etc., and also in certain cases urobilin, acetone, diacetic acid, etc. When the intestinal contents of these patients were administered to rabbits and mice the animals soon died, while the contents of normal persons were negative. The urine (catheter specimens) of the cases which have come under my notice was examined; in 11 the reaction for albumen was present, in 4 granular casts were observed, 6 gave the reaction for acetone, and in all cases the urea output was diminished.

Cazeaux² lays stress on the severe constipation associated with excessive vomiting; in my cases I found bad teeth present in all, in addition to constipation.

Williams³ of Baltimore emphasizes the value of the ammonia coefficient of the urine, which is high in the toxæmic type, but if there are no manifest changes in the urine, he holds that the cause of the vomiting is reflex or neurotic.

Behm⁴ refers the autointoxication to syncytiolysin, and thinks this theory proved by the cessation of vomiting with the cessation of pregnancy. He maintains that the toxins are produced in the periphery of the ovum and not by the metabolism of the fetus, thus explaining the excessive vomiting of the early months. He supports his theory by the excellent results obtained clinically by the administration of rectal salines.

Many years ago Smellie⁵ wrote:

Perhaps this complaint is chiefly occasioned by a fullness of the vessels of the uterus, owing to obstructed catamenia, the whole quantity of which cannot as yet be employed in the nutrition of the embryo; over and above this cause it has been supposed that the uterus, being stretched by the increase of the ovum, a tension of that part ensues, affecting the nerves of that viscus, especially those that arise from the sympathetici maximi, and communicate with the plexus at the mouth of the stomach.

Playfair,⁶ about 150 years later, wrote in a similar strain regarding the cause of excessive vomiting. In the Hippocratic writings the cause is attributed to φλέγμα. Matthews Duncan⁷ in 1879 had a fatal case of excessive vomiting in which, *post mortem*, was found acute yellow atrophy of the liver, which condition he suggested was a factor in the production of the vomiting.

Champetier de Ribes and Bouffe de Sainte Blaise⁸ had a case in which *post-mortem* hæmorrhages and areas of cloudiness were found in the liver somewhat similar to those found in eclampsia. They considered that the excessive vomiting was the result of intoxication due to hepatic insufficiency.

The *post-mortem* examination of the fatal case which came under my notice (BRITISH MEDICAL JOURNAL, July 8th, 1911), showed the liver to be enlarged with fatty infiltration, the spleen slightly enlarged, and the kidneys congested. There was a slight congestion of the mucous membrane of the stomach, with a small patch of superficial ulceration near the pylorus. Nothing abnormal was found in the brain.

Freund⁹ thinks the source of the toxins is in the periphery of the ovum or corpus luteum or placenta, but as the toxins in the great majority of cases do not produce excessive vomiting, he advises looking for predisposing causes, such as anaemia, chlorosis, nervous diseases, etc. Giles¹⁰ considers that there are three factors in the etiology: (1) Increased nervous irritability; (2) a local peripheral source of irritation; (3) a ready efferent channel for nervous energy (the vagi).

Reflex.

Displacement of the womb was held by Graily Hewitt¹¹ and others to be the commonest cause of the sickness of pregnancy, but Giles¹⁰ states that out of 300 pregnancies, 200 had vomiting, and he found it difficult to believe that two out of three women had a displaced uterus. McClintock⁵ met with several cases of retroversion of the gravid uterus where vomiting was not a prominent feature, and in some vomiting was entirely absent. Playfair⁶ found that displacement was the exception in cases of excessive vomiting. Williams³ states that displacement may occasionally be the cause, and considers this is proved by the fact that vomiting sometimes ceases immediately after replacement. I have assisted at two Caesarean sections where ventrifixation had been performed on both patients some years previously. In each case the uterus was so held down that at the operation the uterine incision was wholly on the posterior wall, as the anterior wall had taken no

part in the uterine enlargement. In both cases there had been no excessive vomiting, and in each there was considerable uterine displacement, so much so that the children could not be born alive through the natural passages. I have had a patient with excessive vomiting and retroversion. The uterine displacement was left alone and the hyperemesis ceased with treatment.

Hydramnios and twins are also mentioned as causes. Copeman,¹² Cazeaux,² and others considered the cause often lay at the cervix, so that rigidity, deep tears, erosions, etc., should be attended to at once, the first-named by dilatation of the internal os, a procedure which, I think, would involve the risk of miscarriage. Bennet¹³ maintains that where vomiting is excessive and obstinate there is almost always inflammation or disease of the cervix or a diseased uterus, and recommends the local condition to be energetically treated. Freund⁹ records 3 cases in which the turbinates, especially the inferior turbinates, were enlarged and congested; by attending to the nasal condition, he states, he cured the hyperemesis. Giving careful consideration to the above alleged causes, is not one justified in regarding each as a coincidence merely?

Neurotic.

Williams³ has cured several cases by a vigorous lecture on the dangers attending the induction of labour. V. Winckel⁹ holds that hysteria is almost always the cause; but many women are hysterical, while the excessive vomiting of pregnancy is not common. Kaltenbach¹⁴ considers hyperemesis gravidarum to be the exhibition of a latent neurosis, while others have satisfied themselves by the results of treatment that neurosis is a cause in many cases.

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FEVER IN THE NEWBORN.

BY

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It is customary to reserve the term "newborn" for an infant in the first week of life. I propose to use it somewhat less definitely, so as to include all infants in whom the cord is still attached to the navel, for it is in this respect that such infants differ from older ones. As a general rule the cord separates in seven to twelve days, leaving a healed surface. Sometimes the process of separation takes longer, or a raw surface may be left, which perhaps does not heal until two or three weeks after birth. During this period the infant is peculiarly liable to septic and other affections of the cord and navel. In the earlier days it may show abnormal effects of confinement, some of which are prolonged or even permanent—for example, asphyxia, atelectasis, cephal-hæmatoma, sterno-mastoid tumour, various injuries, intracranial hæmorrhage, birth palsies, and ophthalmia. In addition the respiratory tract has to adapt itself to changes in temperature, and the alimentary system to undertake the digestion and absorption of food. Unsuitable diet easily and quickly induces serious illness. Many of the affections mentioned are associated with a rise of body temperature.

"Fever" means a rise of temperature of definite duration. The temperature should be taken in the rectum. In the newborn it is normally the same as, or slightly higher than, that of the mother. It generally oscillates about 99.5° F. (99° to 100° F.). Exposure, bathing, and lack of food quickly reduce it to 96° or 96.5° F., and it may not reach the normal level for three or four days—perhaps in twenty-four hours, perhaps not for ten days or even longer.

in premature infants. It then ranges between 98° F. and 99.5° F., being slightly higher in the evening than in the morning. It is important to bear these facts in mind and to remember that the temperature range in the infant is unstable and easily upset. An occasional rise for a few hours has no special significance, but a daily rise or the persistence of a temperature a degree above normal is indicative of mischief. Fever in the newborn is frequently overlooked, for there may be no other sign of illness or evident cause of the fever, and the temperature of the baby is rarely taken unless it seems ill. Yet experience shows that the temperature is often raised, for a few hours to several days at a time, during the first ten days of life.

INANITION OR THIRST FEVER.

Some of these attacks of fever, occurring during the first few days after birth, have been called "inanition or thirst fever," because the temperature has subsided abruptly on the free administration of water or a plentiful supply of breast milk. It is also assumed sometimes that sepsis rarely produces fever before the fifth day of life, an assumption not supported by facts. I regard the evidence as opposed to the view that the cause is lack of fluid or of food, for few infants receive any great amount of either during the first two or three days, and yet fever is not common at this period. Probably the pyrexia is due to mild sepsis, and the ingestion of fluid, if curative, acts by inducing elimination of toxins. Some of these cases may be due to intestinal or renal irritation, the absorption of abnormal intestinal products, the swallowing of liquor amnii or vaginal secretions, nasal catarrh, etc.

DIAGNOSIS.

The difficulty of diagnosis in pyrexia during the first few days of life can be illustrated by short details of a case:

A baby was born at term weighing 8 lb. 11 oz., after a difficult confinement: a high forceps case with considerable injury and left facial palsy. The babe was continually crying and sleepless, and thirty-seven hours after birth developed convulsions and a temperature of 104° F. Under treatment by chloral the child rapidly recovered, but there was slight fever for another four to five days.

Possibly the crying and sleeplessness, as well as the subsequent convulsions, were due to injury to the brain. At first I was afraid of a secondary encephalitis, but the rapid recovery and subsidence of the convulsions are opposed to such a diagnosis. On the other hand, meningeal haemorrhage is generally associated with a subnormal temperature. There was no evident cause of sepsis, although I incline to that diagnosis, and normal meconium was passed.

In another babe, weighing 5 lb. 12 oz. at birth, the temperature rose to 100° F., within forty-eight hours, and there was slight twitching. Next day it was 105° F., and the twitching increased. A few hours later the child became unconscious and grey, with gasping respirations, and passed a bad stool. He died in another three hours.

Here, too, the diagnosis was probably sepsis, perhaps of gastro-intestinal origin. The diet consisted of cream, lactose, and water. Labour was difficult, and had been induced two weeks before term, so there may have been cerebral injury.

INJURY AT BIRTH.

This is an evident explanation of a few cases.

Thus, a first child, born after a very difficult labour, had a little bleeding from the left ear. Twelve hours later, and again a few hours after that, he had some haemorrhage from the urethra. When I saw him, thirty hours after birth, he had a pulse rate of 144, very frequent respirations, and showed considerable bruising. He had passed no water for fifteen hours, and cried a good deal. Next morning, forty-four hours after birth, he was convulsed and refused to swallow. There was much sleeplessness and crying, pulse rate 144, temperature 100° F. Two days later the pulse was very irregular, and at times convulsions were continuous. The spasms were most severe on the right side. Undoubtedly the child was suffering with meningitis, from which he died on the sixth day of life.

But injury at birth may lead to death more indirectly, through setting up local gangrene.

A lady lost her first child from meningitis, fracture of the base of the skull being due to forceps, the child being over time. Her second labour was induced two weeks before term, and proved a difficult forceps case. The child had some bleeding after birth from the left ear and there was much bruising in front of it. Convulsions began on the twelfth day. Examina-

tion next day showed a black slough in front of the left ear, twitching on and off, and temperature 103.4° F. The cord had separated and the navel was healed. The child had been circumcised successfully. He was very lethargic and passed stools containing curds. There was a reasonable hope that the illness depended on intestinal irritation. The temperature fell rapidly, being nearly normal on the fourteenth day, and during the next five days progress was good. The temperature then rose to 109° F. on the nineteenth day. The stools were frequent and contained mucus. The gangrenous slough had separated but there was no sign of healing. The liver had enlarged considerably, the child's colour was bad, and twitching was frequent. Although the temperature subsided to nearly normal during the day it rose again to 104° F. at night and then fell gradually until death from asthenia six hours later. Lethargy and lack of vital reaction of the tissues were marked characteristics.

SEPSIS.

Roughly speaking, sepsis is the cause of quite 50 per cent. of the cases of fever in the newborn. About 25 per cent. can be ascribed to gastro-enteric infection, but it is probable that many of these are really septic in origin and the alimentary affection purely symptomatic.

Various causes account for the remaining cases. We may leave out of consideration the occurrence of fever transmitted by the mother while suffering from some specific fever, malaria, or variety of sepsis. Such cases would be readily diagnosed by the medical attendant. The malarial parasite may be present in the blood at birth, yet not cause fever until some days or weeks have elapsed. My experience is that sepsis is the chief and most common cause. All the illustrative cases quoted have been seen in consultation. Patients of this type do not often reach the hospital wards.

The sources of septic infection are numerous. It may be antenatal, maternal, or congenital; natal, due to infected liquor amnii or vaginal secretions; or post-natal, due to dirty hands, scissors, ligatures, powders, dressings, bath water, sponges, flannels, etc. Often it is impossible to ascertain the portal or source of infection. Sepsis may occur, although apparently the strictest precautions have been taken throughout. It would be interesting to know the experience of the lying-in hospitals.

Occasionally the evidence of infection by the mouth is fairly conclusive.

Mouth Infection.—The mouth of a baby, 6 lb. in weight at birth, was full of meconium, and was possibly slightly damaged in the process of cleansing. She was partly fed on the breast, partly on the bottle. At 1 week of age she had lost 6 oz. in weight, and had stomatitis. When seen at the age of 10 days she had lost another 2 oz., and showed erythematous stomatitis, a general pimply rash, green stools, and temperature 100.2° F. In the evening the fever reached 104° F. She had never taken well or passed a good stool. Next day there was definite ileocolitis, with frequent green mucoid stools. She lost weight rapidly, 10 oz. in five days, but recovered from the ileocolitis in about a week. Death resulted from the effects of toxæmia and marasmus on the twenty-ninth day of life.

In a more remarkable instance the primary cause was apparently a pustular dermatitis, which came out first on the face on the fifth day and spread all over the body.

Pustular Dermatitis.—The child was born without difficulty, and weighed 9 lb. 3 oz. Twitching began on the seventh day. When seen on the ninth day she had attacks of spasm, mainly affecting the upper limbs, the arms being flexed and raised and the hands clenched. In severe attacks the whole body twitched. The stools were practically normal. There was a teat ulcer on the roof of the mouth. Next day the temperature rose to 105° F. There was much general twitching, most in the right arm and hand, and a little cyanosis in the worst attacks. The fever persisted at a comparatively high range for two weeks, and then came down, with big intermissions, to normal in another week. After this the spasms, which had persisted throughout with great severity, gradually became less frequent and milder, and finally ceased on the thirty-ninth day of life. The child lost 11 oz. in the first week of illness, and gained 1 oz., 7 oz., and 6 oz. in the succeeding three weeks. Food was taken well, except during actual spasm. The subsequent progress of the child was excellent, and no sign of mental defect was present three years later.

UMBILICAL SEPSIS.

The cord and navel are the most important portals of infection. Sepsis via the cord begins on the second to the fifth day of life; via the navel, at any time until healing has taken place. The process may start in the cord and extend through the navel, setting up arteritis or phlebitis. Arteritis, usually a periarteritis, is the more common. It induces pyæmia without jaundice, and ends fatally from peritonitis, pneumonia, or asthenia. Pus can sometimes be

squeezed out from the end of the cord, and thickened arteries and abscess may be found under the abdominal wall if the disease spreads along the vessels and as far as the bladder. Phlebitis rarely causes local signs, unless associated with arteritis. It affects the umbilical vein, and gives rise to thrombosis, pus formation, and secondary hepatitis with progressive jaundice. Peritonitis and pneumonia are not infrequent, and are almost invariably fatal.

Clinically there are various types of septic infection. There may be no symptoms except sudden collapse, rapid fall of temperature, and death—a type most common in premature infants. Often it simulates acute gastro-enteritis, with vomiting, diarrhoea, and high fever. In other cases, cerebral and meningeal symptoms, or pneumonic conditions, predominate. Or there is severe toxæmia, with fever, greyish pallor, and hæmorrhages. Hæmorrhage after the second day of life is almost always septic. Many cases of hæmatemesis, melaena, and adrenal apoplexy are of this type. Tetanus, hæmorrhagic disease, and the affections named after Winckel and Buhl are also septic in origin.

The chief affections of the navel giving rise to fever are omphalitis; gangrenous lymphangitis, probably a variety of erysipelas; umbilical ulcer, subnavel abscess, and gangrene; and erysipelas, usually localized at first and insidious in onset, but generally fatal. In these affections the fever begins at the end of the first or beginning of the second week of life, sometimes later. A few illustrative cases may be quoted:

An infant, 10 lb. at birth, had a temperature of 102° F. on the seventh day of life and was passing good stools. Two days later there was twitching of the left arm and leg. The sutures were overlapping, the scrotum red and thickened, and there was a gangrenous odour of the cord and slight swelling of the navel. The fever and twitching lasted for six days. A drop of pus came from the navel on the thirteenth day and the cord separated next day.

In a second child the cord separated on the eighth day and there was a drop of pus. Two days later there was diarrhoea and temperature 100° F. Next day twitching began and the temperature rose to 103° F. The twitching became more severe during the night; the stools were slimy and offensive; temperature, 101° F. The buttocks were excoriated, the navel sore and exuding pus, and there was a petechial rash on the abdomen. Death ensued a few days later.

Another babe was seen on the ninth day for fever of two days' duration, anorexia, occasional colic, and one attack of lividity. A diagnosis of umbilical infection was made. Death from asthenia took place a week later, without any further symptoms.

Finally, I must refer to a case of doubtful causation.

The child, a forceps case, did not breathe well for about twenty minutes after birth, weight 9 lb. 13 oz. On the fourth day twitching began. Temperature, 101° F. Ol. ricini and grey powder were given. On the evening of the next day the temperature rose to 106.4° F., and there was much twitching, especially of the eyes, face, and hands. Probably some of the fever was due to the too liberal use of hot bottles. The child was in a state of continuous spasm. The stools were dark green, and contained mucus. No water had been passed for fourteen hours. Possibly this was of gastro-intestinal origin, as mucus and bile were vomited for two days after birth. The temperature fell gradually during the night to 102° F., rose once to 105° F. next day, and then fell gradually to 99° F. The babe was very feeble at times, but took food fairly well. During the next night she had attacks of respiratory spasm and collapse, and, though revived three times by artificial respiration, she died at 5 a.m. from respiratory spasm while being fed.

These cases are sufficient to indicate the importance of septic infection, via the cord or navel, as a cause of fever in the newborn. Such a cause must always be looked for and excluded before even thinking that an attack of fever, especially when associated with spasms and bad stools, may be due to erroneous feeding. Too much importance has been attached to dietetic factors. The incriminated organism is not necessarily a very virulent one. It is impossible to estimate its virulence, except by the height of the fever and the severity of the symptoms.

TREATMENT.

Treatment is primarily preventive. The greatest care must be taken during and after confinement to prevent infection. Dress the cord properly, using dry antiseptic gauze and an antiseptic powder, such as starch, containing 5 per cent. salicylic acid. It is even safer to disinfect it first with rectified spirit or alcohol. Once symptoms arise the treatment is symptomatic. Chloral is far the most

potent and most valuable drug for the relief of spasms. It can be given in doses of gr. ii to gr. iv by mouth or rectum. It should be given every two to four hours, the repetition of the dose depending on the effect on the child, a further dose not being given during sleep. Bromides are of much less value. Hot saline rectal injections are useful in assisting elimination of toxins. In bad cases subcutaneous injection of saline is needed. Small doses of grey powder are beneficial if the stools are bad. It is rarely necessary to give astringents for severe diarrhoea; bismuth in frequent doses is more useful. Brandy, 2 to 5 m every two to three hours, or even in larger doses, is required in toxæmia and collapse.

PROGNOSIS.

The prognosis depends on the type and severity of the case. Localized infections—for example, of the navel—are comparatively benign. As long as there are no grave signs, such as jaundice, profuse diarrhoea, recurrent hæmorrhages, peritonitis, pneumonia, or profound asthenia, there is a prospect of recovery. Anorexia, or refusal of food, and lethargy are bad symptoms. Even prolonged fever, with almost continuous spasm, may terminate favourably, though the possibility of subsequent mental defect must be remembered, as it is not always certain there is no encephalitis. Local or general palsy, due to encephalitis in the motor region, is unlikely to end in complete recovery.

FUNCTIONAL DERANGEMENT OF THE LIVER.

BY

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FUNCTIONAL disturbance of the liver has received scant attention from medical writers. While functional disorder of the nervous system and of the heart are treated at some length, hepatic insufficiency is not even mentioned in the principal textbooks of medicine. This is rather surprising when we consider the complex and varied functions performed by this important organ, for, in addition to the formation of bile, the liver is actively engaged in processes related to the metabolism of proteins, carbohydrates, and fats. The functions of the liver may be briefly enumerated:

1. It regulates the supply of glucose to the body by manufacturing it from proteins when the supply of carbohydrates is insufficient, and by storing it as glycogen when the carbohydrate element is in excess.
2. It not only prepares fats for combustion into their final products, but it synthesizes the more complex fatty compounds.
3. In relation to protein metabolism its chief functions are to convert amino acids into urea, and it plays an important part in the formation of uric acid, creatinin, and other waste products. These processes are chiefly carried out by intracellular ferments produced by the liver cells.
4. It is also the chief antitoxic organ. Further, the liver is concerned in the destruction of hæmoglobin, and is a source of animal heat.

From this brief summary of its more important activities it is obvious that any interference with the work of the organ must produce some symptoms.

What are the manifestations of so-called hepatic inadequacy? A large proportion of the symptoms ascribed to insufficiency of the organ, such as flatulent distension of the abdomen, constipation, etc., are due to digestive disorders, and are themselves the cause of the liver disturbance. It may be dogmatically stated that functional derangement of the liver is generally secondary to disturbance in some other part of the organism. Further, it must be acknowledged that in certain individuals the functional activity of the liver becomes very readily depressed; in other words, there is a liability or a predisposition to functional derangement of the organ.

During the past season I measured the vertical dullness of the liver in 300 consecutive patients. The measurement was taken in the nipple line. The normal measurement is about 4 in. Exclusive of cardiac and gall-stone cases, in 36 the normal average was exceeded—in the large majority by one or two inches. Normal liver dullness may measure 6 in., but the percussion area is then very little affected by stimulation and counter-irritation of the organ. In most of the cases, after a series of liver packs, the vertical dullness was only 3½ in.