tacks of malaria may have caused the renal disease and this may have brought about the arterial trouble.

PATHOLOGY.

The process is a progressive one, proceeding from the periphery toward the trunk, the artery being gradually destroyed until only a fibrous cord is left, resembling the remains of the ductus arteriosus.

Amputation does not always arrest the trouble, the process continuing in the stump until a higher level is reached.

As the process advances there is first a peripheral thrombus lining the walls of the intima; this is usually channeled, and the blood in a much diminished stream finds its way through this channel; as the disease progresses, this is finally closed.

The thrombus is not at first closely adherent to the vessel walls, but becomes so later. It is of the laminated variety, such as is found in aneurisms, and can frequently be dislodged or withdrawn from the vessel ends; sometimes it is several inches in length, and the central channel, when it has not yet closed, can be demonstrated for its entire length. In addition, the arteries undergo a diminution in size, sometimes being much reduced, with their coats much diminished in thickness, but otherwise normal. Later, as the process advances, they become fibrous. Embryonic tissue develops from the walls of the vessels and aids in the obliterating process. No calcareous deposits have been reported in any arteries examined. The veins undergo similar changes, generally commencing somewhat later than the arteries.

In only one case was any change noted in the nerves, which was reported in the history.

TREATMENT.

The lancinating pains are usually the first symptoms that prompt the patient to seek medical relief. All attempts to relieve them or to bring about an improvement in the area of diminished circulation have proved failures. The remedies and methods that have been used are legion. Heavy doses of opiates only slightly obtund the pains.

Salicylates, except in the case reported, in which they relieved the after-pains in the stump, have proved of no avail. Their early use in cases that are detected before the pains occur and in which the circulation is beginning to be restricted, may prove of some value, especially in those cases in which gout, uric acid or its congeners are a predisposing or exciting cause.

Amputation is the only method that has afforded relief, and it should be done sufficiently high to secure unaffected arteries, capable of nourishing the flap and beyond which the disease is not likely to progress.

Improved Technic for Prevention of Ophthalmia Neonatorum.
—H. Hellendahl has an article on this subject in the *Med. Klinik*, December 1. He is inclined to attribute to faulty technic the failures and inflammation sometimes resulting from the instillation of silver nitrate. All this could be prevented by a dropper that would safely deposit one drop and only one drop in the eye. He uses for the purpose a fused tube containing 0.5 c.c. (7.5 grains) of a 1 per cent. solution of silver nitrate. The tip of the tube is broken off and it is inverted in a capillary pipette into which some cotton has been loosely pushed down to fill the entire tip and allow a little tail to project below. The cotton soaks up the fluid and a drop slowly gathers on the projecting wisp below, whence it can safely be dropped into the eye.

AN EPIDEMIC OF INFANTILE DIARRHEA, APPARENTLY CAUSED BY THE BACILLUS PYOCYANEUS.

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DETROIT.

This epidemic, which occurred among the babies in the Woman's Hospital and Infant's Home of Detroit, seems worth reporting, not only because of the relative rarity of this bacillus as a cause of infant diarrhea, but also because of the probable means of spreading the infection, and some unusual clinical features of the disease compared with other reported cases of infection by the same organism.

The babies affected belonged to three groups: (1) The older ones, between 1½ and 2½ years, who were able to walk, to eat some solid food and who were in the playroom during the day. (2) The comparatively healthy bottle-fed infants in the nursery. (3) Those who by reason of sickness or malnutrition needed especial care and were kept by themselves in the infirmary.

The milk given these children comes from two sources. The older children, and the better nourished of the younger ones, receive milk from a dairy which furnishes a very fair grade of Jersey milk, while the more delicate children are fed on formulas made up with milk from the Walker-Gordon farm. The babies are cared for by nurses in the training school, and by women who have been delivered in the hospital and who pay for the care of themselves and their babies by doing such of the hospital work as they can.

On October 12 one of the older children, who was fed on the Jersey milk, bread and cereal, and cared for chiefly by his own mother employed in the hospital, developed diarrhea, without fever and with no special prostration or loss of appetite. There was nothing remarkable in the stools, and at the time no special attention was given to the case. The child quickly became better under routine treatment, but had various relapses, and as he was later found to be suffering from the same infection as the rest it is probable that his was the first case.

On October 24 another one of the older children in the playroom had diarrhea, which again was not severe, and without fever. On November 4 three more of the playroom children were affected. These cases were so mild that the children remained at play, and my attention was not called to them by the interne until a week later. On November 5 one of the infirmary babies had a similar diarrhea. On November 7 and 9 two more of the older children developed diarrhea, and on November 16, 17 and 18 eighteen babies, including all but one of the six infirmary babies, became ill.

At this time it was evident that we had to do with an epidemic resulting from some specific infection, and that this was not an infection of the milk, because babies receiving milk from the two different dairies, prepared in different ways, were simultaneously affected. It was clear, however, that the infection was conveyed by the nursing bottles, because none of the breast-fed infants were sick. It seemed certain, therefore, that the infection was transferred to the nipples by the hands of the women who changed diapers and fed the babies. Accordingly, such measures as were possible were taken to avoid this.

The sick children were segregated so far as possible, extra nurses were put on, and instructions were given

that no one was to go from one child to another without thorough cleansing of the hands, and that no article was to be used for any two children without a sterilization between. There was not, however, vacant space enough to admit of thorough sterilization of the rooms, even if this had seemed advisable, nor was the force of nurses large enough so that we could dispense entirely with the services of the untrained women; and to the utter inability of these latter to understand the necessity of and carry out thorough cleanliness, in spite of strict instructions, is probably due the fact that between this time and December 16 the epidemic spread gradually to ten other babies, so that eventually all but one of the artificially-fed children were sick. No breast babies were infected; but one who was weaned during this period, owing to failure of the mother's milk, had a mild attack.

As soon as it became evident that there was a common infection efforts were made to discover the infective agent and its source. Stains were made of fresh smears from many of the stools, and the facilities of the Detroit Clinical Laboratory being placed at my disposal, Dr. Sill, the superintendent of the laboratory, and myself made careful studies of cultures from nine typical cases. In the cultures it soon developed that in six of them the predominating organism was a bacillus of rather varying form, producing a shiny and sticky growth on agar and forming rapidly an intense blue-green pigment. This pigment gave the chemical reactions of pyocyanin, and inasmuch as the predominating organism in the other three was a bacillus of the same morphologic characteristics, but without pigment formation, we should have been convinced at once that the *Bacillus pyocyaneus* was the cause of the infection, had it not been that in a number of the smears made from fresh feces the principal organism, except the colon bacillus, was what appeared to be a large, deep-staining coccus, usually occurring in pairs, and much time was spent in trying to isolate this from cultures. We found later, however, that our strain of pyocyaneus, grown on glucose agar, tended to assume this same coccus form, so that we felt justified in assuming that we were dealing with a pyocyaneus infection throughout.

Clinically, these cases presented no constant or characteristic features, except that of a very obstinate diarrhea, difficult to check and tending to recur on every effort to feed the babies during convalescence. The stools varied greatly in appearance. In the older babies they were often white, of about the consistency of thick cream; in the younger ones they were more often grass green or dark green, small, and occasionally but not constantly containing mucus. In two very severe and protracted cases, which finally recovered, mucus was constant and tinged with blood. Green stools were usually colored with bile pigment, but a number of stools showed around the edges what seemed a very typical coloring with pyocyanin. The cultures which proved to be the best pigment-producers came, however, with one exception, from perfectly white stools.

Fever was not the rule. It occurred in only ten out of thirty-seven cases, and did not go above 102.6 in any case. In two of the ten cases it was due, partly at least, to complicating otitis media, which subsided in one case without paracentesis. In the other case the fever disappeared after the operation. In two other cases the fever appeared during convalescence and seemed to be due to inanition.

A symptom common to many, especially of the smaller babies, was great abdominal distension. Two children showed temporarily quite decided edema, without nephritis. Vomiting was a symptom in only one case.

With most of the older and stronger children, as has been said, the disease was mild, but prone to relapse. In the younger ones movements were more frequent, though seldom very numerous, and prostration was greater. Emaciation was rapid in most of the prolonged cases, owing to inability to assimilate any food. Appetite was well retained by nearly all and thirst was quite marked.

There were nine deaths in all. Of these six were among the feeble infirm babies, already badly nourished, one of whom had also a gonorrheal ophthalmia. Of the other three, originally stronger, one died in convulsions attendant on an acute otitis media, one was a baby only 4 weeks old, and the other had a very prolonged and obstinate case with several relapses. Autopsies were held in four cases and no definite lesions were found anywhere, profound emaciation, with anemia of all the tissues, being the characteristics. The intestines showed a few hyperemic patches, but were mostly pale, collapsed, and in no case ulcerated. Cultures from the heart's blood and spleen were sterile. The findings in all four cases were practically those of death from starvation.

The treatment used varied according to the age of the child and the severity of the case. The mild cases among the older children did well on calomel and starvation for a day, followed by dilute boiled skim milk. All the children had calomel at the start and occasional doses of castor oil later, and all the severe cases had colon irrigations twice daily, usually with salt solution, though tannin was used with good results in the case of the two children who passed a good deal of mucus. Bismuth was used when stools were very frequent, and opium occasionally, as seemed necessary.

Feeding of the smaller babies after the initial starvation was very difficult and unsatisfactory. The very sick ones took nothing well, but did better on small amounts of dextrinized meal than on anything else; with some of them this had to be continued for several weeks, sometimes alternating with broth. Sour skim milk prepared with pure cultures of the lactic acid bacillus was not a success with any, nor was albumin water or any of the dried milk preparations well borne, except that some took malted milk well when convalescence was established. Barley gruel did not do so well as the dextrinized meal.

Diarrhea from infection with the *Bacillus pyocyaneus* is by no means unknown, and isolated cases and small epidemics have been reported by Escherich, Nobécourt, Kosse Lesage, Thiercelin, Meunier and others. Most of the reported cases, however, differ from those I have described in that sudden high fever and other signs of severe toxemia have been present, although general infection by the *B. pyocyaneus* has not been observed. The pistach-green color of pyocyanin seems to have been more common in the stools in these other cases than in mine.

The *B. pyocyaneus* is not found normally in the child's stool, but is found occasionally on the skin and in the feces of the healthy adult, as well as in certain suppurative lesions. I have been wholly unable to discover where it may have come from in these cases.