamination, but it is no unusual thing to meet with cases in which, although there is not actual pus present, there are still swarms of bacilli and also quite definite symptoms, such as marked irritability, moderate irregular fever, dyspepsia, oedema, and wasting. In pyelitis pus and albumen are present in varying and often only small quantity, and the urine is acid.

A word about collecting the urine. One may want to examine the urine for three conditions—(1) pus, (2) albumen, (3) the *Bacillus coli communis*. In examining for the first two, aseptic precautions are not so necessary in collecting the specimen, and the best method is to arrange a mackintosh sheet in suitable folds under the infant. I have tried the various kinds of apparatus recommended, with poor success, and find them not so good as this simple method. When examining for the bacillus aseptic precautions are essential, because contamination in the passage of the urine to the sterilized receptacle is so very easy. Catheterization is, I think, the only satisfactory method.

Happily, treatment of this condition is usually attended with considerable success. The urine must be rendered alkaline as soon as possible, and for this purpose potassium citrate in 5 to 10 grain doses must be given every three hours. Urotropine is not of any great value in my experience. Vaccine therapy is still of disputed value. Personally I have had two successful cases, and shall certainly employ it in cases which do not clear up under potassium citrate; it seems more likely to do good in cases which have become chronic, and in acute cases does not approach potassium citrate in value.

Time prevents me from discussing other points as regards the pathology and nature of this affection and also the question of dieting, though I might perhaps mention the value of weak tea as a flushing and stimulating agent in infants. I not infrequently use it for this purpose.

Fever due to Digestive Disturbances.

This is a wide term and covers many conditions. In infants and neurotic children slight digestive disorders, such as teething, worms, or undigested food in the intestine, and excess of carbohydrates, may lead to fever. Finklestein holds that in infants food intoxication is common, fever forming a prominent symptom of these attacks. Personally I have only seen one or two such cases, although I have been on the watch for them.

Inanition fever, giving rises of temperature up to 102°, occurs in babies who are getting too little breast milk, and in contrast to this I might mention a case I saw recently in consultation.

An infant of 3 weeks. Breast-fed. Temperature 102°, and blotchy rash (suspected scarlet fever). Stools frequent, about four daily. Nothing else on examination. The mother had a very large amount of breast milk, and was taking a very

rich diet. She was overfeeding the child, who made a complete recovery when the amount given at each feed was regulated and the mother's diet revised.

A state of chronic intestinal indigestion is very common in young children, and such cases often have slight but definite rises of temperature of an irregular nature. Typical cases show wasting, a large abdomen, general flabbiness, and other symptoms pointing to a chronic toxæmia. The stools are characteristic, being frequent, of large amount, and very offensive; they usually contain particles of incompletely digested food. Such children are usually being fed on a diet containing too much carbohydrate and too little protein, so that in many cases judicious dieting works wonders. Of course we must be very careful to exclude other and more serious conditions, which may give rise to similar fever and symptoms. Of these the most important are tuberculous ulceration of the intestine or tuberculous peritonitis, and the differential diagnosis may be very hard.

Recurrent fever, due probably to intestinal trouble, also occurs. In such cases there are attacks of irregular fever lasting for a few days; these attacks come on at intervals of a few months or of a few weeks, and may be a serious trouble. In such cases cutting off the carbohydrates often leads to a cure. These cases are not very common, but may be very puzzling when they do occur.

Meningitis.

Acute typical meningitis is easily recognized, but many cases are not typical.

Tuberculous meningitis may be of slow onset, the cardinal symptoms taking a long time to develop, or, on the other hand, the *Diplococcus intracellularis* may give rise to a low form of meningitis, both in infants (as post-basic meningitis) and in older children.

The following cases illustrate these points:

Boy, aged 10, a moderately healthy and well-nourished boy, began to have headache and feverishness on May 10th, 1911. The temperature ranged from 101° to 99°. On examination, the right lung was suspicious of tuberculosis and the cutaneous reaction to tuberculin was positive. The boy was walking about, but was obviously ill. On May 15th I admitted him to hospital, suspecting meningitis from the headache, although a careful examination failed to show any signs or reasons for the temperature, which now ranged from 102° to near normal. The eyes showed no neuritis or tubercles. By May 20th drowsiness and Kernig's sign had developed and the diagnosis of tuberculous meningitis was established.

Girl, aged 8, seen January 28th, 1912. Had been ill for fourteen days; sickness began after a party; she became weak until she could not walk; had much headache, but no crying out. Examination showed the *tache cérébrale* and Kernig's sign to be present, but no head retraction or rigidity. Headache was marked; there was some pyorrhoea of the gums; constipation was present and incontinence of urine. There were no other signs. The case was diagnosed as meningitis, and lumbar puncture was made. The fluid came out under pressure, and on examination was found to contain the *Diplococcus intracellularis* or an allied organism.† After lumbar puncture the headache abated. With a recurrence of the symptoms, lumbar puncture was repeated on February 10th, with similar results. The child gradually recovered from the infection without further specific treatment, and is now on the way to recovery. Vidal's reaction was negative.

In this case Kernig's sign and the headache were the only symptoms to suggest meningitis, and the case resembled a low form of typhoid fever more than anything else.

Post-basic meningitis in infants may sometimes cause fever without definite signs to guide us to the correct diagnosis.

Meningitis is often difficult to distinguish from pneumonia, either apical or deep-seated, and from typhoid fever; for this purpose we have to try Vidal's reaction and to look for the usual signs of meningitis, but the point I wish to bring out is the value and comparative harmlessness of lumbar puncture. With due precautions there is perhaps rather less danger than in exploring the chest, and one should never postpone the puncture for fear of evil effects. Further, repeated punctures are often of great service in relieving symptoms, and, except in cases of tuberculous meningitis, in helping to cure the case. In meningitis the fluid usually comes out under pressure and is clear. Cerebro-spinal meningitis due to the *Diplococcus intracellularis* is said to give turbid fluid, but in my

* In the discussion following this paper it was pointed out that the *Bacillus coli communis* does not in itself give rise to the smell which is usually attributed to it.

† The organism showed a much greater and more rapid growth than is usual. Possibly because of its diminished virulence.

experience (which has been of sporadic cases in fairly acute stages) the fluid is clear. Under the microscope the cellular elements are seen to be increased, lymphocytes being characteristic of tuberculous and polymorphonuclear leucocytes of meningococcal meningitis. Tubercle bacilli are hard to find without repeated and careful examination, but meningococci may be readily seen.

In conclusion, I may say that I have not attempted to deal with all the obscure causes of fever in childhood—they are far too numerous for that; but I have chosen conditions which in my experience are of great difficulty and importance. I may not have said much that is new, I have made no serious attempt to do that, having in mind rather the promotion of discussion and the gain to our knowledge thereby.

A STUDY OF AN EPIDEMIC OF MEASLES.

BY

ARTHUR EDWIN TAIT, M.B., CH.B. EDIN.,

RESIDENT MEDICAL OFFICER, BRANCH DISPENSARY, CHELTENHAM GENERAL HOSPITAL.

HAVING had the opportunity of dealing with a severe epidemic of measles, I make no apology for publishing my experiences over well-trodden ground. The total number of cases observed was 437.

In the table and chart I have grouped together as pulmonary complications, bronchitis, pneumonia, and bronchopneumonia, excluding croup,

Chart showing influence of pulmonary complications on death curve.

laryngitis, and catarrh; the former proving the death producers. In the accompanying percentage chart it is clearly shown that death depends on these pulmonary complications. In the first five years of life the fact is remarkable that the curves of pulmonary complications and death percentages are parallel, so exact is the relation between them. The maximum in the second year of life is very striking. The cases under the age of 6 months—2.29 per cent. of all cases—occurred as young as 2

months. Some attacks were severe. One commenced with a profuse rash with epistaxis and laryngeal catarrh, diarrhoea and bronchopneumonia followed. Recovery took place. I attribute the apparent immunity of babies under 6 months to the comparative isolation of cradle life. Cases were most numerous in the fourth year of life, with 16 per cent. pulmonary complications, and no deaths. The total death-rate of the epidemic was 5.03 per cent., and all the deaths except two occurred before the end of June. The death-rate before the end of June was 5.31 per cent., and afterwards 3.27 per cent. The two deaths after June 30th were in the second year of life. The death-rate in the second year of life was 14.08 per cent., and was 12.5 in the early months, with 42.1 per cent. pulmonary complications. The high death-rate in the second year is not sur-

prising, therefore. And this is probably the solution to the controversy as to the abnormally high mortality from measles—namely, 15.4 per cent.—of those treated in the Metropolitan Asylums Board fever hospitals in the early months of 1911. These are the severe cases for which the poorer classes would be only too glad to avail themselves of hospital treatment. There were hundreds of mild cases in this district this year untreated. An analysis of ages, condition on admission, and mortality of the Metropolitan Asylums Board hospital cases would be instructive.

Apart from catarrh and laryngitis, severe pulmonary complications supervened in 23.57 per cent. of all cases; 25.5 per cent. in the early months. Pneumococcal infection is the cause of measles mortality. After June 30th a considerable fall in pneumococcal infections and their severity brought down the death-rate, although there were as many smart attacks of measles *per se*.

Ten cases of pneumococcal infection ran to a crisis with recovery out of the total of 104 cases. The remainder varied in type, depending on the virulence of infection, resistance of patient, and presence or absence of diarrhoea. Some cases occurred a few hours after the appearance of the rash, producing a temperature of 102°, 103°, or 104°, with acute dyspnoea and death within three or four days. A large number hung on for weeks and months with unresolved bronchopneumonia, which had come on a few days to a week from the commencement of the rash, the temperature gradually over a week rising to 102°, swinging about this for two or three weeks, and gradually falling to normal. The pulse and respirations remained frequent for some time after the temperature had fallen to normal. These protracted cases, especially when careful nursing was available, nearly all recovered; sorry wrecks doubtless, but they pulled up wonderfully if treated for some time afterwards. Even children one suspected were tuberculous recovered. I always gave an optimistic prognosis in protracted cases; and when they appeared in a dying condition, emaciated, frequent varying pulse, swinging temperature, laboured respirations, râles in the lungs, and often refusing food, and apparently hopeless, I never lost hope. They nearly all recovered eventually. One of these, after two months' illness, succumbed to an operation in the neck for suppurating glands. In these protracted cases a diligent search for tubercle bacilli was made, but never once discovered—a point of some interest in the light of recent controversy as to the presence of active tuberculosis in the lungs of children. Fraenkel's pneumococcus was always present in abundance.

Empyema was conspicuous by its absence. Middle-ear disease was common, but was amenable to fomentations, mild lotions, and hexamethylenetetramine internally. Diarrhoea occurred in 10 per cent. of cases during invasion, with the rash, or afterwards, and sometimes during incubation. Alarming croupy symptoms with the rash sometimes occurred, but quickly subsided. Most dangerous were those cases which with mild coryzal symptoms and rash, apparently a mild attack, when on the second or third day of rash acute dyspnoea suddenly appeared, a rise in temperature, uncountable pulse, and great restlessness, often ending in death in twenty-four to forty-eight hours. They are now, I believe, assigned to collapse of lung.

One of these cases examined *post mortem* showed no collapse of lung to the naked eye. This child simulated laryngeal obstruction so completely that I watched it all one night through, and had everything in readiness for tracheotomy, which was not required. Five and a half days from onset of rash the child died, passing into unconsciousness the last day. The larynx and trachea were quite free. The lungs were studded with yellowish-grey specks under the pleura, the size of an ordinary pin's head. Little fluid in pleural sacs, and some sticky exudate stretching across the cavity like cobwebs. The lungs were pale. Frothy blood could be squeezed out, and mucopurulent plugs from bronchioles. Bronchial glands slightly enlarged. Pericardium externally markedly injected. Sac smooth, and full of albuminous yellow fluid. The stomach showed slight catarrh, also the intestines in places. Blood dark and fluid. Heart muscle pale. Thrombus extending from auricles to ventricles. Brain showed venous congestion, and some sticky exudate. The hemispheres and lobes were cemented together. The blood *post mortem* showed numerous pneumococci. A smear from the laryngeal wall showed plentiful *Micrococcus tetragenus* and pneumococci; also long chains of bacilli as long as the chains of the pneumococci themselves. These long bacilli showed beaded structure and Gram-stained. The pericardial fluid showed crowds of pneumococci.