

hæmorrhages or other causes. Transient rashes have occasionally been observed after its use. It is impossible to speak dogmatically as to its value, for in all cases, as far as possible, where it is given, nourishment is also introduced by other channels. However, if it is absorbed the patient has had so much added nourishment, and this is of great importance where one's resources are so taxed in feeding. Some nurses have thought that patients are more restful after the injections, and that in cases which are constantly retching and vomiting these symptoms have been less marked. My own impression is that the injections of horse serum have been beneficial.

CONCLUDING REMARKS.

Patients who have been fed by the rectum for some weeks become extremely emaciated and not infrequently develop petechial hæmorrhages, generally in the trunk, and they may be profuse. So far I have made little or no reference to drugs. My experience of most if not all as regards their action in the vomiting of diphtheria has been uniformly disappointing. I have spoken separately of the various modes of feeding. In practice, however, they are frequently combined. I am much indebted to the nurses, who have supplied me with careful notes, and whose advice in many practical details of the different methods of feeding has been of much value. I append notes of a few cases, one *in extenso*, specially with reference to their feeding.

CASE 1.—The patient, aged six years, was admitted to Brook Hospital on Feb. 19th, 1900, and was discharged on July 13th, 1900. The patient was admitted on the third day of the disease, with very severe faucial diphtheria. The heart was affected early. Epistaxis occurred on the fifth day. Albumin was seen from the seventh to the thirty-eighth day. Vomiting commenced on the seventh day. There were paralysis, nasal voice, regurgitation, diaphragmatic paralysis, labial paralysis, paralysis of deglutition, and general limpness. The accompanying table shows the approximate amount and nature of food, &c., retained.

CASE 2.—The patient, aged six years, was admitted to Brook Hospital on Sept. 14th, 1899, and was discharged on Feb. 8th, 1900. The patient was suffering from severe faucial diphtheria and was admitted on the third day of the disease. There were albuminuria, palatal paralysis, and diaphragmatic paralysis. Vomiting started on the fifteenth day and ceased about the forty-third day. 10,000 units of antitoxin were given on the third day of the disease, and 12,000 units of antitoxin were given on the fourth day of the disease. On the twelfth day, owing to retching, peptonised milk only was ordered by the mouth. On the sixteenth day rectal feeding alone was ordered. The feeds, consisting of four ounces of peptonised milk and half an ounce of brandy, were ordered to be given every four hours. In addition, water feeds of four ounces were ordered one hour before the milk feeds. On the seventeenth day milk enules (containing peptone from five drachms milk) were ordered four-hourly. On the twentieth day, owing to the feeds being badly retained, the brandy was omitted from each feed and the quantity of milk was reduced to three ounces. On the twenty-second day the milk feeds were further reduced to two and a half ounces each feed. At the same time only three water feeds were given in the 24 hours; but the milk enules were continued every four hours. These rectal feeds were continued till the thirty-sixth day. On the twenty-ninth and thirtieth days a starch and opium enema was required. Twenty cubic centimetres of horse serum were injected on the twentieth, twenty-first, twenty-second, twenty-third, twenty-fourth, twenty-fifth, twenty-sixth, twenty-seventh, and twenty-eighth days. The last two gave rise to subcutaneous hæmorrhage. From the thirty-first to the thirty-sixth day the patient took a small but appreciable amount of food by the mouth. From the thirty-sixth to the fiftieth day the patient was nasal-fed, but each day had in addition by the mouth one or two eggs and some bread crumbs. After the fiftieth day the patient gradually got back to a normal diet.

CASE 3.—This patient, aged five years, was admitted to Brook Hospital on Nov. 8th, 1900, suffering from severe faucial diphtheria, it being the fifth day of the disease. Albuminuria was present from the time of admission to the thirty-third day. Vomiting commenced on the eighth day and did not cease entirely till the sixtieth day of the disease. Palatal paralysis was first noticed on the seventeenth day. 12,000 units of antitoxin were given on the fifth day and 12,000 units of antitoxin were given on the sixth day.

Rectal feeds were ordered first on the twelfth day, consisting of three ounces of peptonised milk and half an ounce of brandy, given four-hourly. On the thirteenth day the milk was increased to four ounces each feed. On the nineteenth day the brandy was diminished to two ounces divided over the rectal feeds given in 24 hours. Three-ounce water feeds were also ordered one hour before the milk-and-brandly feeds. The rectal feeds were omitted on the fifty-seventh day. Nasal feeds, consisting of one ounce of peptonised milk, one drachm of raw meat juice, and one drachm of brandy, were first ordered four-hourly on the fifty-fifth day. On the fifty-sixth day the milk was increased to two ounces each feed. On the fifty-seventh day the nasal feeds were increased to three ounces of peptonised milk, one drachm of meat juice, and three drachms of brandy. On the sixty-fourth day the patient began to feed by the mouth. On the seventy-second day the nasal feeds were increased to five ounces of peptonised milk; the brandy was omitted. These were given three times a day. On the eighty-first day they were omitted, and from that date the child gradually got back to an ordinary diet. From the twelfth to the fifty-fifth day the patient was fed almost entirely by the rectum. On the fifteenth, twenty-fourth, and thirty-ninth day 20 cubic centimetres of horse serum were injected as she was then retaining her feeds badly. The child had a great craving for food and was occasionally tried with it in minute quantities, but mostly it was rejected by vomiting, until the fifty-sixth day. On the thirty-sixth day one nasal feed was tried, but this was vomited, and for some days the vomiting was increased.

CASE 4.—The patient, aged five years, was admitted to Brook Hospital on Jan. 14th, 1899, suffering from faucial diphtheria and was discharged on June 1st, 1899. On June 16th there was vomiting. Peptonised milk was ordered and brandy one ounce in the 24 hours. On the 17th the vomiting stopped. The patient then did well and was on a fish diet on Jan. 22nd and on child's diet on Feb. 3rd. On March 1st the child collapsed in the morning and vomiting occurred. Half an ounce of brandy was given by the rectum. Mouth feeding was omitted and the child was ordered four-hourly rectal feeds, each feed consisting of four ounces of peptonised milk and half an ounce of brandy. Water feeds of from three to four ounces were given one hour before the milk feeds. On March 2nd the yolk of half an egg was added to each milk feed. On the 25th there were punctiform hæmorrhages in the body. On April 3rd brandy only was given in alternate feeds. On the 4th the patient commenced to take food by the mouth for the first time since March 1st. On the 10th two rectal feeds were omitted. On the 12th rectal feeds were omitted. In this case the child was fed by the rectum alone from March 1st to April 4th, a period of five weeks.

Shooters Hill, Kent.

SCARLATINAL INFECTION: AN INQUIRY AND AN ILLUSTRATION.

BY J. B. PIKE, M.R.C.S. ENG., L.R.C.P. EDIN.

THE pathogenic germ of scarlet fever appears to require moisture for its development, and, this being the case, it seems somewhat strange that dry exfoliated epidermis should have received so much credit as the potential in scarlatinal infection. Latterly more attention has been paid to nasal discharge, and I believe pus from the middle-ear is also suspected. This being granted the question arises, How long can these discharges convey specific scarlatinal infection? Can scarlet fever microbes lurk insidiously in hiding? Certainly the middle-ear and mastoid cells form excellent quarters for the secret dwelling, if the germs can lie there quietly, without resentment of the tissues. If they can do so for a long or indefinite time we must enlarge our view of the infective period of scarlet fever. Isolation can hardly be indefinite, but if we recognise an ear discharge occurring even a year or more after scarlet fever as possibly or probably infectious something may be done to prevent the spread of the disease.

Another interesting question which is suggested by the following illustrative case is this, Is a secondary auto-infection possible from scarlatinal poison lurking in the cavities of the temporal bone? I cannot pretend by one

case to answer these questions, but I think the following notes illustrate the inquiry, and subsequent observation may possibly throw more light upon the matter.

A girl, aged 14 years, was isolated, together with one of her sisters, for scarlet fever on Jan. 5th, 1898. She was about again on Feb. 24th and appeared to regain her normal health. On Sept. 27th, 1899, she was attacked by sore-throat followed by earache. I saw her first with regard to this illness on Oct. 14th, 1899, when she was suffering a good deal from the ear, a discharge having been noticed from the meatus for about a week. On Oct. 17th the ear was very troublesome and there was some puffiness over the mastoid. She was also showing symptoms of acute nephritis. It was arranged to make Wilde's incision the next day. On the 18th, however, an older sister developed scarlet fever, and this occurred without our being able to trace any outside infection. My patient was consequently moved to a private ward at the Loughborough Hospital and on the same day an incision was made. A superficial necrosis of the mastoid was found which was removed together with a part of the posterior wall of the meatus. The operation was made as short as possible as prolonged anaesthesia was undesirable with the acute kidney condition. In its subsequent progress the case gave rise to much anxiety. For some time there was high temperature, rising at night or early morning to from 103° to 105° F., and it was difficult to determine how much this was due to mastoid trouble and how much to nephritis. On this point I had the advantage of consultations with Mr. Bond of Leicester and Dr. Howarth of Derby, and the decision was not to interfere further with the mastoid unless there was an extension of local symptoms. Ultimately all symptoms of active mischief subsided, the incision healing and the urine becoming free from casts and albumin. The patient went home convalescent on Dec. 6th, 1899.

The points illustrative of the previous inquiry are, first, the infection of the older sister, and secondly, the sore-throat followed by nephritis and associated with mastoid and middle-ear trouble, which had been for some time latent. Apart from these points the case is interesting as an example of nephritis associated with mastoid necrosis and simulating septicaemia.

Loughborough.

PURE UREA IN THE TREATMENT OF TUBERCULOSIS.

By HENRY HARPER, M.D. R.U.I.

IN THE LANCET of March 9th, 1901, I was permitted to place on record my experience of pure urea in the treatment of tuberculosis. The subject is so vast, the problems in physiology are so great and many-sided, the whole matter is so closely connected with organo-therapy, and the possibilities are so far-reaching, that I once more venture to record my further experience of urea. I selected urea, a substance of known chemical composition, from amongst its congeners, the "great end-products of nitrogenous metabolism," as an antitoxin for the tubercle bacillus. Hitherto urea has been looked upon as a waste product of the body of no further use in the economy—in fact, just as coal-tar used to be previously to the discovery of the aniline dyes it was found to contain.

My opinion is that urea is a constructor or builder up when administered in tuberculosis. This view is forced upon me by the frequent expressions of patients stating that they feel so much improved since eating kidney, liver, or brain—all substances rich in urea—in conjunction with urea ingested by the mouth. A few chronic phthisical patients have stated that these substances acted like a stimulant on them. Urea props up and holds together the tuberculous subject better than any other substance with which I am acquainted.

From my investigations among many families subject to gout and its allied diseases, including all forms of calculi except phosphatic, I am persuaded there is antagonism between these diseases and tuberculosis, and that this class of patients possesses a natural antitoxin against the bacillus. Here it is worthy of note that nuclein, which is used as a remedy in tuberculosis, in certain blood diseases accompanied by leucocytosis splits up and forms uric acid. "The discovery of the linking-on of toxin to proteid bodies and the

assimilation by the cells, with the consequent appearance of anti-bodies, was one of the most remarkable contributions to the knowledge of immunity that had yet been made."¹ "A molecule of proteid, hitherto dead, coming within the grasp of the molecular forces of the living substance, is caught up by it and, as we phrase it, made alive."² Probably this is how urea acts when ingested by the tuberculous.

CASE 1.—A man, aged 25 years, a tailor, came under my care on Dec. 21st, 1900. He had been very ill for 10 months with cough, sputum, loss of flesh (1½ stones), and night sweats; his evening temperature was 101.5° F. There was much dyspnoea on exertion and he had a poor appetite. No hæmoptysis was present. The patient looked very thin and far advanced in phthisis. Physical examination revealed much damage to the right lung; percussion was dull; there were loud crackling sounds denoting rapid softening of the upper half of this organ; the sputum contained many bacilli; the prognosis was very unfavourable. The grave nature of his disease was explained to the patient and his aid was besought in carrying out the treatment. He was ordered to live outdoors nearly all the day and to eat four good meals daily, each meal containing plenty of animal food. He ate daily one well-cooked kidney or an equal weight of liver, calf's or sheep's brain. He was told that these things were given to him as a medicine and he took them willingly. Along with this pure urea in 20-grain doses four times daily in separate mixture was taken. After meals a mixture of hydrochloric acid, strychnia, and pepsine was taken as well to aid digestion; also half an ounce of cod-liver oil daily with breakfast. The patient soon expressed himself feeling better, gaining weight and strength, the cough and sputum lessening. Now he says he is quite well, his weight being only four pounds below what it was at the beginning of his illness. The sputum still contains bacilli.

CASE 2.—A man, aged 38 years, came under my care on Feb. 28th, 1900. For many years he had been a carter. During the last three years he had kept a public-house and for a number of years had been a big beer-drinker. Two years previously his health began to fail, as manifested by repeated "bilious bouts." Slowly, shortness of breath and cough came on with rapid loss of flesh. He had several attacks of pulmonary hæmorrhage. When first seen by me he had been confined to his bed for 16 weeks, being nursed up in a warm room and afraid to have the door opened. He had all the appearance of long-standing wasting disease, including the clubbed finger-nails. There were daily hectic, anorexia, and very frequent cough, with much sputum crowded with bacilli. The physical signs revealed a cavity at the left apex with loud cavernous râles and fine crepitation at the margin of infiltration with the sound lung. The heart sounds were feeble; the liver was distinctly enlarged. The patient was ordered out of bed and changed his room during the day. He was put on a light nutritious diet, including milk, fish, and mutton. A mixture of hydrochloric acid and strychnia, with pepsine, was taken after meals, the same as in Case 1; 20 grains of pure urea dissolved in water with half-minim doses of creasote in combination were taken soon after food thrice daily. On this treatment the patient soon showed improvement. Less cough and better appetite followed within a week; two weeks later he was able to go out for carriage drives. On April 1st he was able to walk freely and he had gained four pounds in weight. From this time onward improvement was more rapid. With the view of increasing the urea in the food ingested he ate daily one well-cooked kidney or an equal bulk of liver or brain-substance. The importance of these things as a medicine for his disease was explained to him and he ate them willingly. He has recovered so much that he is able to do work, including grooming his own horse, and drives about freely now. His worst trouble is dyspnoea on exertion. He has very little cough or sputum. Bacilli are sometimes present, more frequently absent.

CASE 3.—A man, aged 51 years, a stonemason, came under my care on Jan. 20th, 1900. He had not been strong for several years and had been ailing 18 months with "bad cold," but was not laid up in bed; increased cough and more sputum followed. Since Christmas he had become much worse with more cough and dyspnoea. He had several attacks of hæmoptysis and marked laryngitis for one month; he had lost 1 stone in weight during the last six

¹ Brit. Med. Jour., March 16th, 1901.

² Stewart's Physiology.