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THE DIAGNOSIS OF DISEASES OF THE GALL BLADDER AND
BILE DUCTS.*

BY

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The bile ducts are but passages for the conveyance of bile from the liver cells to be cast out into the intestines, and the gall bladder is a diverticulum that acts as a temporary reservoir to receive the excess of bile when the discharge is less rapid than the secretion, as it probably often is in sleep and rest, at which time the flow lacks the stimulus of the active movements of the diaphragm and the abdominal muscles.

The outlet of the common bile duct into the intestine is considerably narrower than the calibre of the duct, and the pressure of the bile in the ducts is very low; a very slight impediment therefore suffices to interfere with its proper discharge, and cause a damming back of the bile in the bile capillaries, when it begins at once to be absorbed by the lymphatics of the liver and is discharged into the blood by way of the thoracic duct. The flow of bile may be impeded, or wholly obstructed, (1) by inflammatory swelling of the lining membrane of the ducts; (2) by gall-stones, or foreign bodies in the ducts; (3) by pressure from without by tumours, glands, etc. It is from obstruction that most of the symptoms of disease of the bile passages arise.

It is furthermore to be noted that the bile ducts, opening as they do into the small intestine, are peculiarly exposed to infection by the micro-organisms of the intestinal tract, especially the *bacillus coli communis*. As the bile may contain bacteria excreted from the blood,

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direct infection may also take place, as occurs, for example, in typhoid fever, but the danger is much less than that of infection from the intestine. Not only the inflammatory affections of the biliary passages, but gall-stones also are due to bacterial infection. The infection causes some catarrhal inflammation of the gall bladder. Increased secretion of mucus results, and this leads to a precipitation of calcium salts, cholesterine, and bile pigment, of which the stones are composed. Clumps of bacteria may constitute the nucleus of a stone. Further it is at least possible that malignant diseases are caused by infection. In the bile passages, with few, if any exceptions, the development of malignant disease is preceded by gall-stones, from which we can fairly infer that the irritation produced by gall-stones offers a favorable condition for malignant infection, if there be such; hence the much greater frequency of malignant disease of the gall-bladder than of the bile ducts. The cardinal symptoms of disease of the bile passages are jaundice, pain, and fever.

Jaundice is the most common, as it is practically a constant symptom of the affections of the common bile duct.

As diseases of this duct always alter its calibre and therefore cause obstruction, it follows that jaundice must result. The converse is, I think, equally true, viz., that jaundice is always the consequence of obstruction of the common bile duct, or of its ramifications in the liver. A non-obstructive jaundice is described in the books, and acute yellow atrophy among others is given as belonging to this class; but in this disease, as in others of a similar character, there is ample proof of obstruction of the biliary canaliculi in the periphery of the hepatic lobules. It will certainly contribute to the definiteness of the pathological concept if jaundice signifies to us absorption of bile, and absorption that always results from its flow through the bile ducts being somewhere obstructed.

Fever is a frequent symptom in all forms of disease of the gall bladder and bile ducts. It is caused by the absorption of toxic material from the inflamed or ulcerated mucous membrane. Its severity usually accords closely with the gravity of the cause. In catarrhal jaundice the fever, if present, is slight, lasting three or four days; here the infection is mild. In marked obstruction, especially from gall stones, there may be recurrent chills with high temperature, the temperature being normal in the interval—the so-called hepatic intermittent fever. Chills and fever are more common, however, in suppurative cholangitis, which is very often associated with a history of gall-stone obstruction. It may occur also in obstruction from tumours, especially in rapidly growing cancers implicating the ducts. In gall-stone colic, even in the absence of suppuration, the chills and

fever may recur in distinct malarial-like paroxysms of great regularity. The suppurative cases can only be differentiated by the continuous fever, deeper jaundice, tenderness in the gall-bladder area, rigidity of the overlying muscles, and the graver constitutional symptoms. If a decided increase of leucocytes is found on examining the blood the existence of a suppurative condition may be rendered certain.

Pain varies according to the cause; it is the earliest and may be the most distinctive symptom. It is referred to the upper right quadrant of the abdomen. In inflammatory conditions it is of varying intensity but usually moderate, and always continuous and associated with tenderness. That due to passage of gall-stones is, in typical cases, sudden in its onset; it may be mild, but is usually severe; so severe it may be as to kill outright. It is paroxysmal, and, as in colics generally, pressure gives some comfort. As soon as inflammation occurs in the gall-bladder or ducts, tenderness over this region and spasm of the overlying muscles occur, marked in proportion to the extension of the inflammation to the peritoneal covering; then there is also continuous pain. In neurotic patients, especially females, there may be marked tenderness over the gall-bladder without the existence of inflammation. It is due to hyperæsthesia; there is usually no spasm of the muscles in such cases.

I. CHOLANGITIS AND CHOLECYSTITIS.

1. (*a*) *Acute Catarrhal Cholangitis*, or *Catarrhal Jaundice*, occurs usually in younger persons and is generally easily diagnosed. Jaundice in a young person coming on without pain or apparent cause, except disturbed digestion, is most probably catarrhal. Absence of pain, and of emaciation, and a negative examination, usually renders the diagnosis certain. If the condition lasts more than a week or two the possibility of grave disease such as acute yellow atrophy should not be overlooked. The general disturbance may be so mild that faint tinging of the conjunctiva is the first thing noticed; generally, however, the jaundice is preceded by symptoms of gastro-intestinal disturbance, as anorexia, nausea, furred tongue, foul breath, constipation, malaise, headache, etc. Ordinarily the cause is soon removed and the symptoms quickly disappear, and we surmise that the condition is due to catarrhal swelling of the mucous membrane of the bile passages with consequent impediment to the flow of bile; its absorption by the hepatic lymphatics giving rise to a mild jaundice.

Sometimes the obstruction is more decided and persistent, and the symptoms may continue for weeks. In such cases the liver may become enlarged, the general health impaired with loss of flesh and strength, and the condition assume the general appearance of serious

organic disease. Such cases may assume the appearance of the early stages of acute yellow atrophy, so that in children when the jaundice does not abate within a week, and still more, if it increases, a guarded prognosis should be given.

Gall-stone jaundice is easily excluded if the symptoms are definite—by the attacks of sudden pain and the jaundice increasing with each attack of pain; but remitting in the interval; by the history of preceding attacks of gall-stone colic; and often by the associated paroxysmal hepatic fever. But gall-stones may cause little pain and tenderness, and be thus indistinguishable; in such cases, however, the jaundice is catarrhal. In malignant disease, in which the jaundice is always partly due to catarrhal swelling, the loss of flesh, cachexia, ascites, tumor, and nodules in the liver serve to distinguish the more grave lesion.

In cirrhosis the slight jaundice, more advanced age, previous history, and ascites, are usually sufficient to differentiate. Hypertrophic cirrhosis is distinguished by the large liver, the ascites, the more advanced age, and the chronic course.

(b) *Chronic Catarrhal Cholangitis* is rarely a sequel of the acute affection, but usually results from the continued irritation of some persistent cause as gall-stones, carcinoma, etc., implicating the bile ducts, or pressure from without. The mucous exudate may be so inspissated as to cause attacks of colic which may be indistinguishable from those due to gall-stones. There is, however, usually little if any increase of jaundice in such colic, as there is in colic from gall-stones in the common duct. In these chronic cases the inflammation may extend through the duct wall and affect the peritoneal covering and adhesions to surrounding structures follow. Such adhesions may give rise to severe pains resembling colic; they are usually less distinctly paroxysmal, but tend to be more continuous with exacerbations like inflammatory pains.

2. *Suppurative Cholangitis and Cholecystitis*.—This is called *Infective Cholangitis*, but the term is not well chosen, as inflammation of the tract is always infective.

The results of infection depend rather on the degree of impediment to the flow of bile than on the inherent qualities of the infecting organism. The more complete the arrest of flow the more virulent is the infection likely to become. Normal bile is sterile, and organisms are not easily grown in it, not because of its antiseptic properties, but owing to its poverty as a nutrient medium. If there is a free flow of bile the organisms have little opportunity to grow and develop malignancy, but if the flow of bile is obstructed they flourish in the exudate that takes place from the diseased passages. Probably there-

fore all varieties of inflammation of the gall-bladder and passages are but gradations of infection by such organisms as bacilli coli communis, streptococci, staphylococci, pneumococci, and typhoid bacilli. Infection with little obstruction of bile flow usually produces catarrh; with complete stoppage a septic cholangitis and cholecystitis, that may be so severe as to be gangrenous.

In the great majority of cases of suppurative inflammation there is a history of gall-stones, and one or more of these are found impacted, or acting as "ball valves," in the ducts; other cases occur from infection by the organisms of such constitutional diseases as typhoid fever. In the mildest cases, in addition to the gall-stone colic with some intermittent jaundice, there are more or less marked chills and fever followed by sweating. The regularity of the recurrence of chills may simulate malarial fever, but such regularity rarely lasts long.

If the obstruction is more marked, and therefore the infective organism more virulent, the symptoms become more grave. The chills, fever, and sweating are more decided, and the jaundice is more marked and persistent. Unless relieved a general condition of sepsis soon develops, the patient dying in the typhoid state.

If the disease has developed in the absence of gall-stones, there will be little pain, but it is rare to find none present. The liver becomes regularly enlarged and somewhat tender. On account of extension of irritation to the peritoneum there is usually tenderness below the right costal margin. If the disease follows gall-stone colic which has recurred from time to time the diagnosis may be easily made; in other cases a diagnosis is often impossible. Cases of pylephlebitis present a similar picture and cannot be distinguished, unless a focus of infection of the portal system can be discovered. In both there is marked leucocytosis. The gall-bladder is nearly always affected in cholangitis, though probably rarely secondarily to it, as the cystic duct is closed early. There is always distension of the gall-bladder, and the inflammation extends to the surrounding peritoneum, hence there is always tenderness, and a pear-shaped tumour is usually palpable at the costal margin in the line from the tip of the ninth costal cartilage to a point one inch below the umbilicus. This is the usual seat of it, but not rarely it becomes much displaced especially if the gall-bladder is greatly enlarged. It moves with respiration, and an incisure may be found between it and the liver. As the inflammation affects the peritoneum the tenderness increases, and adhesions take place to surrounding structures so that the tumour becomes less definite, and the increasing spasm of the abdominal muscles interferes with examination. Pain is usually continuous; and fever moderate, although it may be absent. Fever is said to be more marked when there is

ulceration of the mucous membrane of the gall-bladder, and the pain more marked when there is no ulceration.

In the gangrenous or phlegmonous cases as in all acute intra-abdominal diseases, the diagnosis is difficult in proportion to their severity. The more severe the symptoms the more they lose their localizing characteristics and the less likely they are to indicate even the section of the abdomen in which the disease occurs. The symptoms are those of *peritonism*, and are such as may arise from gangrenous inflammation of any abdominal organ, as gangrenous appendicitis for which they are most frequently mistaken. They simulate also strangulated bowel, gangrenous pancreatitis, perforation of the stomach or intestine, and acute intestinal obstruction. A previous history of cholecystitis, of gall-stones, or an infective fever, especially typhoid, indicate the gall-bladder as the seat of disease and may enable us to make a diagnosis.

II. CHOLELITHIASIS.

Gall-stones are said to occur in 20 per cent. of all persons over 60, but to produce symptoms in only 5 per cent. of those affected. The occurrence of symptoms depends, first on the situation of the stones, and, secondly, on the condition of the wall of the gall-bladder and the surrounding tissues. So long as the stones lie in the gall-bladder no symptoms arise directly from them; it is only as they block the ducts that they cause disturbance. Once the wall of the gall-bladder and the tissues around it become inflamed, the occurrence of symptoms may be quite independent of the presence of stones.

Of those in whose gall-bladders there are stones, in a large group there are no symptoms; in a smaller group, the symptoms are mild, consisting of slight disturbances in the region of the liver and stomach, such as may arise from gastric catarrh with hyperæsthesia, floating kidney, slight adhesion of the stomach, or a neurosis. The possibility of gall-stones should not be forgotten in such cases. In the third and smallest group the symptoms are severe; they may or may not be characteristic.

In a typical case, the onset is sudden, it may be with such slight prodromata as chilliness, nausea, and malaise. There is usually no apparent cause for the symptoms, though there may have been some error in diet. The pain may be sudden in onset and extreme from the first, or, begin mildly and become slowly or rapidly severe. It is felt in the right upper quadrant of the abdomen, with some extension to the left. It radiates to the back, the right shoulder, and even down the abdomen and thigh. It may be so severe as to cause collapse. Usually it is somewhat paroxysmal, and terminates abruptly. Nausea and vomiting may be marked. Such is the descrip-

tion given of the pains of gall-stone colic. The description may locate the pains more definitely in the right upper quadrant, but, unfortunately, in many cases it is not so typically located.

The difficulties of diagnosis are well illustrated in the following cases.

In a lady whom I saw a few days ago there was a history of attacks of colic extending with intervals over 8 years. In the earlier years she said the pain always began in the lower zone of the abdomen, and gall-stones were not suspected as the cause; in recent attacks the pain was rather diffuse in the area between the ensiform cartilage and the umbilicus. Her gall-bladder now formed a freely movable pyriform tumour extending nearly to the umbilicus. There was persistent vomiting and marked prostration. There was no fever, yet leucocytosis was so decided that empyema of the gall-bladder had doubtless occurred in this attack. Her general health was such as not to permit of operation, and she died two days later.

In another case, a lady of rather neurotic temperament, the pain began at the costal margin, just at the ninth cartilage, but was greatest to the right of the spine between the eighth and twelfth ribs where there was much tenderness of the muscles with radiation of pressure pain to the front; to the gall-bladder region if the pressure was made over the eighth or ninth ribs, and to the appendix region if over the eleventh and twelfth ribs. There was marked tenderness in the region of the gall-bladder, but no spasm of the overlying muscles. The tenderness was evidently due to hyperæsthesia and not to inflammation. The recurrences of pain were irregular, sudden in onset and ceased suddenly, bore no apparent relationship to food, and were often accompanied by vomiting. There were no symptoms of gastric ulcer or history to indicate perigastric adhesions. The gall-bladder could not be made out with certainty. The right kidney was slightly prolapsed so that the lower portion of it could be palpated. In such a case only a probable, or even a possible diagnosis of gall-stones could be given. Some years ago Boas drew attention to tenderness to the right of the twelfth dorsal vertebra as a sign of gall-stones. The tenderness may persist long after the attack has subsided. In the foregoing case tenderness was more diffused and was nearly as marked on the opposite side.

Jaundice is usually said to occur in one-half the cases of gall-stones, that is, we are to infer that in half the cases the stone passes into the common duct. My own experience places it much below that. Stones in the gall-bladder and cystic duct cause no jaundice unless from extension of catarrhal inflammation to the common duct. It is probable that in considerably less than one-half the cases with a

history of gall-stones do any stones pass through the cystic into the common duct, so that in only a minority of cases will gall-stones interfere with the flow of bile from the liver; it is only in the "successful," not in the "unsuccessful" attacks that jaundice occurs (Riedel). If the stone does not gain access to the common duct jaundice follows the attack of colic in one or more days after its escape from the cystic duct. Its amount and duration will depend on the degree and duration of the obstruction. As soon as the stone passes into the intestine and the obstruction is removed the bile flows freely again and the jaundice rapidly disappears. The stone, however, may become impacted in the duct, or lodged in the ampulla just above its outlet. The obstruction will cause dilatation of the duct with distension especially around the stone; this allows the stone to float backwards and bile escapes, and the jaundice lessens until the stone again blocks the passage. The process is repeated and continues so long as the "ball-valve" action of the stone continues. With these recurrences of obstruction there may be repetitions of chill and fever. This variation in the jaundice is almost pathognomonic of gall-stone obstruction as jaundice from other forms of obstruction usually remains unabated while the obstruction lasts. Gall-stone obstruction rarely gives rise to unvarying persistent jaundice unless the stone is lodged at the outlet of the duct into the intestine, a rare event. In gall-stone jaundice the liver is rarely much, if at all, enlarged, and the enlargement takes place more slowly than in jaundice from carcinoma.

Fever of the intermittent hepatic type is not uncommon in the cholangitis associated with gall-stones, and is of serious import in proportion to its severity and continuance. If with it tenderness in the gall-bladder area with spasm of overlying muscles, the development of a tumour in this region, and rapid increase in leucocytosis occur, there is little doubt of pus formation in connection with gall-stone obstruction.

Tumour as a result of gall-stone obstruction is not common because of the inflammatory thickening of the wall of the gall-bladder which usually precedes and accompanies the formation of the stone. If the changes in the gall-bladder are but slight a plug in the cystic duct may cause great distension of it by mucoid fluid secreted from its wall. It then forms a smooth pyriform tumour with its large end towards the umbilicus, freely movable at its lower end and fixed to the liver above and moving with it. If not too much distended and a number of stones are present, and if the abdominal wall is thin and relaxed, crepitus is sometimes obtained on manipulating the tumour. There are, however, a good many "ifs" to be provided for before this sign is obtainable. Such a tumour has to be differentiated from tumour

of the pylorus, and of the head of the pancreas. If it is large and dislocated it may be difficult to distinguish from floating kidney, or from a cyst of the ovary.

Gall-stones may be diagnosed with certainty in the following conditions:

(1) Recurrent attacks of colic at the right costal margin with or without jaundice, with nausea and vomiting, and tenderness in the gall-bladder region. A history of such attacks, especially at long intervals renders the diagnosis certain.

(2) Recurrence of jaundice of short duration, or of long duration if preceded by colic. In such conditions the degree of jaundice is usually variable. Previous attacks of jaundice with gall-stones in the fæces are, of course, conclusive.

(3) Attacks of colic followed by jaundice a few days later.

Several conditions produce symptoms similar to those of gall-stones. In many cases of gastralgia the pain is sudden in onset and severe and is occasionally accompanied by nausea and vomiting. Such attacks may be due to a variety of causes, such as gastric or duodenal ulcer, hyperacidity in cases of gastric hyperæsthesia, and adhesions of the stomach to the gall-bladder or bile ducts. In the last class with the attacks there may be jaundice, and thus simulate a gall-stone attack very completely. A history of gastric ulceration or of gall-stones would be of great value in such circumstances. The attacks in such perigastric adhesions usually persist longer than gall-stone colic, and recur for years without material injury to health. They usually resemble gastric ulceration with hyperacidity more than gall-stone colic. The pain of neurosis, especially in neurotic women, may give much difficulty. The second case already described is one in point. In that woman there was the pain of neurosis, but that there was not also pain from gall-stone irritation of the cystic duct was quite uncertain. The gastric crises of *tabes dorsalis* may cause difficulty, especially if they occur before the other symptoms become manifest.

By way of conclusion I may say that in typical cases of gall-stones, as well as of diseases of the gall-bladder and bile ducts, the diagnosis may present no difficulties, but in the atypical—and they form the great majority—more than a probable diagnosis is impossible. Inflammation may simulate stone; and stone, inflammation. Tumour may simulate both. One often masks the character of the others.

A positive diagnosis being impossible, it only remains to be armed with a full appreciation of the difficulties to be met and of the conditions that may lead astray.

THE MEDICAL TREATMENT OF DISEASES OF THE BILIARY PASSAGES AND GALL BLADDER.

BY

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I have been requested to say a few words to open that part of this discussion dealing with the medical treatment of diseases of the biliary passages and the gall bladder. Diffuse suppurative inflammations and stenosis, and obstruction of any one of the ducts of a mechanical character, are admitted by all to demand immediate surgical intervention and, therefore, call for no remarks from me this morning. My observations will be limited to the treatment of the so-called catarrhal inflammations of the bile passages and gall bladder, and to the prophylaxis and early medical treatment of cholelithiasis.

Until recently the treatment of these affections has confessedly been very empirical, and the results obtained have been uncertain and disappointing. Many advances, however, have been made during the past few years in our knowledge both of the physiology and the pathology of these organs. Recent carefully conducted experimental investigations carried out in animals with artificial, and in men with accidental biliary fistulæ, have enabled us to appreciate the various influences which modify and alter the secretion of bile, and interfere with its passage from the liver cell through the minuter bile ducts to its exit into the intestinal tract. By this same method of investigation also we have been enabled to clear away much of the ignorance and confusion which has existed in reference to the action of drugs on this secretion. These advances in our knowledge may assist us in prescribing a more rational, and, therefore, more successful therapeutics.

Rational therapeutics must always be based upon a knowledge as exact as possible of the underlying pathology. Pathologists, however, have as yet spoken in a very hesitating way as to the morbid conditions present in jaundice not due to a demonstrable obstruction. The opinions of Hunter (1) carry much weight, although as yet post-mortem evidence of catarrhal inflammation of the ducts is very scanty. Our present views may be epitomized as follows:—The liver, situated as it is on the most important vessel of the portal circulation, besides performing its important offices in regard to metabolism, acts as an important excretory organ

much in the same way as the kidneys do in the general circulation; and in doing so it protects the system against the entrance of toxic drugs and the crude and irritating products of faulty digestion. The products of normal digestion carried to the liver and excreted in the bile are non-irritant. It is otherwise in certain disorders of the gastro-intestinal tract associated with the formation of irritating toxins, which toxins, when absorbed into the portal system, are arrested and excreted by the liver cells into the bile, altering its non-irritant character. If this bile were poured directly into the intestines, little or no disturbance might arise, but, instead of this, it is passed at a very low pressure along a system of minute canals lined with epithelium which is itself excretory. This epithelium under normal conditions appears to secrete a considerable quantity of watery fluid into the bile, rendering its consistence thin and its flow easy. Under the influence, however, of irritating properties in the bile the secretion of this lining epithelium is increased in quantity, and becomes mucus and viscid in character, thus checking the onward flow of the bile, and, in the more severe cases, producing such a rise of pressure in the ducts as to lead to some re-absorption by the lymphatics.

The results obtained by Stadelmann (2) in his experiments with toluyl endiamin afford us a curious illustration of this condition in an extreme degree. When this drug was administered to dogs, it promptly produced an attack of jaundice, which could be attributed only to the marked increase in the viscosity of the bile, resulting not from changes in the bile as secreted by the liver cells, but from a greatly increased secretion of mucus by the walls of the bile ducts. This increase of viscosity, associated with an inflammatory swelling of the epithelial lining of the ducts, brought about a stasis in the bile current leading to re-absorption of the bile through the lymphatics into the general circulation, and thus gave rise to the symptoms of icterus. The jaundice in this case had nothing to do with the duodenum, for it occurred even when the common bile duct had been ligatured and a biliary fistula established.

Fortunately few toxins or drugs possess properties so irritating to the mucous membrane of the bile ducts as this toluyl endiamin, but Hunter (3) considers the icterus of epidemic jaundice, of febrile jaundice, of the jaundice of Weil's disease, of acute yellow atrophy, of the various specific fevers, such as yellow, relapsing, and malarial, and of pyæmia, to be of a similar nature.

He is also of the opinion that some retardation of the flow of the bile associated with a slight degree of catarrh of the bile ducts frequently underlies the ailments included under the term lithæmia, and popularly

attributed to "biliousness" and a "torpid liver", ailments not infrequently accompanied by more or less tinging of the conjunctiva.

It is easy, on this supposition, to understand the good results often resulting from the employment of the so-called hepatic stimulants, such as mercury, podophyllin, and rhubarb, which, as we now know, have little direct action on the liver cells, but a very distinct action on the gastro-intestinal mucosa.

Closely associated with any retardation in the on-flow of the bile in the ducts is another important factor in the production of disease in these passages, namely, the infection of the bile by micro-organisms. In health the bile is sterile. Attempts to prove that it is not so have not been confirmed, though the old idea that it possesses marked antiseptic properties has been overthrown, and investigators have shown that many forms of micro-organisms may grow luxuriantly in it under certain conditions.

Infection by bacteria may take place in two ways. We may have an ascending infection through the biliary passages from the duodenum. In this case an infection is possible from either the bacillus coli or the streptococcus, as these bacteria are frequently present both in the duodenum and in the lower end of the ductus choledochus. We may also have an infection through the portal circulation; bacteria absorbed from the intestine may pass in the blood through the portal vein, be eliminated by the liver, and pass into the bile. Fütterer (4) has demonstrated that typhoid bacilli may readily pass in this way into the gall bladder. Fraenkel and Krause (5) have shown that the bile is a much frequented habitat of the typhoid bacillus, and cultures made from bile in the gall bladder in 30 autopsies of patients dying of typhoid fever showed the bacillus typhosus in 21. Chiari (6) found the typhoid bacillus in 19 out of 22 cases of typhoid fever, and Osler (7) states that Flexner found them in 7 out of 14 cases, but in no case was there any clinical or pathological evidence of an inflammatory reaction in the gall bladder. To permit an active infection some stagnation in the bile current appears to be necessary.

Naunyn's experiments demonstrated that only after ligation of the common duct will an injection into the hepatic duct of a culture of the bacillus coli be followed by inflammation. Peterson, (8) referring to cases of cholelithiasis occurring in Czerny's Klinik, says, "after the operation the bile which escaped in the fistulous opening was examined from time to time, and it was found that the bacteria diminished rapidly as the bile continued to flow, and were often found to have disappeared at the end of eight days, almost always after three to four weeks." In one experiment Cushing (9) found that the typhoid bacilli

introduced directly into the gall bladder of the dog, disappeared in 24 hours with the free flow of bile. Many other experiments that I could mention indicate conclusively that without stagnation in the onflow of the bile, an active infection does not take place.

Still further, a retardation in the onflow of the bile associated with a catarrhal condition of the bile ducts, and a consequent increased secretion of mucus and exfoliation of epithelial cells, undoubtedly plays a very important, if not the most important, part in the formation of gall stones. The majority of gall stones, as we know, are formed chiefly of cholesterin, having a nucleus either of clumped bacteria or of bilirubin calcium. Cholesterin has been regarded as a normal constituent of bile, in which it is held in solution by the bile salts and by the small quantity of fats and soap present in bile, but it appears to be very doubtful whether it is actually formed in the liver cells. Experiments carried out in Naunyn's laboratory would indicate that there is no separation whatever of cholesterin from the blood by the liver cell, and that the amount found in the bile is in no way dependent upon the quantity or character of the food taken. Naunyn (10) considers that only a very small amount, if any, of the cholesterin in the bile is formed by the liver cells, but that a much larger amount is derived from the epithelium of the biliary passages and is a product of the disintegration of their protoplasm. He adds that whatever view may be taken of the source of the cholesterin of the bile in health, there can be little doubt that the biliary passages are its source in disease. What, then, are the conditions leading to its formation in increased quantities and to its precipitation? Statistics show that gall stones are extremely uncommon in young persons under 30, and are most frequently met with over 60. They are three to four times more common in women than in men; they are also much more frequent in those who suffer from conditions favouring retardation of the bile current. Such conditions exist in those who lead an inactive life, in persons suffering from mitral stenosis, and in those in whom the movements of the abdominal and respiratory muscles are hampered by tight-lacing, obesity, pregnancy, or abdominal tumour. Stasis in the onflow of bile in the ducts, therefore, appears to be an important etiological factor in the formation of gall stones. How does this stasis lead to cholelithiasis? Frerichs taught that under conditions of stasis changes took place in the bile, its reaction became acid, the bile salts were decomposed, and the cholesterin was precipitated. Naunyn, (11) however, questions this explanation, and, as the result of his investigations, regards the infection of the bile by micro-organisms as the efficient cause of the increased secretion

from the epithelium of the bile passages. When stagnation occurs from any cause, a bacterial infection is favoured. Should such infection take place, a catarrhal cholangitis and cholecystitis is set up; cholesterin is formed in an abnormal amount, which is afterwards readily deposited on any suitable nucleus, either a minute bilirubin calcium calculus, or a clump of typhoid or colon bacilli. Still it is to be remembered that stasis is the important underlying factor permitting such infection, for with a free flow of the bile we know that bacterial infection tends to disappear rapidly.

Stasis is also an important factor in the formation of the bilirubin calculi. Pure bilirubin is never precipitated (Hunter), but under certain conditions it combines with calcium and is then precipitated as an insoluble compound constituting the gritty particles sometimes met with in the intrahepatic ducts, which may grow to form small calculi, or may form the nucleus of a cholesterin gall stone. Bilirubin and calcium are both normal constituents of the bile, but under ordinary circumstances never combine to form this insoluble compound, even when lime is added directly to the bile in considerable excess; the combination being prevented by the presence of the bile salts. Naunyn found, however, that the addition of a small amount of egg albumin to the bile at once brought about a precipitation of this insoluble salt. He, therefore, considers it highly probable that the albuminous material derived from the desquamation and disintegration of the epithelium of the bile passages in catarrhal conditions is the chief determining cause of the precipitation of these small concretions. This catarrhal condition is dependent to a great extent on stasis in the bile current associated with either a bacterial infection or the excretion of irritating toxins in the bile, so that again we have stasis as the important etiological factor to be considered in our therapeutics.

Recognizing, therefore, the importance in the etiology of the diseases which we are now considering of any retardation in the on-flow of the bile in its ducts, let us briefly enquire into the means at our disposal for modifying the amount and character of this secretion and for favouring its passage through the small ducts till its exit into the intestine.

Placed, as the liver is, upon an efferent vessel of the alimentary canal, its vascular condition must vary with the varying conditions of the gastro-intestinal tract. The mere taking of food in itself produces an increased secretion which becomes marked within an hour and greatly increased after four or five hours have elapsed. Heidenhain (11) has also shown that in dogs, section of the splanchnic nerve, by producing a general dilatation of the portal vessels, causes a marked increase in the flow of bile, while stimulation of that nerve, by inducing a contraction of the same vessels, diminishes the secretion of bile.

Our knowledge is still defective as to the exact influence on this secretion of the various constituents of the food. Fats appear to have a marked effect in increasing the amount of bile secreted and also the amount of fat excreted in the bile. Rosenberg (12) has shown that the influence of the fats in stimulating the secretion of bile is much more distinct than that of either proteids or carbohydrates. Barbara (13) in a recent paper has stated that the excretion of bile after a meal of proteids or carbohydrates, runs parallel with the excretion of urea, while after a meal of fats, bile secretion increases out of proportion to the urea; and Albu (14) says that in a woman with biliary fistula he found that a diet consisting of eggs, soups, white meat, vegetables and fruit, caused a more abundant outflow than one in which meat figured largely.

The secretion of bile is also influenced by the amount of fluid taken, but there is no mechanical filtration such as exists in the kidneys, as the bile is excreted at a pressure several times higher than that in the portal vein. The amount of water excreted is, therefore, dependent on the activity of the liver cells and not on the water in the blood. At the same time, it has been observed that in the case of a woman with a biliary fistula, the amount of bile excreted was greater upon the days on which a large amount of fluid was taken, and that this increase was in the quantity of the water and not of the biliary salts.

The determination of the influence of drugs on the biliary secretion has been beset with many difficulties; and even in the case of the few which apparently stimulate this secretion, it is difficult to be sure of the exact part played by the liver cell itself and by the expelling apparatus, and of the effect produced by the action of tissues outside the liver, such as the intestinal glands and mucosa. Careful experiments, however, have been recently made in cases of accidental biliary fistulæ, and the effect of drugs carefully observed.

The more important drugs which have been found to increase the flow of bile are: turpentine, salol, sodium salicylate, sodium benzoate, and euonymin, but no drugs stimulate the flow so powerfully as do the bile salts, the glycocholate and taurocholate of soda. The action of sodium bicarbonate, sodium chloride, sodium sulphate, Karlsbad salts, aloes, rhubarb and ipecac, is so slight as almost to amount to nil; while calomel, strychnine, and potassium iodide rather diminish the flow.

A recent investigator has questioned the existence of any drugs directly influencing biliary secretion. But this, I think, is carrying scepticism too far; we know that the bile salts will stimulate the flow; similarly, but to a less extent, that sodium salicylate will increase the flow, and Rosenberg claims a direct cholagogic action for olive oil, which, in his hands, next to the bile salts, was the most efficient stimulant of the biliary secretion.

It is also to be noted that not only is the onflow of the bile in its passages influenced by the activity and character of the secretion, but also by the vigour of the peristaltic action of the muscular coat of the ducts, and by the pressure made directly on the liver and gall bladder by the movements of adjacent organs, notably by the excursions of the diaphragm and by the contraction of many of the abdominal muscles. Experiments have demonstrated that the flow of bile is much accelerated by vigorous and deep respiratory movements; a very marked increase in the amount of bile poured out takes place after waking and rising in the morning.

Having thus, very imperfectly I feel, reviewed the pathological and physiological facts with which we have to deal, let me briefly suggest a few broad lines of treatment.

In all affections of the biliary passages it is of the first importance that the blood carried to the liver cells by the portal vein should contain no irritating drug or toxin which after its secretion in the bile may have a tendency to maintain or increase irritation of the mucous lining of the ducts. To this end the dietary must be supervised and made to conform to the digestive capacities of the patient. No hard and fast lines can be laid down, but each individual must be carefully considered as regards his habit of body, his capacity for the digestion of the different articles of food, the amount of exercise he is able to take and the nature of his work. An all-important point is that the diet list should be a simple one; simplicity means facility of digestion. It is of the utmost importance to secure and maintain a healthy condition of the gastro-intestinal mucus membrane. To this end the occasional employment of a gastro-intestinal alterative and laxative, such as mercury, euonymin, podophyllin, or rhubarb, followed by an alkaline mineral water, will, I think, be of much service. For many reasons constipation should not be permitted. In Europe the waters of the Sprudel Springs in Karlsbad are highly esteemed. They are alkaline, laxative, and have a temperature of 110-115° F. At the same time it appears to me desirable that, except in conditions of actual blocking of the ducts, the free secretion of a normal watery bile is to be encouraged—to favour this the meals should be regular and at not too long intervals, and the daily dietary should contain as large an amount of fat as can be taken without disturbing digestion. Fat more than any other element of the diet stimulates the secretion of the bile, and at the same time acts as an efficient intestinal antiseptic. The free use of a pure water between meals should also be encouraged. The great majority of persons suffering from affections of the biliary passages will be found to take an insufficient amount of water to drink.

Luff (15) states that this insufficient consumption of fluid is especially frequent in women, and attributes the fact to the erroneous and absurd belief that a diminution in the amount of fluid taken tends to keep down the body weight and to prevent the occurrence of obesity. In the prevention as well as the treatment of these disorders, the free consumption of water, apart from the meals, is most desirable.

It is also of the greatest importance to develop and maintain a free and full action of the diaphragm and the associated abdominal muscles. All forms of clothing which tend to impede the action of these muscles or unduly press upon and tilt downwards the fundus of the gall bladder, must be discarded, and regular systematic exercises involving these muscles chiefly should be taken.

And lastly, the question arises, what can we effect by the administration of drugs? No drug that we know of has so powerful a stimulant action on the liver cell as its own bile salts, the glyco-cholate and taurocholate of soda, and in suitable cases, where the passages are not absolutely blocked, these may be administered in the form of ox-gall. The objection to the use of this drug, however, is that it contains not only the bile salts but the bile pigment, and in those cases where the system is already suffering from more or less reabsorption of these pigments, it is inadvisable to burden it still further by the exhibition of ox-gall. And here let me say that a sharp distinction must be made between these two constituents of the bile. Bile pigments are entirely of an excretory character. They are waste material, and according to Bouchard, they are toxic, and are not intended for re-absorption. It is quite different with the bile salts, of which four-fifths of the amount secreted by the liver cells are re-absorbed into the circulation and appear to subserve a useful purpose in the economy. Some purer preparation, therefore, of cholalic acid than ox-gall would appear to be a desirable addition to our *materia medica*.

In the slighter catarrhal conditions sodium salicylate and sodium benzoate both appear to be capable of rendering us some assistance, and as they are excreted in the bile, will doubtless assist in maintaining its sterility. They should be employed in doses of from 60 to 80 grains daily.

In the treatment of cholelithiasis, although the administration of olive oil has by no means fulfilled the expectations of those who first recommended it, yet I still think that in certain conditions it will afford us distinct assistance. The large doses originally recommended in the treatment of cholelithiasis are apt to disturb, and may in that way do harm, but in gradually increasing doses of from 2 to 6 ounces per diem, it will stimulate the secretion of bile, rendering it more fluid,

and by increasing the amount of fat excreted in the bile, will increase considerably its power of holding cholesterin in solution.

During the actual attack sedative and anodyne measures are called for. We have no anodynes so effectual as the hypodermatic employment of morphine, or of morphine and atropine, and the application of local heat. At the same time, the free employment of an alkaline mineral water, such as Vichy, is to be commended, and this, I think, has a distinctly better effect if drunk as warm as may be convenient.

When the acuteness of the attack has passed, what measures are to be adopted? Are we, as physicians, at once to recommend operation? I think not. Naunyn (16) says cholelithiasis is a disease which becomes dangerous through cholecystitis and cholangitis and their consequences, through chronic icterus, and through carcinoma. Kehr (17) states, of a probable 2,000,000 Germans who have gall stones, only 100,000 complain of their trouble; with the remainder the disease is in a latent condition; and again, "Latent cholelithiasis is now to be regarded on the whole as a rather harmless affection." The great success which often attends a "Karlsbad Cure" is attested by all, and to those who can afford the time and the money, I should be inclined to give the option "of the regular life, the beneficial, pain-assuaging, laxative action of the Karlsbad Springs, the delightful influence of the Sprudel baths, with their peat poultices to the liver and region of the gall bladder. There the beautiful surroundings entice the cure-guest into the noble forest; he climbs the mountains, which in stillness leave nothing to be wished for, and he forgets the worry of his business and the pain of his disease. The cuisine permitted by the cure removes the sins of his club-life at home, and of the many strawberry and peach punches; whoever is not very sick must in a short time feel himself well." Such may well be the treatment of cholelithiasis for the prosperous classes.

In cases, however, of repeated unsuccessful attacks, as Riedel (18) calls attacks without the passage of stones, and in cases of prolonged impaction, unquestionably an operation by the surgeon is demanded. But even after the operation, the careful dietary, the free use of water, and a regular amount of daily exercise, are demanded to maintain freedom in the future from recurrence. The surgeon no more than the physician can promise an absolute cure.

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DR. JAMES BELL.—If a distinction is to be drawn between the medical and the surgical diagnosis of diseases of the gall-bladder and biliary passages, it would seem to be in the direction of later specialization in those conditions which fall into the hands of the surgeon for operative treatment, for most of these cases are first treated by the physician, and only a limited number of them are subsequently treated by the surgeon. The conditions which are generally referred to the surgeon, are: 1st, gall-stones in the gall-bladder or bile passages; 2nd, infective conditions leading to suppuration; and 3rd, malignant disease.

They should be enumerated in this order because both infective conditions and malignant diseases are usually sequels to an irritative lesion produced by the presence of gall stones. It must be remembered, however, that gall stones may remain for a very long time in the gall bladder without giving rise to symptoms, or perhaps it would be better to say, without having given rise to special diagnostic symptoms. Such I believe is the experience of surgeons, so that in many of these cases submitted to operation, the patient, some 5 or 10 years after operation, will declare that he or she has never felt so well for a great many years, and that prior to operation, for a great many years he or she suffered from "dyspepsia," "indigestion," painful conditions about the lower part of the chest, etc., etc., general symptoms which could not be referred to any special lesion, and that since operation all these have been entirely absent.

I believe that in many cases such symptoms as those referred to are due to the presence of gall stones in the gall bladder, perhaps for a long time before characteristic symptoms appear. The first of the characteristic symptom of gall stones is usually the so-called biliary colic, which is due to an attempt on the part of the gall bladder to expel the stone or stones through the bile passages, and if this attempt is not successful recurrence of the symptoms from time to time is to be expected.

In this connection, I may say that I have recently come to the conclusion that the bile passages are capable of a degree of dilatation and of allowing the passage of much larger stones than I hitherto believed or than is generally taught. I have known of the passage of very large stones which must have found their way directly through the gall passages and not by any irregular route. I have also known of the passage of large and long pieces of gauze which had been left accidentally in the gall bladder after operation.

Cholecystitis occurs, sooner or later, as a rule, when gall stones are present in the gall bladder, and then special symptoms are produced. Locally, pain and tenderness, fever, with usually, at first, distension of the gall bladder and later contraction, until it is not recognizable. In this condition infection is most likely to take place, infection by the typhoid bacillus, the colon bacillus, etc., being quite common and leading to suppurative or gangrenous conditions. Toxic symptoms, which are usually expressed by chills, fever, etc., frequently occur in such cases, but it is a remarkable fact that the severity and frequency of the chills and the height of the fever do not give any actual indication of the seriousness of the lesion; for instance, very severe and frequently repeated chills, with very high temperature, may occur in cases in which at operation no evidence of pus or of any suppurative process can be found, and the gall bladder, in addition to containing stones, contains what is to the naked eye appearances at least normal bile. In other cases in which the symptoms are no more severe, multiple liver abscesses or a suppurative cholangitis is discovered at the time of operation.

Jaundice is not such a frequent symptom as is generally supposed, and in fact is only due to obstruction of the common duct either by the lodgment of stones within it or swelling of its mucous membrane and extension of a cholecystitis. The differential diagnosis between gall stones and malignant disease of the biliary passages, especially in the early stages of the latter, is very difficult indeed, and in fact in most cases impossible.

THE VALUE OF X-RAYS AS A DIAGNOSTIC AGENT IN THORACIC DISEASE.*

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This year, for the first time, the Canadian Medical Association considers the X-ray method of the diagnosis and treatment of diseased conditions. It was while reviewing the programmes of the more recent meetings and while unable to find any record of a paper upon this topic, that courage was taken to make an attempt and prepare a few remarks upon what has so rapidly become one of the most important diagnostic aids in medicine and in surgery.

Since the great majority of our members have become more or less familiar through the journals and medical societies with the general results of the application of this new method, it is proposed in these remarks to consider in the first place what has been accomplished in thoracic examinations, and, in the second place, to illustrate some of the cases studied in the Royal Victoria Hospital.

How premature were some of the opinions expressed, concerning the applicability of the Roentgen Rays in 1897 and 1898, only now becomes apparent and in all probability—indeed, almost certainly—what is now believed and taught upon this matter will be found far short of the truth in ten years. Scarcely any one here need be reminded that in 1896 these Rays were discovered—now a few months more than six years. The development of the knowledge concerning them has been both rapid and far-reaching, and the first year had not closed before it was recognized that a far wider application of the discovery was made than was at first thought possible. And yet, within that year, one writer remarked that “it would surely try the patience, if not the sense of humour, were he to mention one-tenth of the absurd and utterly irrelevant questions he had been asked as to the efficacy of the X-rays. Some go so far as to *imagine a therapeutic use for them.*”

In what manner the application of X-rays to the thorax was considered, appears in the writings of the same authority. As we read the paragraphs indicating the results of practical application of these rays to diagnosis of disease of head, spinal column, abdomen and

* Read before the Canadian Medical Association, Montreal Meeting, Sept., 1902.

limbs, that devoted to the thoracic organs is most interesting. It opens as follows:—"Coming now to the thorax we enter upon a realm about which so much has been recently said concerning the application of the X-rays to the diagnosis of cardiac mischief . . . It is quite true that . . . a skiagraph of the heart can be obtained . . . but it must be remembered that a skiagraph thus obtained consists of nothing else but a shadow of the outline of the heart. . . . Consequently the knowledge that we can gain from the application of the method to this region of the body, is no more than can be obtained in a much simpler manner by the ordinary method of percussion." After making a brief reference to foreign bodies opaque to X-rays in the trachea or bronchi, or substance of the lungs, the writer passes on to consider another topic. It is plain, therefore, we think, that this paragraph sums up the knowledge of the use of this method as applied to the thorax at that time (October, 1896).

Apart from the treatment of certain cases, which marks a more recent advance in the trial of this method, the Roentgen Rays have found more general application in the diagnosis of surgical conditions. There is little doubt that those who concern themselves with internal medicine have not fully appreciated the advantages of X-ray diagnosis. Dr. Haughton, in a paper recently read before the Royal Academy of Medicine in Ireland, sought to explain this fact upon two reasons:—a natural diffidence to adopt a new method of examination whose utility was unproved, and a neglect on the part of advocates of the process to call attention to its utility in medicine. To these it seems we may well add a third and very important reason—the expense and skill necessary in the purchase and running of the apparatus, render the general application of this method of examination impossible apart from the larger or more well-to-do centres.

New methods of examination and investigation are almost certain to meet with opposition and we need not go outside that history which deals with the development of the methods in making diagnosis in thoracic disease for instances illustrative of this. The method of percussion, as old as Celsus, although used only in abdominal cases, was first adopted in thoracic diagnosis in 1761. Fifty years of ridicule and disregard followed, but in 1806 it was revived by Corvisart, and since that date has been generally adopted.

To cite but another instance, we may recall the fact that Laennec's discovery and invention of the stethoscope was not appreciated for years. In the Life of Stokes, one finds it stated that the science of the stethoscope was then only in its infancy . . . and . . . was met with opposition and adverse criticism. In his lectures on the application of the stethoscope to the diagnosis and treatment of

thoracic disease Stokes says that "the sense of hearing has been called to our assistance and has, I will affirm, added more to the facility, certainty and utility of diagnosis than anything that has been done for centuries."

While inspection has been practiced so long in clinical medicine, *the eye* has done its work unaided by any specially devised appliances, and the observer could only infer from external signs the underlying internal conditions. By this new method—one of the greatest discoveries in medicine of the past century—we may really look within, and, as Bouchard and Claude put it, "the X-ray method of examination makes the evolution of disease visible to the eye." May we not hope that some day, as the clinical teachers in the future come more and more to appreciate this wonderful discovery in its application to internal medicine, some one may speak of the X-rays as enthusiastically and as broadly as Stokes did of the stethoscope, and the name of Roentgen may be found upon the Roll of Honour not far removed from those who taught clinicians the best way to investigate thoracic diseases.

When we turn to the literature which deals with X-rays in diseases of the chest, we find a large number of contributions. Among those who wrote early in 1896-97 are Bouchard of Paris, Stubbert of Liberty, N.Y., Williams of Boston, and Sydney Rowland of England. Holzknecht of Vienna, has recently published a special work upon the thorax. This publication and the very complete work of Francis H. Williams of Boston, afford us our highest authorities upon this subject. Time does not permit a lengthy discussion of these works, but it may be stated that the results of these various observers are hopefully in accord, and this is the best promise for the future, more general application of the method.

From the view point afforded by a little more than five years' experience, one observes several results which may be briefly enumerated:—

First. The fluoroscope in very many respects is of greater value than the skiagraph. While each method has its limitations, yet it appears that more satisfactory results can be obtained and in a shorter time by the use of the fluoroscope than by skiagraphy. When one remembers that the examiner desires to see the movements of the heart and of the diaphragm—to look at these from different positions in different degrees of light, etc.—and to see the shadows cast by abnormal areas under like varying conditions, one can readily understand how much more information may be derived from a few minutes spent with the fluo-

roscope than from the study of many skiagraphs which require so much time to make. The skiagraph, on the other hand, preserves a picture, while after the fluoroscope method one can only remember and describe it.

Another result of these years of experience which is well established is the fact that the position of the diaphragm and the type, or rather the degree, of excursion made in ordinary and forced breathing, is a most important and trustworthy method of judging of the lung capacity, or of the pleura itself. In this connection Williams has done most valuable work to which, later, reference will be made.

A third result, among others which may be mentioned, and this we have already indirectly referred to more than once, is that this method of examination should be applied in all obscure thoracic cases and only in conjunction with the most careful observation made after the older and well-tried methods of inspection, palpation, percussion and auscultation. Often, after a few minutes with the fluoroscope, one is induced to go over the thorax yet again applying the ordinary clinical methods.

Further, there is no longer any room to doubt that in this discovery we have a method which reveals conditions within the chest which are otherwise undiscoverable. The shadow of early pulmonary tuberculosis, but alas, not before the initial stage of the disease is well over; the deep-seated pneumonic patch; the exact position of the heart; the aneurysm without sign or symptom; the type of diaphragmatic movement, the height and contour of the diaphragm, and many other conditions which are only recognized in an autopsy, and yet which greatly aid in forming a true clinical estimate of the case, can be discerned only by a careful fluoroscopic examination.

There are so many accessible descriptions of the signs found by the fluoroscope and recorded by the skiagraph in pulmonary tuberculosis, pleurisy, pneumonia, etc., that one does not feel justified in occupying the time of this meeting in going over them. These signs, so far as they are shown by the skiagraph, may be better understood while we have the lantern views before us. The fluoroscope reveals them yet more clearly.

Before turning to consider the heart and the vessels in the thorax, we may refer again briefly to the diaphragm as revealed by the X-rays in health and disease.

Normally, this musculo-tendinous structure stands dome-like with its highest point opposite the fourth rib on the right and the fourth space on the left—its shadow being very dark, and especially so over the right side, owing to hepatic density immediately beneath. The

difference in height is slight, 1 to 2 cm. On ordinary inspiration the curve of the summit and the phrenico-costal angle alter but slightly, but on deep or forced inspiration there is a little flattening of the curve and a slight increase of angle may be noticed.

Abnormally, the diaphragm may stand low as in emphysema, or high, as in pulmonary tuberculosis. Again, it may be higher on one side than upon the other, and it has been seen that this occurs in tuberculous processes in the lung of that side. The movements of the diaphragm may be limited as in,

- (1) Loss of lung capacity,
- (2) Obliteration of the pleural sinuses through inflammation, or,
- (3) Adhesions and fibrosis about the diaphragmatic pleura, anchoring it either to lung or mediastinum as in pleurisy or peribronchitis with fibrosis,
- (4) One side may be greatly depressed as in pneumothorax.
- (5) The diaphragm has been described as in a state of immobility or fluttering movement in asthmatic cases. Thus the fluoroscope has cast another ray of light upon the possible causes of asthma,—a spasmodic action of the diaphragm.

In making fluoroscopic examinations it is quite easy to trace the outlines of these movements either upon thin paper, or upon the chest wall itself—and then comparison afterwards becomes easy.

The heart and the thoracic vessels:

We have already seen that it was with the heart that observers in thoracic skiagraphy first interested themselves. Now it is found that comparatively less can be taught about this organ than concerning the lungs. We may sum up our knowledge by saying that but little more can be made out than the situation and size of this organ, and to determine accurately the latter, special care and apparatus are necessary. Some workers urge that much of the work with this aim in view is useless, as this organ is so changeful.

For some time I have not agreed with those who were satisfied with marking out the superficial cardiac dulness and have maintained that with a little more care and time, the deep cardiac dulness could be mapped out, giving a better view of the size of the heart. Much is promised by this method in this connection, and the recent article by Grunmach and Wiedemann is a valuable help in this direction.

It will need time and practice to recognize the weak and the strong types of cardiac action described by Creigern. Already some work has been done in determining the relation between cardiac movements and the sounds; and it has been suggested that the apex beat is presystolic in time. It seems, therefore, that there is much work

yet to be done in the fluoroscopic study of the heart. For instance, tachycardia, bradycardia, arrhythmia, intermittence of pulse, hypertrophy and dilatation may yet have much light thrown upon them. It has been claimed that dilatation and hypertrophy may be readily distinguished, while from either, one may readily separate a pericarditis with effusion.

The great vessels:

The aorta—This vessel can be studied immediately above the heart and to the left of the spinal column, behind the sternum. For the most part, it is in front of the spinal column and becomes noticeable just to the left of the central dark shadow immediately beneath the sternal portion of the clavicle where the descending portion of the arch stands out. Thence throughout the thorax it runs behind the heart and is practically unnoticed. The normal appearances are characteristic and one may readily recognize the abnormal changes.

Aneurysms are recognized by their situation and pulsatile character—which in most instances may be seen. It may be that pulsation is absent as the sac may be filled with blood clot. Williams and others have discovered aneurysms by this method when other methods yielded no evidence of their presence.

It is very important in examining into such conditions to get the shadows from all possible directions, antero-posteriorly, laterally, obliquely, and postero-anteriorly.

As I have had no experience with new growths in the thorax, this part of the subject must remain over for another time.

Turning now to the second part of this paper, we shall deal as briefly as possible with a few skiagraphs, illustrative of some of the more common conditions found in the chests of patients under treatment at the Royal Victoria Hospital.

Case No. 1. A normal chest. The patient was a female, under treatment for hysteria, and from her state of nutrition very suitable for showing clearly the organs. One can see the shadows cast by the kidneys. The light was rather strong to show distinctly the shadow of the diaphragm.

Cases 2 and 3. Aneurysm of the aorta with two views. The skiagraph shows the abnormal increase of the transverse measurement of the mediastinum, and a shadow both on the right and left corresponding to the arch of the aorta.

This appears to be more of the fusiform type than otherwise. This abnormal condition is discoverable only on the right side. The skiagraph reveals more correctly the extent of the changes. The posterior view serves to confirm the anterior.

Case 4. Aneurysm of the innominate (?) artery. One may distinguish the large globular-like shadow. Clinically, the localization of this aneurysm has always been difficult. The radial and carotid-pulses have been equal. There has been no absolutely certain localizing sign, but when one considers that early in the case there were signs of dulness in the apex of the right lung and that the clavicle has been destroyed at its inner third, and that the tumour points upward and to the right, one has fairly good evidence in favour of its origin from the innominate artery. The skiagraph does not confirm this.

Case 5. Pulmonary tuberculosis. There was evidence clinically of a left apical lesion. It appears from the haziness or mistiness of the skiagraph that there are other areas similarly involved. The descending portion of the aortic arch is plainly seen.

Case 6. Right basic pneumonia seen on the eighth day, the day of crisis.

Case 7. The same case three days after the crisis. A change in the density of pulmonary tissue may be readily recognized.

Case 8. Pleurisy, with effusion.

Case 9 (a). Hydro-pneumothorax. It shows the line of level of the fluid—the heart displaced to the left and the dense, very dense, indeed, opaque fluid. It was purulent.

Case 10. Hydro-pneumothorax. The skiagraphic and fluoroscopic study of this case has been of great interest, indeed, the case is such from any standpoint. The onset was sudden in a healthy man. The temperature was never febrile. There were no signs of disease discovered in either lung. The heart became widely displaced to the right. Fluid in small quantity was manifestly present late on in the case. The heart gradually returned to the normal situation.

The skiagraph shows no outline of the diaphragm on the left. At the time of taking this, a fluoroscopic observation was also made, and one could *dimly* yet *distinctly* see the surface of the fluid a little above the level of the apex of the heart, and with each beat of the heart a wave was seen passing toward the wall. A faint lop was audible synchronous with the heart beat and heard best on deep inspiration, reminding one of the sound produced by small waves against a boat upon quiet water.

The X-ray examination in the case was most helpful in establishing the fact that the heart was returning to its normal position, and in demonstrating the presence of fluid in the pleura.

11. Taillfer—Broadened mediastinum, displaced heart, dense, area

with apex toward root of lung, Hæmoptysis, malignant disease or pulmonary tuberculosis of chronic type.

12. Ouellette—Shows clearly right side of heart. Pericarditis and endocarditis. Left base of lung compressed. Doubtful pericardial effusion.

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RESUME OF RECENT LITERATURE ON THE TOXÆMIA OF PREGNANCY.*

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Many new and interesting facts and theories associated with the physiology and pathology of pregnancy have been advanced recently, chiefly by German writers, and it is my object to attempt to present some of these to you this evening. This paper may thus be considered as a review of recent contributions to our knowledge of some of the conditions associated with pregnancy.

At the IX. Congress der Deutschen Gesellschaft für Gynäkologie, which was held in Giessen in May, 1901, Fehling¹ of Strassburg, in opening the discussion on Eclampsia, formulated, as representing the state of our knowledge of that condition, the following propositions:—

I. By puerperal eclampsia we understand a distinct, well characterized disease, which is associated with the reproductive period of women.

II. No characteristic placenta of eclampsia exists.

III. There is no pathognomonic form of kidney disease associated with eclampsia.

IV. The view that eclampsia is associated with dilatation of the uterus is discarded.

V. Albuminuria but very rarely fails to be present in eclampsia.

VI. There is no specific eclampsia liver.

VII. A conclusive characteristic anatomical condition is not found in eclampsia.

VIII. The view of the infectiousness of eclampsia is up to the present completely unproven.

IX. Bouchard's view that at the basis of eclampsia there lies an increased toxicity of the blood plasma, with a diminished or increased toxicity of the urine, is not tenable.

X. The explanation of eclampsia as a heptotoxæmia or leucomainæmia is not proven.

XI. To produce the anatomical changes found in eclampsia there must exist in the blood current a substance which acts by exciting coagulation (necrosis) in the tissues.

XII. Eclampsia is a toxæmia of foetal origin.

* Read before the Montreal Medico-Chirurgical Society, November 7, 1902.

If in the last of these propositions he includes in the word "foetal" the whole ovum, he foreshadowed the results which recent work along this line seems to be bringing out, for the experiments and observations of the writers whose papers form the basis of my essay to-night, seem to prove that the origin of the toxin which gives rise to eclampsia, is in the cells of the periphery of the ovum, or rather, that these by their presence in the maternal blood permit the development of toxins, which produce the condition we term eclampsia.

In 1893, Schmorl² of Dresden, reported that in the lung capillaries of 17 cases of eclampsia he found emboli present, associated with other characteristic changes in the liver and kidneys. These emboli were not present in pregnant women dying of other diseases. He thought that the emboli consisted of epithelial-like cells and that they were of foetal origin, being probably syncytial.

Later he added 53 other cases to his series, his findings being very much the same. He mentions also having found a similar condition in a pregnant rabbit which died of an eclampsia-like disease.

In his later paper he states that these emboli may occasionally be found in the non-eclamptic, though under what conditions he does not state.

In his opinion, the anatomical finding in eclampsia shows that some blood change occurs which results in multiple thrombosis formation. The origin of this abnormal metabolism product he cannot state, but suggests two possibilities, 1st, disease of the placenta, or 2nd, the formation of some cytotoxin.

Following Schmorl's first article, other writers report very similar observations, to a few of which I may be permitted brief reference:—

Lubarsch³ verified the findings of Schmorl in eclampsia, but failed to note these emboli in other conditions, with one exception, a case of chorea occurring in a pregnant woman. One may note here that this condition is also associated with convulsions, which in the light of later findings probably accounts for their presence.

Kassjanow⁴ found emboli 11 times in non-eclamptic parturients. In one case where pregnancy had only advanced to the 5th month they were observed, hence they do not, he concludes, result from the act of labor, and they are of normal occurrence. Kossmann⁵ reports finding them in non-eclamptic women and has noted their presence in cases of hydatid moles and syncytioma maligna.

Maximow's⁶ experiments with pregnant rabbits gave interesting results in this connection. Under normal conditions he failed to find these lung emboli, or syncytium-like cells, in the blood current in

pregnant rabbits. On the other hand, five times he found both conditions present after he had thoroughly massaged the pregnant uterus.

Veit⁷ of Leiden, was led to investigate the origin of these foetal cells in the maternal organism, by his findings in a case of tubal pregnancy upon which he had operated.

His first paper on this subject was published in the latter part of 1901.

In the case he mentions, he was able to remove the unruptured tube with a very early ovum, intact. This was carefully prepared and serial sections made of it. In studying these he made a very interesting observation, on which his theories and future experiments are based, so I may be permitted a somewhat detailed description.

In these serial sections he discovered in a vein of the tubal wall, situated close to but distinctly separated from an intervillous space, a mass which occupied the lumen of the vessel. This mass was undoubtedly chorionic villi with their intercellular tissue, their cells of Langhan's layer, and syncytium. The walls of this vein showed intact endothelium, and in no part was there any adhesion between the villi and the vessel wall. He was able to make out two small openings in the vein wall through which the villi projected. All the veins of the neighbourhood of the intervillous spaces which were filled with villi, most of which still firmly attached to the ovum, communicated with these spaces. Everywhere these attached villi could be traced for at least a centimeter into the veins.

Being struck with the importance of this observation Veit instituted a search for similar observations on the part of others, especially to find if this condition had been noted in connection with intra-uterine pregnancy. He quotes the observations of Nitabuch, Von Rohr, Hofmeier, Virchow, Kolliker, Ruge and Webster in this connection.

Chorionic villi have been found in the veins of the serotina, occasionally so numerous as to plug the opening, and they have been traced for some distance along the course of the veins, being evidently torn free and carried along with the blood current.

Veit thus concludes, from a review of the literature that in uterine, as well as in extra-uterine pregnancy, chorionic villi may be found in the veins a considerable distance from the intervillous spaces. In his opinion, Veit found in other blood vessels quantities of free cells of the Langhan's layer, some of the vessels being completely filled with them. He notes that in these vessels the blood was not coagulated, an observation which had previously been made by Heinz. The explanation of this is that probably there exists in these cells, or else

in the cells of the syncytium, a chemical agent which prevents coagulation.

He, in common with others, only found these villi and villi fragments in veins.

To this carrying-away of villi by the blood-stream he applies the word "*deportation*" to distinguish it from embolus, which it is not.

It is difficult to form any idea of just how the maternal blood first escapes from the vessels of the decidua into the intervillous spaces. Two theories predominate. The most generally accepted is that of Kölliker, that the chorionic villi can destroy the maternal tissues, *i.e.*, eat their way into the vessels by phagocytic action. Hofmcier's theory, to which Veit seems to lean, is that through growth of the ovum the surrounding maternal structures are stretched until the walls of the capillaries break, and thus form lacunæ into which the villi penetrate. As the villi develop these spaces enlarge and form sinuses, which are only in part lined with endothelium.

In this connection, Veit, in discussing why the blood fails to coagulate when poured out into the maternal sinuses, where the current must be very slow, and which are not surrounded with endothelium, this being only, as it were, on the maternal side, suggests that, as before noted, the villi act in some way to prevent coagulation of the blood.

When the villi perish coagulation does result we know, hence the probable formation of white infarcts in the placenta and also the outlining of the placental margin.

Adhesion of the placenta at term, and the firmly attached condition of the placenta often noted in abortions, are susceptible of explanation in the same way. With the death of the villi clotting of the blood takes place, this becomes organized and thus may become firmly attached to the uterine wall.

Conclusions as to the consequences of this deportation must be hypothetical in the present condition of our knowledge, though the question naturally arises, what becomes of these cells of Langham's layer and syncytial cells, and what action do they have in the maternal organism? Where in the organism these cells are destroyed is at present unknown, though in a later paper Veit makes some reference to this.

On one effect of the deportation of cells Veit feels he has sufficient ground to draw certain conclusions, that is, that they are associated with deposit of pigment in the skin, the so-called cloasma uterinum. The entrance of these cells into the maternal organism is evidently

physiological and they must be associated with some physiological action.

Telegony may have some anatomical basis when one considers the fact that foetal cells penetrate the maternal organism. The destruction and absorption of these cells gives an anatomical basis for concluding that a variety of "internal secretion" of the pregnant uterus exists. It also may account for the auto-intoxication of pregnancy.

Poten⁸ has recently published an interesting paper on what he terms 'Transportation of Chorionic Villi.' Having noted the occurrence of chorionic elements in secondary malignant growths, he sought for evidence as to whether in ordinary pregnancy foetal structures enter the maternal circulation. He describes in detail his microscopical findings in seven pregnant uteri. In all, the placenta was in situ. Two were at an early period of pregnancy and the remainder toward the end.

In every case there was evidence of the deportation of villi. The early specimens showed the migration of syncytial buds, such as are seen on young villi, as well as whole villi. In the older specimens, whole well formed villi were found in the veins of the uterine wall.

Poten considers that the villous structures found must have been only those which were in the uterine veins at the time of death, all others having been swept away by the blood current.

Like Veit, he says they are not emboli, inasmuch as they do not block the veins but pass through them, and through the heart, to be blocked in the lung capillaries.

He seems to agree with Veit in most of his theories as to the effect of this transportation, and also makes an interesting suggestion in regard to hereditary syphilis. The broken down villi from the ovum of the child of a syphilitic father, may pass thus into the blood of a not yet syphilitic mother, and may communicate the disease to her. He thus explains the apparent immunity to syphilis that is conferred in this way occasionally.

Veit⁹ has recently published the results of his studies, so far, on the biological effects of the deportation of villi.

The effect of the penetration of bacteria and other cells into blood, raises the question in Veit's mind whether there is not an analogous condition in the penetration of chorionic villi.

In this connection the methods of Ehrlich and Morgenroth are naturally suggested, and have been adopted by Veit as his working hypothesis in experimentation and research.

The effects of the artificial introduction of foetal elements into the

body were first studied. Portions of rabbits' and of human placenta were injected into the peritoneal cavity of rabbits. In the first experiments the animals quickly succumbed, but with the experience gained, the methods were rapidly improved.

With regard to these it is sufficient to state that all aseptic precautions were taken throughout, and that control experiments were always undertaken to check results by.

The placental tissue employed was finely divided, and all blood removed before the injection. With regard to the dose, it was found that the injection of six rabbit's placenta invariably caused death in about 12 hours, so generally half this quantity was used. It was found that 12 grammes of human placenta gave the same results as three rabbit placenta in the last third of pregnancy.

The urine of the animals under experimentation was collected with all aseptic precautions, by catheter when possible, while in the case of female rabbits the peritoneal cavity was opened, and the urine taken directly from the bladder, on account of the long urogenital sinus. The urine was examined in those cases where it was possible, at regular intervals while under observation.

The first result of this method of investigation was the finding of albumin in the urine of all cases in which placenta had been placed in the peritoneal cavity. The albumin was present in only small quantities, and usually in from 40-48 hours after the injection, when it quickly disappeared.

The significance of the albuminuria thus induced may be apparent by analogy with the conditions which give rise to immunity according to the theory of Ehrlich.

We know that the introduction of the erythrocyte of man, for instance, in the circulation of a rabbit, results in the production of a poisonous substance, against which an antitoxin (hæmolysin) is developed. Thus, Veit argues, do the cells of the ovum periphery, when introduced into the maternal circulation, give rise to the development of toxins.

It is supposed that an albuminous element of the cells of the villi combines with a lateral chain of the erythrocytes, and hence the toxin.

This toxæmia we know is not specifically placental, for, according to Veit's experiments the insertion of bits of the umbilical cord, or the muscle of a guinea-pig, into the peritoneal cavity of a rabbit, also results in albuminuria. It is thus presumable that the albumin of these, acts on the albumin of the erythrocytes similarly.

Thus this albuminuria is the result of an intoxication, in the widest

sense of the word. It is probable that the combinations of the albumins of the cells of the ovum periphery, with the albumin of the erythrocytes, produces a substance which in the process of elimination evidently gives rise to a pathological irritation of the kidneys, and hence, albuminuria.

The questions which now arise are, 1st, can this toxic substance be demonstrated? What is its nature? 2nd, is there an antitoxin? If so, how is it produced?

These are difficult questions to answer in the present state of our knowledge, but Veit feels that some progress towards this has been attained. He has proved that the toxic material is not to be found in the serum, for neither the serums of animals with artificially induced albuminuria, nor the serums of eclamptic women, when injected into animals, injured them or gave rise to albuminuria.

One gathers from Veit's paper that he has obtained an antitoxin, but he does not state how, in very clear terms. He mentions in one instance preventing the development of albuminuria in a rabbit, into whose peritoneal cavity he injected placental tissue, by administering a dose of antitoxin serum beforehand.

In another instance he mentions that five days after giving a rabbit an antitoxic serum (50 grammes of placental extract) he introduced a large dose of placenta into the peritoneal cavity (6 rabbit placentæ), with the result that the animal died in 18 hours.

Veit terms the antitoxin substance syncytiolysin. He deals with the dose of antitoxin, and with the duration of the resulting immunity, but cannot as yet come to a definite conclusion on either point.

Veit then takes up the question of the relationship between this cyto-toxic albuminuria, and the kidney of pregnancy. We have known for some time that in cases of albuminuria certain definite placental changes are frequently noted. Two views as to the origin of these changes have been advanced. One view is that the placental changes are consequent upon kidney disease, while others, as Gottschalk, consider the placental changes as primary.

Veit states, rather indefinitely, that his observations permit him to conclude that in many cases of albuminuria where these placental changes had been found, deportation of villi has taken place.

In seeking to form some connection between the deportation of villi and the kidney of pregnancy, Veit reverts to his previous work on the deposit of pigment in the skin during pregnancy. He demonstrated that iron is present, dissolved out in the tissues, in such cases; reasoning that if this presence of iron in the skin is associated

with the absorption of villi and the production of a cyto-toxin, then, there must be an overplus of iron present, which is not needed and leaves the body. Led by this thought he investigated the urine of pregnant women. He invariably found iron present in the urine of pregnant women in much larger quantities than in the case of non-pregnant women, who were otherwise healthy, and lived in exactly the same conditions.

To explain the presence of this iron in the serum, he reverts to laws which govern the production of antitoxines. More lateral chains are thrust out from the erythrocytes than are necessary for combination with the toxic albumin from the ovum cells, and these give rise to the immune body.

Three possibilities occurred to him as to the action of the cytotoxin. Under the influence of the absorption of ovum cells a cytotoxin is produced which, 1st, either contains iron, or 2nd, that as the result of the production of this cytotoxin, erythrocytes decompose, and iron is dissolved in the serum; or, 3rd, that cytotoxin circulating in the serum has hæmolytic properties for the erythrocytes.

This reasoning led him to examine the serum of pregnant women for the presence of free hæmoglobin. Blood was obtained from the retroplacental extravasation and also from the finger-tip. As a rule the latter source was preferred.

His results were variable, but it may be said that, in general, the serum of pregnant women is free from hæmoglobin. In labor it is not infrequently present, and occasionally it may be detected during pregnancy.

Hæmoglobin is not to be found, according to Lazarus, in normal blood; it results invariably from the action of toxins, thus its presence is associated with severe infectious disease, etc.

Veit concludes that at present we know no better explanation for the changes in the blood serum, than the union of the placental cell albumin with the lateral chain of the erythrocytes, and the production of antitoxins as the result of the absorption of these foreign elements into the blood.

He does not think that the hæmoglobin in the serum is due to hæmolytic properties of the syncytiolysin, but that probably in the formation of a cyto-toxin, erythrocytes are damaged and so hæmoglobin is set free.

In explanation of the infrequent occurrence of hæmoglobinæmia during pregnancy, Veit suggests that probably in early pregnancy ovum cells regularly enter the maternal blood, and there so much cyto-

toxin is formed that the after-coming cells are made harmless as soon as they enter, so that gradually a lasting absorption and a lasting production of immune bodies (cytotoxin) results, and an injurious influence is avoided. On occasion a sudden excess of ovum cells may be thrown into the maternal blood, use up all the available immune body, and then act injuriously, setting up hæmoglobinæmia, and finally albuminuria.

Transitory albuminuria is not infrequently associated with labor, and is probably due to the action of the uterus loosening villi or other cells from the ovum.

In this way may also be explained the toxæmia which sets up nausea and vomiting of pregnancy, and pernicious vomiting, for in a recent paper I called attention to the fact that nausea and vomiting of pregnancy stood in relationship to uterine contraction.

The work of Lazarus and Ponfic clears up the question as to the disappearance of the iron and of the disappearance of the erythrocytes. These latter disappear in the spleen, bone-marrow and lymph glands, without giving rise to symptoms of disease.

The free hæmoglobin appears in the liver as bilirubin, and is also thrown out in the bone-marrow, spleen and kidney cortex. As soon as the portable amount is exceeded one finds hæmoglobinæmia, and above all, albuminuria; the latter arising from the irritative action of the hæmoglobin on the kidneys. The former gives rise to the icteric condition sometimes seen (eclampsia).

It is interesting to note in this connection the views of Lange, who considers that the disappearance of the hæmoglobin is due to the action of thyroid secretion. Lange¹⁰ explains the kidney of pregnancy as due to thyroid deficiency.

Oliphant Nicholson¹¹ has but recently been advocating the curative and preventive action of thyroid secretion in eclampsia.

Veit's summing up of the points I have referred to in this paper is as follows:—

"1. By introducing into the peritoneal cavity of rabbits sufficient quantities of placenta, one produces albuminuria.

2. The pigment in the skin of pregnant women contains iron.

3. The urine of pregnant women contains somewhat more iron than does the urine of non-pregnant women.

4. The blood serum of pregnant women only exceptionally contains hæmoglobin.

5. The blood serum of women in labor contains hæmoglobin somewhat oftener."

“In explanation of these facts I offer the absorption of chorionic cells, and I assume that consequently changes are physiologically produced in the blood of pregnant women, which can by sudden, or continuously increased absorption (of these cells) pass over into pathological conditions.”

Veit's concluding remarks are worthy of repetition.

“To scientific obstetrics belongs not only the effort to deliver a woman by the best means, but also the correction and improvement of our knowledge of the influence of a pregnancy on the whole female organism. The more we comprehend the favourable effects of a pregnancy on a woman, so much the more shall we grasp by means of what powers nature obviates injurious results, and so much the more shall we contribute to the true welfare of womankind.”

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ON THE ACTION AND THERAPEUTIC EMPLOYMENT OF
ALCOHOL, BEING AN EPITOME OF RECENT
CONTRIBUTIONS TO THE SUBJECT.

ix

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From the earliest times, alcohol in the form of wine or beer has been employed for its therapeutic effects. Hippocrates ordered it for his patients, and since his time, physicians of all creeds and systems have taken advantage of its action in battling with disease. The extent to which it has been employed has varied much according to the views which, from time to time, have been current; but throughout all the ages the idea that wine is a good thing for the sick and infirm has very generally prevailed.

Towards the middle of the last century, with the introduction of the experimental method into the study of the various branches of medicine, the exact action of alcohol was made the subject of extensive experimental research, especially in Germany, and its effect on the circulation, respiration, metabolism, and temperature was carefully investigated. Binz, writing in the early eighties, summarized its action as follows:—"Alcohol is an antipyretic, stimulates both circulation and respiration, and is a convenient food."

Since that date, however, our methods of investigation and our means of observation have much improved, and the truth of the statements then made as to the exact effects of alcohol on the system has been very seriously questioned by pharmacologists and by several clinical teachers. For this reason the several papers read before the Massachusetts Society last June and the symposium on alcohol which appears in the last number of the *Practitioner* (November, 1902) will be welcomed as an attempt to place before the profession the most advanced views on the action and therapeutic value of this much discussed, yet much employed drug.

On the Physiological Action of Alcohol.

The action of alcohol, so far as it has been ascertained by experimental research, is stated by Prof. Cushney to be that of a narcotic, not that of a stimulant on the nerve centres. At the same time it is to some extent a stomachic and may, under certain conditions, act as a food.

In the lower animals the action on the central nervous system is marked by depression, and the symptoms produced are not unlike those of chloral. Occasionally a transient excitation occurs due to the irritant action of the drug in the stomach, but this fails to appear when more dilute solutions are administered. In man the same depressant effect is often seen, drowsiness and heaviness passing subsequently into slumber; more usually the first effects elicited are liveliness and feelings of good-fellowship, with increased confidence in one's own powers. Symptoms of excitement marked by loquacity and exaggerated movements of all kinds frequently manifest themselves; the face is flushed, the eyes are bright, and the pulse and respiration are accelerated. Larger quantities give rise to uncertainty and inco-ordination of the movements; still larger amounts induce narcosis, which may pass into complete anæsthesia, and eventually prove fatal. The symptoms of excitement are much more marked when drinking is indulged in in company with others: on the other hand, if the alcohol is taken with less exhilarating environments, or in solitude, the excitement stage is much less marked, and may be entirely absent.

These effects in man have been explained in two different ways. The view, which appears at first sight to be the more natural one, is that in moderate doses it stimulates the cerebral cells to greater activity and that this stimulation is afterwards followed by depression. According to this view, alcohol acts on the cerebral grey matter much in the same way as strychnine acts on the cord. This view is widely entertained both by the laity and by clinicians. The majority of experimental observers, however, lean to the view suggested by Schmiedeberg and supported by many others, that the stimulation of the central nervous system is only apparent. According to this theory the symptoms of excitement are caused, not by an augmented vitality of the nerve cells, but by a loss of the associations which ordinarily retard the expression of mental activity. To adopt a mechanical simile, the brain may be compared to an engine fitted with powerful brakes; an acceleration of the motion may be due either to increased power of the engine or to a removal of the brakes, and it may be very difficult for an onlooker to determine which is the true explanation. Careful investigation, however, of the apparent evidences of increased mental activity under alcohol, have proved them for the most part illusory. While under the influence of alcohol the individual may be more brilliant in conversation, more witty and more social, yet is he not so careful in his statements, nor so considerate for his own dignity, or for that of others. He loses self-control, he also loses his sense of responsibility and his power

of discriminating between the trivial and the important, and between the merely plausible and the actually proven. In a word, it is generally recognized that some of the highest functions of the brain are thrown out of action by alcohol administered even in moderate quantities; it seems probable, therefore, that the exhilaration observed may not be a direct action, but an indirect result of a depression of those higher centres which ordinarily control our actions and feelings. Much valuable evidence as to the effect of alcohol on mental processes has been gathered by Kraepelin and his pupils, who have shown that typesetters do a smaller amount of work and make a larger number of mistakes, with even a small amount of alcohol, than when they perform their work without this drug. Students show a lessened capacity for mental work and a smaller ability to keep the attention directed on one subject. Arithmetical calculations of all kinds are carried out slower and with more errors. In one respect only was an increased power shown, namely, in the transformation of an idea into movement. This might suggest that the motor functions are accelerated under alcohol, but another explanation is quite as probable, namely, that an ordinary movement is hampered by a series of associations and that when these are weakened by alcohol the movement may be carried out more quickly. It is noteworthy that the powers most recently acquired and most readily lost are those on which alcohol first acts; the mental operations which have become habitual are less easily impaired.

In all of these experiments the amount of alcohol taken was small, and was in no case sufficient to induce any of the more evident symptoms of intoxication. It is of interest, therefore, to note that Kraepelin found a distinct impairment of the psychical powers to persist for a much longer period than was anticipated; the average efficiency was not regained until from 12 to 24 hours had elapsed after the alcohol had been taken.

The result of these investigations strengthen the view that alcohol acts as a narcotic upon man as well as upon animals, especially since the evidence thus far brought against the view is of a very indefinite character. This view of the action of alcohol corresponds also with the effects obtained in its therapeutic employment, for it is difficult to understand what use physicians could make of alcohol in disease were it a cerebral stimulant, for no mental exertion is encouraged in acute disease; on the contrary, every effort is made to maintain mental as well as bodily rest; the room is darkened, noise is excluded and exciting conversation and reading forbidden. The truth appears to be that when the clinician applies the term stimulant to alcohol he uses the word in a different sense to that in which it is under-

stood by the experimental observer. The same confusion was formerly met with in regard to opium. The effect of both drugs is in reality cerebral depression, which manifests itself in a condition of euphoria. Disease often loses its strongest ally when anxiety and worry are allayed by alcohol. The patient feels less concern and more resignation, not because his soul rises triumphant through the stimulant action of the drug, but because his brain is rendered less capable of dwelling on his disabilities owing to its being partially narcotized. This effect of alcohol in allaying subjective symptoms, relieving nervous strain and promoting the rest and comfort of the patient is not surpassed by that of any other drug.

The action of alcohol on the respiration has long been a subject of experimental investigation and though the results show a good many discrepancies, the evidence thus far gained is to the effect that the amount of air inhaled is generally increased by alcohol, even when no signs of excitement are displayed. We must wait for further research to determine whether this augmentation of the air inhaled is due to a direct central action or to reflexes arising from the stomach, but it may be stated that if due simply to the latter, its use as a respiratory stimulant in disease would scarcely be indicated.

Alcohol has long enjoyed the reputation of a cardiac stimulant, yet pharmacologists agree in the statement that in small doses it has little or no action upon the heart, while in larger amounts it acts as a cardiac depressant. There may be, when given in strong solution, a slight acceleration of the pulse, due to reflex action from the stomach, but beyond this, alcohol would appear to have no distinct action upon the heart itself. It has, however, a distinct action in dilating the superficial vessels, but it is noteworthy that the dilatation has little effect on the general blood pressure. Professor Meltzer suggests as an explanation of this fact, that alcohol at the same time that it produces dilatation in the superficial vessels gives rise to a constriction of those in the area controlled by the splanchnic nerves. He says, "we know that there is a mutual nervous arrangement between the peripheral organs and the splanchnic area to such an effect that every vaso-dilatation of the peripheral organs is accompanied by a proportionate vaso-constriction of the splanchnic area. The administration of a dose of alcohol which has the visible effect of causing redness and turgescence of the skin has the actual effect of distributing the blood in such a manner as to cause a vaso-dilatation in the peripheral organs, including the brain, and a vaso-constriction in the splanchnic area. It is obvious that under these circumstances the blood pressure measured in the carotid artery will not be altered."

In many infections we have a general vaso-dilatation of central origin; the patient may then be said to have "a bleeding into his splanchnic area" and blood is withdrawn from all the peripheral organs, skin, extremities, central nervous system, heart and kidneys. Such a patient may have a high rectal temperature but cold extremities, livid skin, small pulse, mental depression and may void only a small amount of concentrated urine. The administration of alcohol by producing a degree of vaso-constriction in the splanchnic area and vaso-dilatation in the peripheral organs results in the heart receiving more blood, the pulse becoming fuller, the extremities warmer, the skin flushed and turgescient, so that by increased dissipation of heat the general temperature is reduced; at the same time the patient's mind becomes brighter and his urine is increased in quantity. In short the patient is stimulated and feels better. Alcohol, according to this view, does not affect the circulation by stimulating the heart or by increasing or decreasing the general blood pressure, but by instituting such a distribution of the blood as is especially favourable to patients suffering from the conditions we have mentioned. This explanation of Prof. Meltzer, however, is as yet unproven, and must be received for the present as a very plausible explanation of clinical symptoms.

The effect of alcohol on digestion is more definite. It has been shown to alter the gastric functions in a way in which, so far as is known at present, no other drug does. After alcohol reaches the circulation a profuse secretion of fluid takes place into the stomach, it matters not whether the alcohol is given by the mouth or injected into the rectum. This fluid generally contains a considerable quantity of pepsin, but sometimes merely traces, apparently indicating that alcohol does not actually augment the secretion of the ferment but simply increases the watery fluid which carries with it what pepsin is preformed in the gland. Again, it has been demonstrated beyond question that the secretion of the stomach depends largely upon the appetite, and this upon the taste and odor of the food. Persons to whose sense alcohol and its accompanying ethers are grateful, may thus be able to digest food taken with wine better than they otherwise would. The slight irritant action of alcohol on the gastric mucous membrane also tends to promote absorption by the stomach. Clinically, however, we find that the effects of alcohol vary in different individuals, and in different conditions of the mucous membrane of the stomach, and further research is necessary before the indications for its use as a stomachic can be defined accurately.

On the Nutritive Value of Alcohol.

Discussing the nutritive value of alcohol, Professor Cushny considers that while the food value of the small quantities of alcohol, ordinarily tolerated, is insignificant, in certain cases it may be borne in quantities which may materially aid in maintaining the resources of the body, and says that there is no convincing evidence that when used for a short time in such cases it lessens the resistance to the invasion of disease. This aspect of the subject, however, was treated at length by Prof. Benedict in his paper, also read before the Massachusetts Society. His opinions may be summarized as follows:—

Formerly the opinion prevailed that alcohol, while readily absorbed was excreted unchanged, as is, for example, saccharine, and consequently could be of no benefit to the body. A most careful and exact research, however, has shown that in doses not exceeding a total of $72\frac{1}{2}$ gms. (about $2\frac{1}{2}$ fluid ounces) during the 24 hours, less than 2 per cent. is excreted unchanged from the body of a healthy man. This fact being established the value of alcohol as a food may be more closely studied. We know that it is very rapidly absorbed in the stomach, indeed, so rapid is its absorption, that comparatively little alcohol enters the intestines. Alcohol may, to this extent, be regarded as pre-digested, for the action of the digestive juices is not necessary to prepare it for absorption.

Obviously the simple molecule of ethyl hydroxide containing no nitrogen cannot be considered as in any sense contributing to the structure or repair of the tissues of the body. But if the law of the conservation of energy obtains in the living organism, as we have every reason to believe it does, the potential energy of the alcohol must be transformed into kinetic energy in the body; either in the form of heat, or of internal and external muscular work. That this is true is shown by experiments in which 72.5 gms. of alcohol, equivalent to about 500 calories of energy, were substituted in the diet for fats and carbohydrates. A close agreement was noted between the results obtained under the two dietaries, and when we examine the analytical data we see that there was neither an excessively rapid combustion nor was there any abnormal radiation of heat. It is therefore reasonable to assume that the energy furnished by the alcohol does aid the body in maintaining its temperature and may be of service in the performance of internal and external muscular work.

To assume the contrary we must suppose that the energy furnished by alcohol is of a different nature from that yielded by fats and carbohydrates in combustion, and this appears extremely improbable,

especially when we find by experiment that the total energy transformed from a diet containing no alcohol corresponds exactly in a similar and parallel experiment with the energy from a diet in which 500 calories are furnished by alcohol. In thus furnishing food to the body it must spare either other food material, or what is still more important, body material, from consumption. A diet deficient in energy results in an immediate draught upon the tissues of the body, chiefly the fats for the lacking energy. Alcohol added to such a diet invariably lessens the quantity of the body material disintegrated. Similarly a diet sufficient to maintain the body in equilibrium when augmented by alcohol, results in a storage of fat in the body.

The contention has frequently been made that alcohol even in moderate doses influences the general metabolism of the body in such a way as either to increase or diminish the production of carbon dioxide and the consumption of oxygen. Widely varying results have been obtained on this point, but the best and most trustworthy work shows very little variation from the normal during the consumption of moderate amounts of alcohol. A more serious question is the effect of alcohol on proteid metabolism. It has been stated that the ingestion of even moderate amounts of alcohol results in a more rapid disintegration of muscular tissue but the most accurate recent experiments afford no valid ground for asserting that alcohol in moderate doses influences proteid metabolism any more than does any other carbohydrate.

When used moderately, alcohol may be said to agree with most people, its rapid absorption precluding difficulties of digestion, but when used in excess it produces, as do many of our common food materials, stomachic and other disturbances not infrequently of a serious character. It is, however, the habit-forming property of alcohol leading to its consumption in excessive and consequently toxic quantities, that brings us to a halt in our estimate of the nutritive value of alcohol. The toxic properties of alcohol are not possessed by any other common food material and consequently must be considered a drawback to its habitual use for nutriment in quantities large or small. Furthermore, if excessive doses are so disastrously toxic may we not reasonably question the effect of moderate doses, and suspect an insidious action that may not be apparent in the necessarily short chemical, physical, and physiological examination of its effects afforded by the usual experimental period. Experiments in the laboratory can never furnish the data for determining satisfactorily the effects of the persistent use of alcohol even in moderate quantities upon the general bodily and mental condition.

of the man. Accurate and impartial observations on this point are with difficulty obtained, but the work of Kraepelin, Aschaffenburg and Hodge, surely indicates that alcohol, even in moderate doses, has a retarding action on many vital processes, and, accordingly, should be used as a nutriment in health only with the full cognizance of such action.

With regard to the

Pathological Results which may arise from the Employment of Alcoholic Drinks.

Prof. Sims Woodhead, of Cambridge, contributes an excellent paper to the *Practitioner* (November, 1902, p. 539).

Since the time of Virchow it is evident that a complete study of the action of small doses of alcohol on healthy protoplasm must be undertaken if any adequate picture of the changes wrought by it in the system is to be obtained. Physicians have long known that the advanced cirrhotic changes found in the liver and kidney are in a large proportion of cases the result of the excessive use of alcohol; that pneumonia attacking alcoholic patients usually assumes a most virulent form, and that fatty degeneration of a most marked type is found in various organs, and that in certain nervous diseases an antecedent alcoholic history is usually obtainable. If we are thus able to trace its ill effects in interfering with, and altering the function of secreting cells, and in causing fatty degeneration of the muscles of the heart, of the gland cells of the liver, and of the pyramidal cells of the brain, are we not justified in assuming that much smaller quantities are sufficient to disturb the healthy equilibrium of these cells? The question has been raised as to whether alcohol is an aliment, or a disease exciting substance? It would be almost as rational for us to ask the same questions concerning the diphtheria toxin and enter upon a discussion as to the oxidation of that poison in the tissues and take the amount of such oxidation as the measure of its food value in doses large or small. The whole question is one not of oxidation but of the proportion of beneficial effect to the injurious action known to occur when alcohol, even in very small quantities, is introduced into the human economy.

Alcohol, like phosphorous, has an extraordinary affinity for oxygen; so great is this "oxygen hunger" that the oxidation of the fats and carbohydrates taken into the body is interfered with, the respiratory oxygen being seized upon by the alcohol, with the result that there is imperfect metabolism as the result of imperfect oxidation. Owing to this abnormal metabolism there may result an excessive accumulation of fat, not only in subcutaneous tissues, but also in many of

the more internal structures of the body. It may also lead to an accumulation of fatty degenerative products in the protoplasm of the cells. In this co-existence of infiltration and degeneration we have one of the most characteristic features of alcoholic poisoning or of poisoning by substances similar to alcohol.

How alcohol acts in these cases it is somewhat difficult to determine, but that it is doing this special work every pathologist is now perfectly satisfied. Where fatty degeneration takes place two other sets of changes may almost invariably be met with. In aged people there is usually a great tendency to the deposition of calcareous matter in tissues of low vitality. This is perhaps best seen in the muscular coat of the blood vessels in which fatty degeneration of the muscle fibres has occurred. This calcification is frequently met with in alcoholics, not necessarily in patients who have been drunkards, either intermittent or habitual, but in those who have taken what they call moderate quantities of alcohol regularly up to the latter part of adult life, or to the earlier periods of old age. Indeed, so numerous are the deaths from vascular disease among this class of patients that the position assumed by some of the important assurance societies is fully justified by these changes alone.

These fatty and calcareous changes may be associated with a second series, an increased formation of fibrous tissue in certain active tissues and organs. In some cases the fibrous change must be regarded as of primary origin and the result of direct irritation, as for instance the changes induced in the connective tissue cells of the liver, by the alcohol brought in the portal circulation. More commonly, however, it is a secondary process associated with the occurrence of fatty degeneration. At one time cases of pure fibrosis were ascribed to everything but alcohol, but more recent observations have convinced many pathologists, the writer among the number, that the production of "arterio-sclerosis" in many cases can be attributed to nothing but the use of alcohol, and not always, or necessarily, in very large doses. One of the points on which I have always insisted in connection with alcohol is that it acts as a cumulative poison, and that it may exert its cumulative action not only as regards alcohol itself, but also in connection with other poisons such as arsenic, phosphorus, etc., and in connection with the production of disease-producing organisms, and even in connection with the ordinary metabolic waste products of the body. These waste products, as we know, are of a distinctly toxic character, and if retained exert very deleterious effects upon tissues. Alcohol appears to accentuate the action of these waste products in two ways; first, by increasing or exaggerat-

ing their effects, the two poisons together doing more damage than either one alone is capable of doing; and in the second place, as the result of an interference with the activity of the secretory cells, we have the removal of the various waste products obstructed, and a vicious circle set up, which can end only in the degeneration of the tissues and the death of the patient.

In alcohol also we have a substance that has a most marked effect in intensifying and accelerating disease processes. As an outcome of a wide experience there has certainly been a great revulsion against the indiscriminate use of alcohol in cases of typhoid fever and the same is true of the indiscriminate use of alcohol in pneumonia. Experiments go to prove that alcohol acts directly on almost every part of the body, and that the higher the function of a tissue, the more readily are its cells affected. Moreover, the cells acted upon by alcohol are profoundly modified as regards both their functional activity and their metabolism. It is found also that in many tissues, especially in the cells of the connective tissue series and in the leucocytes, where it is impossible to make out any well marked structural or ordinary functional changes, there are profound modifications as regards the susceptibility to the invasion of disease-producing bacteria, and to the action of the poisons produced by these bacteria, that practically render the patient who takes alcohol much more susceptible to disease of various kinds than is the non-alcoholic.

This paper of Prof. Whitehead is certainly a very strong arraignment of the action of alcohol. Is it too strong? In reference to its

Therapeutic Employment in Surgery.

Mr. Pearce Gould, surgeon to the Middlesex Hospital, writes: (*Practitioner*, November, 1902, p. 569). "For many years I have dispensed almost entirely with alcohol as an aid in surgical treatment. As a student I saw it used almost as a matter of routine for every kind of surgical malady except head injuries, and in my early years I naturally followed the practice of my teachers; but as soon as I made trial for myself of the effects of withholding alcohol, I found how entirely overrated its value was, and how gravely mistaken had been the teaching . . . I believe that experience with patients suffering from various forms of infections exactly coincides with the results obtained in experiments upon animals. Not only are individuals who are addicted to alcoholic excess possessed of a much diminished resistance to all forms of infection, but the administration of alcohol to those already infected not only fails to add to their power to resist disease, but even lessens that power. Even in cases of uncontrollable suppura-

tion, I have found nothing but good from withholding all alcohol. Exhaustion is, I believe, hastened and not delayed by alcohol."

It is more difficult to determine the value of alcohol in cases of profound shock and collapse. Mr. Gould thinks it is of some value in shock, in helping to tide over the acute emergency—but considers that it is not of the same value and importance that the horizontal position, rest, internal heat, morphia, and strychnine are, and that it never produces such a striking beneficial result as the introduction of normal saline fluid into the circulation does. Referring to its use in cases of advanced cancer, he says, in some patients it is found that a small quantity of well diluted spirit, given at about the same time as the evening dose of morphia will secure a better sleep than does the morphia alone. Entire distaste for food is another distressing symptom not rarely met with, and sometimes a little beer or wine will help these patients to take food, and so promote their well-being. But anything like a free use of alcohol is strongly to be deprecated; it is as pitifully injurious as is the free, unrestricted use of morphine. Either drug in moderation may be useful, but in excess only adds to the patient's misery.

On the Use of Alcohol in Medicine.

Under this heading Sir William Broadbent writes, what we consider to be a clear and impartial statement of the advantages and disadvantages accruing from its therapeutic employment. His views may be thus epitomized:

We are daily called upon to consider the administration of stimulants, on the one hand in acute disease, and on the other in conditions of mere debility of varied causation, and in chronic disease of every kind, and it is necessary to ask ourselves the question, What do we expect of them, and in what way are the good effects we look for produced? It is also always necessary when employing a remedy to think, not only of the immediate advantage we aim at, but of the remote effects which may be produced. An alcoholic stimulant may be continued indefinitely when the conditions which led to its being recommended have long passed away; we have thus to bear in mind the possibility of establishing an alcoholic habit and the results that may follow from such a condition.

The action of alcohol which we call stimulant is, an indirect one, and its most conspicuous evidence is a dilatation of the arterioles and capillaries allowing a freer supply of blood to all the organs. There is also a concomitant increased action of the heart, due partly, if not mainly, to the diminished resistance in the peripheral circulation. A temporary general acceleration of the circulation, and

increased afflux of blood to the brain and viscera; this constitutes the action of alcohol of which we take advantage clinically.

In considering the employment of stimulants in the treatment of debility and chronic disease generally, the first point is to take care not to do harm. It may be said at once that alcohol has no place in the treatment of weakness in childhood; in the anamia and chlorosis of adolescence stimulants are of a very doubtful advantage, and this or that wine recommended as containing iron often does more harm than good. The most dangerous employment of stimulants at any period of life is when they are allowed to be taken for the relief of depression, or of sensations described as "sinking," or of subjective feelings of weakness, even if accompanied by weakness of the pulse. The immediate effect is no doubt distinct and agreeable, but reaction is inevitable. If stimulants taken on medical advice are ever responsible for the establishment of the alcoholic habit it is under these circumstances. While there is a great tendency to exaggerate the necessity of stimulants in debility, however caused, and to attribute to them an influence in promoting the recovery of strength which they do not possess, there can be no doubt that properly employed they are of great value; but as an invariable rule, they should only be taken with meals. Their beneficial effects may be estimated by the increase in the amount of food which is taken with their aid. In choosing a stimulant, therefore, for a given case, the best criterion is not the chemical composition, but the effect on the appetite and digestion. We do not recommend Burgundy, under the idea that red wine makes red blood, nor order a given wine because it is said to contain iron. When stout or ale is taken the volume of liquid drunk at a meal is much increased, and we should make sure that it is taken in addition to the food and not instead of it. In all cases the food must largely predominate in amount over the stimulant. The biscuit and glass of port or sherry, so often allowed in the course of a morning, do not come within the designation of a meal, and the practice is not a legitimate employment of stimulants.

Renal disease of any kind may almost be regarded as a bar to stimulants, and the same may be said with regard to disease of the liver. In phthisis and tubercular diseases stimulants may, perhaps, render us some service.

In acute febrile disease the profession has gone from one extreme to the other in the use of stimulants under the influence of the dominant theories of the day, or following the example and teaching of some distinguished physician, or enthusiastic advocate. The general doctrines which possess the medical mind at the present moment have

little direct bearing on the administration of alcohol, and on the whole, stimulants are given with judgment and with moderation. In their administration the following rules, in Dr. Broadbent's opinion, should guide us:—In no case should they be given in the early stages; on the contrary, they should be withheld as long as possible, even when the patient has habitually taken alcohol in excess and may be thought to have become dependent upon it. The safest course is to withhold them until it is clear they are necessary. As the disease advances the indication for their employment is not muscular prostration and weakness, still less any sense of weakness of which the patient may complain. We must be guided mainly by the pulse, and by its frequency and low tension rather than by its apparent strength. The effects of the first few doses should be carefully watched; if the stimulant is doing good the pulse ought to be less frequent, steadier and longer, namely, better sustained and less dirotic. The state of the tongue is another indication; when this is dry, and especially when there are sordes about the lips, teeth, and palate, alcohol does good. When stimulants promote sleep, and diminish restlessness and agitation, they are of service. Converse effects, excitement, sleeplessness, and increased frequency of the pulse, would constitute contra-indications as would also evidence of gastric irritation. The odor of the breath should always be noticed. As a rule in pyrexia, the vinous or spirituous smell disappears from the breath with extraordinary rapidity; when it lingers, or especially if the foul after-odor of the spirit-drinker is recognized, the stimulant should be withdrawn, and should it be considered necessary to give it again, the dose should be small and the effects of it carefully watched. The amount of stimulant which can be taken with advantage will vary with the character of the disease and the severity of the attack. If it has not been given unnecessarily early, and if it has been increased cautiously, it is very rare that more than 6 oz. of brandy or whiskey, or the equivalent of this amount of spirit in the form of wine, will be required in enteric fever, even in a severe and protracted case. Typhus seems to have more need of stimulants, but does surprisingly well on comparatively little. In pneumonia the stimulant may have to be pushed rapidly, but six or eight ounces should be considered a very large amount. Ten ounces a day represents, in my opinion, a maximum likely to be of real service in any form of acute disease. I have seen much more given with apparent impunity, and especially, perhaps, in septicæmia. The amount of stimulant to be given has been spoken of in terms of brandy and whiskey, but effects can often be obtained by substituting champagne once or twice in the 24 hours, which cannot be got from

spirits, and port or other wine may have a valuable place during convalescence.

On the Employment of Alcohol as a Beverage.

the editor of the *Practitioner* thus writes:—

“We have the testimony of Sir Samuel Wilkes, Sir H. Thompson, Professor Sims Woodhead and Dr. Edmunds, founded in each case on their personal experience. Evidence of this kind from such men must, of course, carry great weight, and the fact that their testimony is substantially to the same effect gives it a cumulative force which might well seem to make it conclusive. Sir Samuel Wilkes states that he was practically a teetotaler throughout his working life. Sir Henry Thompson, after total abstinence for six months, found that he had got rid of severe hemicrania and rheumatism, to which he had previously been subject. When he began to decline into the vale of years, remembering the old saw that wine is the milk of old age, he gave it a trial, but soon came to the conclusion that the aphorism was a fallacy. Dr. Edmunds, who in earlier life never took more than one fluid ounce of alcohol, freely diluted, in any day, and for the last forty years had taken none at all, is convinced that in regard to his own health and the efficiency of his work, he has gained everything for his patients and himself and has lost nothing by his disuse of alcoholic beverages. Professor Sims Woodhead believes total abstinence enabled him as a student at the same time to win laurels in the athletic field and prizes in the class room. In the former sphere it dispensed him from the necessity of training, and in the latter it helped him to do the best work of which he was capable. He feels that it is owing to the same cause that he can still get through as much work with as little effort as most men.

On the other hand Sir Samuel Wilkes recognizes that the desire for an alcoholic drink of some kind is a natural instinct in man which has not been extinguished by civilization, and is not shocked by the fact that many good and thoughtful men consider that good wine taken in moderation soothes irritabilities of temper and brings the company at the dinner table to the same level of good humour. On this point we may be allowed to quote the evidence of another eminent witness. Sir Lauder Brunton, speaking of a city dinner where each course seemed to excite the appetite for the one which succeeded and was accompanied by a wine so carefully selected that it gave zest to the food, while the food appeared to give additional zest to the wine, says: “I went to the dinner exhausted with overwork, irritable in temper, and believing that city companies were wasteful bodies, who squandered money that might be employed for useful pur-

poses and that they should be abolished. I came away feeling strong and well, with an angelic temper and firmly convinced that the city companies had been established for the express purpose of giving dinners and ought on no account to be interfered with. Nor was the good thus effected of a transitory nature; the irritability of temper which had disappeared in the course of dinner did not return and the morning afterwards, instead of waking with headache and depression, I awoke strong, well, and ready for work, and remained so for a considerable length of time."

The statistics given by Dr. Ridge show that abstainers have a somewhat longer expectation of life than others. It is not length of days, however, that counts, but the work that is done before the night comes. If wine gladdens the heart of man without disordering his brain or dulling his moral sense, that in itself is, in Mr. Morris's opinion, a good reason for using it; if a man finds that it chases away the cares of business when he is at home and makes him more cheerful in the midst of his family and friends, some physicians may regard it as his duty to take a small quantity to produce these effects. If, on the other hand, a man finds that he cannot take even a small quantity without detriment to his health or his temper, it is equally his duty to abstain. There are those who, like Cassio, have very poor and unhappy brains for drinking, or who, like Dr. Johnson, can abstain but cannot be moderate.

RETROSPECT OF CURRENT LITERATURE.

Medicine.

UNDER THE CHARGE OF JAMES STEWART.

Diet in Granular Kidney.

VON NOORDEN. "On the Dietetic Treatment of Granular Kidney."
Brit. Med. Jour., Nov. 1, 1902.

Any light which can be thrown upon the treatment of granular kidney is very welcome, and all who know of the keen interest taken in the metabolism of patients with Bright's disease by the author of this paper will gladly receive the publication of his views formed after several years of special study of such cases.

Von Noorden states that there are three criterions for determining whether a certain diet suits the diseased kidneys or not. The observation how the disease is influenced by this or that diet yields by far the most important criterion. As a second criterion the intensity of the albuminuria may be considered, while the excretory power of the diseased kidneys—a factor of the utmost importance, and yet one not receiving enough attention clinically—may be regarded as the third.

The questions discussed are as follows:—

- (1) How much albuminoid substances are allowed in granular kidney?
- (2) Is the quantity of albumin of any influence?
- (3) Shall the patient drink much or little?

The answer to the first question, based upon clinical observation and experiments, goes to show that it is not necessary or justifiable to strictly withhold almost all albumin in the food of patients suffering from chronic nephritis. The strength of the patient must be maintained, and that practice which is perfectly correct in acute nephritis is a grave error in the treatment of the chronic form. Putting the answer of this question in a more concrete form, it may be said that nitrogen to the amount of 14 to 15 grams per 70 kilograms of body

weight may be excreted with ease, but when the amount of albumin ingested requires that more than the above amount of nitrogen per 70 kilogram weight has to be excreted, then elimination becomes uncertain, then the amount of albuminoid material is too much.

In reviewing the answer to the second question, one finds that the conclusions formed in the studies devoted to this topic are as much at variance with the older teaching as are those under the first division. When the uric acid excreted does not go beyond 10 or 12 grams per day, elimination goes on all right. Animal tissues rich in nucleins are forbidden, *e.g.*, sweetbreads, liver, kidneys and all glandular organs. Von Noorden states that the kidneys make no distinction between corresponding quantities of albumin of meat, eggs, milk and vegetables. As between white meats and red meats there is no choice. On experimental as well as upon chemical tests, "it is absolutely no consequence for the eliminatory functions of the kidney whether one gives red or white meats to the patients."

The third question is answered from the standpoint of the cardiac condition, which is of such importance in chronic nephritis. If the vascular system is inundated with water the work of the heart is increased, hence the fluids ingested are limited and not more than $1\frac{1}{2}$ litres per day of water are allowed. Such a limitation of water may be followed by an increase in the albuminuria, but Von Noorden claims that the advantages secured are greater than the disadvantages. In order to avoid all danger of retention of solid uric acid substances it is advisable, one day in every week, to let the patient drink a large quantity of water, $2\frac{1}{2}$ to 3 litres. The total quantity of food taken should be such as to satisfy the needs of the patient, and overfeeding must be avoided as adiposity is a grave complication of Bright's disease.

Myelopathic Albumosuria.

BRADSHAW. "Myelopathic Albumosuria." *The Lancet*, Vol. II., 1902, pp. 929.

SIMON. "Observations on the Nature of the Bence Jones Albumin." *Amer. Jour. Med. Sciences*, June, 1902.

BOSTON. "A Rapid Reaction for Bence Jones Albumose." *Ibid*, Oct., 1902.

HAMBURGER. "Two examples of Bence Jones Albumosuria associated with Multiple Myelomata." *Johns Hopkins Hos. Bull.*, p. 39. 1901.

Historical. The discovery of "albumosuria" was made by Bence Jones in 1847. A report followed in 1848; and in 1850, W. MacIntyre, in whose practice the case occurred, gave the clinical report, the diagnosis in which post mortem was "osteomalacia fragilis ossium."

According to Simon, there were 23 cases recorded in the literature up to June of this year. With the increase of light from the advancement of clinical and pathological study, cases of "osteomalacia" or "mollities ossium," though recognized for many years, were divided into two groups. To the first group, which maintained the name osteomalacia, belonged these patients who were "young, mostly women; recovery temporary or permanent was not infrequent, and the essential lesion was absorption of lime salts and the replacement of the bony structure by a simple type of connective tissue." In the second group the patients were generally well beyond middle life, "recovery did not take place and the essential lesion was the invasion of the bone by cellular growths of the connective tissue type, either generally diffused through the bone or forming circumscribed tumours and leading to the absorption of the osseous structure." For this condition Rustizky in 1873 introduced the term "multiple myeloma." In 1885, as a means of differential diagnosis between osteomalacia and multiple myeloma, it was thought that the discovery in the urine of the Bence Jones albumose would suffice, since it was then thought that body was always present in multiple myeloma. However, in the light of present knowledge, this view is abandoned, and those cases which have *albumose in the urine and some affection of the marrow seem to form a group of themselves.*

Dr. Bradshaw describes these cases, marking out their individuality, and names the disease *Myelopathic Albumosuria*. From the endorsement received by this article in the editorial column of the *Lancet* of October 4, 1902, it would seem that this term will find its way in due time into the Nomenclature of Diseases issued under the authority of the Royal College of Physicians, London.

Etiology. Upon this point but little can be said. The disease has been found more frequently in men beyond middle life. Syphilis was present in two of the cases several years previously.

Morbid anatomy and pathology may be considered under two heads:

- (1) The changes in the skeleton.
- (2) The changes in the urine.

Certain bones are invaded by a soft mass of new growth, the proper osseous tissue undergoing absorption. The growth may be confined to the interior of the bone, or break through the compact tissue and form tumours of considerable size. The bones involved are the ribs, sternum, and bodies of the vertebrae, rarely the pelvic bones or skull, and yet more rarely the long bones of the extremities. The new growth is soft, gelatinous, vascular, and looks like red marrow. Microscopically it is composed chiefly of round cells with little or no intra-

cellular substance. Fat globules are often present in the cells and occasionally spindle cells and here and there islets of cartilage.

In structure and clinical progress the growth seems to resemble sarcoma, but it differs from common sarcoma in its invasion of several parts of the skeleton simultaneously, and in showing no tendency to form metastases in other organs. It would appear to be from its position and structure an outgrowth or hyperplasia of the normal marrow.

The Urine.

(1) It may be milky in appearance.

(2) It is markedly increased in quantity in some cases. Hamburger's case averaged between 2,000 and 3,500 c.c.

(3) The specific gravity may be very high, and it is generally acid in reaction.

(4) It undergoes ammoniacal decomposition very slowly.

(5) It contains a proteid closely resembling albumin but differing in the following most obvious particulars. (a) It coagulates at a remarkably low temperature, 58° C. This is the reaction which Simon regarded as the most characteristic general reaction. (b) The coagulum disappears on boiling, and reappears on cooling. (c) The coagulum, which forms on treatment with cold nitric acid, disappears on boiling and reappears on cooling. (d) Hydrochloric acid readily coagulates it. (e) The most recently reported cases confirm the view that it is a crystalline body.

Simon points out that turbidity appears in such urine between 52° C. and 53° C. At 55° the liquid is quite opaque, while at 75° or 80° a coarsely flocculent precipitate forms, and when left to itself falls, leaving the supernatant fluid quite clear.

Dr. Boston describes a rapid reaction for Bence Jones' albumose. He claims that the reaction probably most reliable is that with lead acetate and caustic soda for the detection of sulphur. It is stated that many chemists regard the presence of loosely combined sulphur as a pre-eminent feature which distinguishes Bence Jones' albumose from other albumosuria. A modification for economizing time is clearly described.

The chemical nature of this substance has long been a dispute. While good authorities, on the one hand, classify it as an albumose, Simon, Magniss-Ley and others, on the other hand, are forced to conclude that it cannot be an albumose. It is a body *sui generis*. It is probable that it is more correctly placed under the water soluble globulins.

Before passing on to note the views held concerning the origin of

this substance, it is important to note that a considerable difference of opinion obtains with respect to the reaction of this substance to heat, and hence possibly arises some of the different views as to its nature. The present knowledge is imperfect, but it is very near the truth to state "that the substance is one closely allied to albumin and probably is somewhat less complex in its constitution"; and Bradshaw says we may conveniently designate it as the Bence Jones albumose.

How is this substance formed? Three views have been presented in answer to this question.

(1) That the proteid constituents of the food, through altered abnormal metabolism, furnish this substance first described by McIntyre as "a superabundance of animal matter in the urine."

(2) Some abnormal metabolism taking place in connection with the new growths in the bones, possibly by means of a ferment.

(3) That the loss of function of the bone marrow accounts for the albumosuria.

It appears from the observations made that the substance under discussion is really formed in connection with the new growths, although there is some evidence contrary to this. Simon suggests that with the abnormal proliferation of the plasma cells of the red marrow there is associated some deviation from their physiological function, and this in turn is expressed in the Bence Jones substance. He argues that on account of its being foreign to the body, it would appear in the urine. Experiments on dogs with this substance leads one to the belief that it is a foreign body, and when introduced intravenously it may be found subsequently in the urine.

Sumptoms. The onset may be insidious with increasing debility; painful areas about ribs or sternum or back, or marked anæmia may be present. Pain and debility may give place to comfort and increase of strength for a time. Tumours about the bones may be found, or there may be a peculiar yielding of the ribs. Spontaneous fracture of the femur is reported in one case; muscular atrophy has also been noted.

Prognosis is always bad; although there may be remissions.

W. F. Hamilton.

Reviews and Notices of Books.

VISITING LISTS FOR 1903.

The close of the year is always brought to our notice by the arrival of our annual visitors, the physician's visiting lists; and like everything else that comes to us regularly and without effort on our part, we perhaps little appreciate the amount of trouble it saves to the average practitioner in the course of the year.

The Visiting List of P. Blakiston's Son & Co., has now reached the fifty-second year of its publication. It is issued in the same form as formerly, but contains, in addition to the usual fund of useful information, pages on incompatibility and the immediate treatment of poisoning. It is supplied in the same styles as in past years—a single volume for 25 or 50 patients per week, selling at \$1.00 and \$1.25; and also for 50 to 100 patients in two volumes. This firm publish also perpetual and monthly editions.

The Medical News Visiting List for 1903, published by Lea Brothers & Co., is issued in four styles adapted to any system of records and any method of keeping professional accounts. It contains a great deal of printed data of the most useful sort and can be obtained in weekly, monthly or perpetual forms, dated or undated. Each style is in a wallet-shaped book, provided with pocket, pencil and rubber.

Society Proceedings.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

Stated Meeting, November 7, 1902.

GEO. E. ARMSTRONG, M.D., PRESIDENT, IN THE CHAIR.

Rodent Ulcer Treated by X-Rays.

DR. GIRDWOOD showed a young woman whom he had been treating for rodent ulcer, extending from the inner angle of the right eye to the edge of the cheek. The disease, when first seen, showed much induration with raised rounded edges of a bluish colour; and several portions gave evidence of extending growth by the presence of several recent nodules glistening through the skin outside the margin of the ulcer. For three weeks she had been treated with what is known as high currency, with but little improvement. Then, after a week in the country she had been subjected to 43 treatments with X-rays for ten minutes each time. The thickening began to disappear and has continued to do so, the ulcer commencing to heal from the inner side. After a week's interval, during which the improvement continued, she again had two weeks of treatment, then another week's interval, followed by a week of treatment, and finally, two weeks interval and three days treatment. There was still some thickening to be removed, but the improvement gave hope of a cure. The tube used was of the "hard" variety, excited by a current of about 100 volts and 4 amperes.

A Case of Addison's Disease followed by Death.

DR. F. G. FINLEY gave the following history of the case:—The patient was a young man of 24, admitted to the Montreal General Hospital for an abscess of the back which was opened. This had been present for twelve months, and during the last seven months he had had to give up work on account of muscular weakness. When first seen, a few hours before he died, he presented all the typical features of Addison's disease. There was an extremely deeply-bronzed skin, most marked about the feet and lower part of the legs. The buttocks and genitals were very dark, almost black, as were the axilla. A few pigment spots were seen on the mucous membrane of the mouth, gums, and inner lining of the cheeks, and two or three moles present on the body were quite black. There was little vomit-

ing and persistently weak pulse during the fortnight he was in the hospital. He had also subnormal temperature.

DR. JOHN McCRAE exhibited pieces of the skin of the scrotum and abdomen and both adrenal bodies. Although the man was of comparatively fair complexion the skin was very dark, being almost of the negroid content. The autopsy had shown tuberculosis of both lungs of old date and a comparatively recent miliary tuberculosis. The suprarenal bodies were both tuberculous, the left being most affected. It was enlarged, caseous, in places suppurating, and it (as did also the right) proved microscopically to be almost replaced by tuberculous material.

DR. W. E. DEEKS said the case was interesting in connection with the one that had been reported in April before the Society, in which a cure had been effected by the use of suprarenal extract. The case since then had remained in perfect health. He asked if suprarenal extract had been tried in this case or if any attempt had been made to relieve the cardiac symptoms.

DR. FINLEY was unable to answer the question, not having seen the case until just before death.

Fracture of the Ribs followed by Emphysema with a Fatal Termination.

DR. MCKEE reported the clinical history of this case, which was that of a youth who was crushed between the beams of an elevator, remaining there until the beams were pried apart. Extensive fractures of the ribs were produced with puncture of the parietal pleura, the visceral pleura being intact. Within an hour after the injury emphysema of the subcutaneous tissues of the left side, the back of the neck, the scalp, face and upper arms appeared.

DR. McCRAE stated that at the autopsy it was at first difficult to understand why so many petchial hæmorrhages had occurred about the face and neck, but it was seen that the body had been caught in such a way as to shut off the venous return while allowing of the supply of arterial blood to the head and neck. Crackling due to the emphysema could be felt over the areas already described, and as low as the knees. The affected areas were swollen and bulging and in the tissues the bacillus *aërogenes capsulatus* was found.

Brief Notes on a Case of Acute Pancreatitis.

DR. W. A. GARDNER presented a case report of a man who had walked from his ship to the ambulance and was dead within an hour and a half. His chief complaint was headache and vomiting, but no diagnosis was made during life.

DR. McCRAE submitted the pancreas of the patient and gave the

notes of the autopsy. The heart was found moderately dilated and the pancreas acutely necrotic. In the latter organ localized small hæmorrhages were made out both superficially and deeply.

An Unusually Large Ventral Hernia.

DR. J. ALEX. HUTCHISON presented the report of this case which will be published later.

The Etiology of Eclampsia.

DR. D. J. EVANS read a paper with the above title. See page 941.

DR. W. W. CHIPMAN thought one of the chief results of this paper was in showing the line along which observations were being made in the study of eclampsia. All knew that formerly this was done in a rather an empirical way, remedies being sought for and when found vaunted for a time, only to fall into disuse. During the past seven or eight years, beginning with the work of Bouchard, a more scientific standpoint had been assumed and work done on auto-intoxication. The speaker thought the time had come when the term eclampsia should be dropped and puerperal intoxication used instead, as had been done by many societies already. In reference to Veit's views on the physiology of the placenta and especially with regard to the discharge of foetal cells into the maternal blood system, this was a new idea, although, of course, all admitted a certain reciprocity going on between the foetal and maternal cells. Breeders of horses believed that if a well-bred mare was bred to an underbred horse, that mare was spoiled for future well-breds.

Dr. Chipman thought that even the term puerperal toxæmia might include more than one condition. He referred to a case reported by Bell in the *Journal of Gynecology* for September, in which the changes in the liver were identical with those of yellow atrophy, and also to two cases of his own, one of which was similar to Bell's in having acute yellow atrophy of the liver, while the other was of the renal type and recovered. He urged the importance of doing an autopsy in every case of eclampsia where possible, in order that the morbid anatomy of the condition might be scientifically studied.

DR. WESLEY MILLS, speaking with regard to telegony, said that the views Dr. Chipman had presented were generally held by all breeders, but when put to the actual test of scientific investigation they had broken down. Nevertheless, it was difficult to believe that this view of telegony, so widely spread amongst breeders, was without some foundation. One could see in a general way the influence between the foetus and the mother; and while the influence of the mother on the foetus had been carefully studied, the other side had been too much neglected. While the theory of auto-intoxication

was extremely important, he would suggest that a condition of the blood might exist which was not to be traced to one or two organs but to the general changes in metabolism.

DR. ROBERTSON would like to know whether the last speaker or the reader of the paper had ever known of eclampsia occurring in the lower animals. If it did occur the theory of Veit would receive much support by experiments conducted with this purpose in view. The speaker, in an experience of seven cases of eclampsia, had been struck with the suddenness of onset of the attacks. This point, he thought, was difficult to explain by the theory of Veit.

DR. MAUDE ABBOTT would like to know whether the examination for pigmentation had been made often, and if the hæmoglobinæmia was often recognized as preliminary to the albuminuria, also whether any of the other organs besides the skin were examined for iron.

DR. J. C. CAMERON valued the paper as showing the trend of modern influence and the line along which modern observations were going. We were back to the old story, however, that we were dealing with a toxæmia for which there had been a great many theories advanced, each of which explained some cases, but not one of which could explain all. Perhaps the truth of the matter was that grouped under the term eclampsia were many different conditions produced by different toxines. If the theory with respect to the poisoning of the maternal blood by the deportation of fetal cells were correct, it would lend support to the idea of emptying the uterus rapidly to remove the cause of poisoning. The speaker himself was convinced that there were a great many different toxines, and referred to a case reported by Wilson of Birmingham, in which there seemed from the history and clinical signs no reason to question a diagnosis of eclampsia, and yet post mortem a suppurative pneumococcus meningitis was found. He believed that in the future, cases of puerperal toxæmia would be differentiated and broken up into groups, and probably with the institution of a more rational method of treatment.

DR. REDDY, while approving of discussing these theories as a stimulus to the profession, failed to see how they added anything practical to the treatment. Even were the deportation of cells proved to be a fact it would not be possible to estimate the likelihood of convulsions setting in. In the meantime, our efforts should still be directed towards watching for those indications which we knew to be of danger, admitting that in some cases the condition occurred without any warning.

DR. EVANS, in reply, said that he agreed with nearly everything Dr. Chipman had said, and particularly in regard to the word

eclampsia being unsatisfactory. In thinking over this deportation theory and trying to fit it to the cases which had come under his notice, there had been two just similar cases; and it seemed to him that a possible explanation lay in the fact that when a poisonous organism attacked a system it was probably the weakest part that suffered first. Hence, where the kidneys were not up to the standard they would be the first to suffer, while in other cases it might be the liver. With regard to the application of the theory to the occurrence of convulsions, this was explained by the uterine contractions loosening, as it were, the attachments of the villi and thus pouring out a fresh quantity of these cells into the circulation, a quantity sufficient to overcome all the immunizing influence of the body at the time.

With regard to treatment Strogonoff of St. Petersburg, had probably obtained the most extraordinary results. He claimed that the condition was an infectious disease, and treated the cases with absolute rest, administration of oxygen, free ventilation of the room, and sedatives in sufficient quantities to quiet the patient, never allowing her to be handled or touched except under anæsthetic. Thus he got the uterus quieted down as quickly possible and the poison thrown into the circulation had time to be eliminated.

With regard to the favourable effects of pregnancy, Veit had only mentioned this in a very casual way, but the speaker thought all had come across women in very poor health who had improved during pregnancy, the improvement sometimes being lasting.

Dr. Evans was unable to answer with regard to eclampsia in animals. The iron pigment had been found in the skin in those cases in which there was hæmoglobinæmia, but he did not know whether it was also present in the organs.

Dr. MILLS stated that he had not himself seen those cases which resemble eclampsia in animals, but they were well known in the literature of comparative medicine, and he had heard veterinary surgeons report them. They occurred in animals that had seemed to be in unusual vigour up to the time of parturition, and in bitches at least, where convulsions occurred after parturition, it was noted that they had been usually overfed. He thought it would be of advantage if one went back and took up some of the theories that had been cast aside, such as the nervous and blood pressure, and worked them out.

THE

Montreal Medical Journal.

A Monthly Record of the Progress of Medical and Surgical Science.

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VIRCHOW'S SUCCESSOR.

It is a severe strain to which to subject any individual to appoint him as a successor to one of the great Masters in his particular subject, for it is inevitable that comparison should constantly be drawn and that the world should criticize how Elijah's mantle sits upon Elisha.

Virchow was so unquestionably the first of pathologists and will so assuredly be classed among the immortals, that we have little wonder that Professor Marchand, notwithstanding the great name he has made for himself in the course of the few years during which he has been head of the Pathological Institute at Leipsic, declined what is regarded as the first and most important Pathological Chair in Germany, and, we may say, in Europe. In Johann Orth, who has for long been professor at Göttingen, so far as regards teaching and depth of knowledge of his subject the authorities appear to have made a most excellent selection. Orth has made for himself a great mark as a morbid anatomist. His text-books upon Pathological Diagnosis and upon Special Pathology held a first place for accuracy.

and thoroughness in treatment. After all, it cannot be expected that anyone in the present generation should be a first authority on many subjects as were Virchow, Huxley and others of the last generation.

We have no doubt that Professor Orth will add materially to his great reputation now that he is in Berlin, and will draw thither the best of the younger workers to study under him. And even if, according to report, he resembles his predecessor in a certain difficulty of approach and impatience, if not severity, towards the workers in his laboratory, that treatment of juniors has become so traditional in certain German centres as not to be a serious hindrance.

ON THE PREVENTION OF TUBERCULOSIS.

Under the Presidency, of His Excellency, Lord Minto, an influential meeting was held a few days ago to inaugurate in this city a Committee or Association for the study of the condition of the tuberculous poor in our city, and the encouragement of all methods whereby the spread of this disease may be checked and those already suffering from it may receive due care.

At this meeting, quite the most remarkable address was that of Dr. A. J. Richer. His study of the statistics of consumption and other manifestations of tuberculosis in our city, and his estimate of the number of cases which, recognized or unrecognized, are constantly present in our community deserve to be in the hands of everyone interested in the welfare of the city. And when we remember that the disease is so distinctly preventable, and that by compliance with the laws of hygiene and with certain very simple rules, other communities are rapidly reducing the extent of the ravages of this disease, it is obvious that this movement to establish an association of the above mentioned nature is by no means premature.

Judging from the remarks of other speakers, we are glad to see that it would seem intended to proceed cautiously in the matter and to work, more especially, by familiarizing the public with the dangers of the disease and the means of arresting its spread and by strengthening, as far as possible, the hands of our provincial and municipal authorities. We think it well that this aspect of the movement was placed in the forefront even although we urgently need one or more hospitals and sanatoria for the treatment of our cases and hope sincerely that these will be established.

With the great number of already existing charities in Montreal, however, we are doubtful whether it would be good policy to make any general call upon the charitable public to support such an annual

contributions. It would be better could one or two wealthy men come forward and not merely build, we would not say necessarily a complete sanatorium, but certainly the nucleus of such, and building it, endow the portion thus established. There is and has been in the past a great tendency in Montreal and elsewhere for those charitably disposed, recognizing the needs of the community in one or other directions to build and equip hospitals and like institutions and to leave it to others to find the means necessary for the maintenance of the same in succeeding years. The result is that slowly but steadily the number of individual calls to help on this or that good work is becoming so considerable that the amount available to properly carry on individual charities is collected with increasing difficulty, so that each new charity tends to diminish the efficiency of those already existing. It is a delicate matter to advise about such things, for advice may seem to imply ungenerous criticism of work accomplished with the highest motives, work by which the community benefits most materially. Yet the signs of the times are undoubtedly that in the near future he will be considered to accomplish the most good with his benefactions who does not place all of them in land and buildings, but makes his gift with the express stipulation that while one-half is employed in building, the other half—or thereabouts—is utilized as an endowment fund.

In pointing this out, we by no means wish to throw cold water upon the newly formed association. On the contrary, we are in full accord with all the speakers at the recent meeting, and recognize thoroughly that the spread of tuberculosis is a blot upon our civilization, and that it is essential to encourage every means of arresting that spread. The Association has our hearty support; we do but feel it necessary to emphasize what seems to be already realized by those who have been the movers in this work, that great care must be taken lest in making an advance in one direction, we arrest advance in others.

CHOLELITHIASIS.

A formal pre-arranged discussion forms one of the most interesting and instructive features of a medical convention. Those who take part come prepared to give the results of their experience and an epitome of the latest work done relating to the subject.

At the meeting of the Canadian Medical Association in September last, one of the largest gatherings assembled to listen to and take part in the discussion on Cholelithiasis. It was opened by Dr. McPhedran, of Toronto, in a most elaborate and thoughtful paper, which appears in the present number of the JOURNAL. Dr. McPhe-

dran put the subject of cholelithiasis, its varieties, complications and sequelæ in such a clear and concise form that everyone present felt that their memories were refreshed, and that they were able to grasp the great and somewhat complicated question in a clearer light.

Dr. A. D. Blackader then took up the medical treatment, also published in this issue, and discussed it in a most scholarly and scientific spirit. After a brief review of the physiology of the liver, he gave a carefully prepared review of the known action of drugs on that organ, and their influence, so far as known, upon the formation of gall-stones. He showed that some of the old, so-called, stimulants of the liver really retarded the outflow of bile; and, while the salts of soda were mild stimulants, the tauro and glyco-cholates were the most effective. The two all-important factors in cholelithiasis, slowing of the flow and infection, were duly emphasized and their relative importance indicated. The influence of diet and the importance of exercise were also discussed.

The surgical side of the discussion was ably presented by Dr. Ross in a paper covering the ground most thoroughly, but to one or two of the general sweeping statements made, we must take exception. Should an operation be advised as soon as a diagnosis of gall-stone in the bile passages is made. We should most emphatically answer, no. Internal treatment should first be given a chance. Medication and dieting can accomplish much in many cases. In the majority of cases of gall-stone disease no treatment is required because no symptoms or inconvenience follow. We all know young people who have suffered during a period of months or years from recurring attacks of gall-stone colic and then remained perfectly free from symptoms for years together. Let us then give the use of medication a chance and, if the circumstances of the patient permit, let the waters of Karlsbad have a trial.

Operative treatment is demanded in acute purulent cholangitis, in chronic obstruction of the common duct, and in chronic obstruction of the cystic duct, and is indicated when the internal and bath treatment have failed and the constantly recurring attacks of pain render the patient miserable, unable to earn a living and in danger of acquiring the morphine habit. Operation is also indicated when there is a suspicion of cancer, and when perforation of the bile passages has occurred.

The surgeon must always be guided largely by the clinical history of the case. The actual findings during a physical examination are frequently disappointing—some enlargement of the liver and occasionally jaundice. As a good working rule it may be said that compara-

tively early surgical interference is the safer course to pursue. There are, on the other hand, definite contra-indications to operation. Operation should not be undertaken in cases of acute obstruction of the common duct, in carcinoma of the gall-bladder, in frequently recurring attacks of jaundice followed by the passage of small stones and perfect health during the intervals. It is to be avoided, if possible, in old people, in diabetics, and in people suffering from heart and lung diseases, renal insufficiency, and general arterio-sclerosis.

In regard to the technique of operation, two points seem of first importance, namely, the emptying of the stomach and intestines to prevent the possibility of embarrassing difficulties in unforeseen complications, and the use of calcium chloride in large doses beforehand to prevent hæmorrhage.

The propriety of removing the gall-bladder more frequently than has been done, is yet a debatable question, and the use of a lumbar drain in all cases seems to us, as advocated by some surgeons, unnecessarily severe and seldom called for.

The general feeling of the meeting was that while the surgical treatment of gall-stones in the absence of malignant disease was most satisfactory, yet that operative measures were indicated only in a well defined class of cases, and that the medical and dietetic treatment should first receive a fair and judicious trial.

Discussions by physicians and surgeons of pathological lesions in which medicine and surgery are intimately associated, are always interesting and beneficial. We cordially commend these articles to the attention of our readers.

Obituary

THOMAS CHRISTIE, M.P., M.D.

Dr. Thomas Christie, M.P., died at his home in Lachute, on August 5th, 1902. He died at a good, full age, falling asleep in the ripeness of years like a tired child at the close of a long summer's day. A man of correct habits and uniformly good health, he enjoyed the activities of life almost to the last. For less than one week was he confined to bed, senile pneumonia having set in. There he lay quietly, and for the most part, painlessly, while "the last golden sands of a golden life were running out."

Born in 1824, in Glasgow, Scotland, he came to Canada when three



years of age, with his father who settled near Lachute. There, young Christie grew up, attending the common schools in the neighbourhood. He entered the Medical Faculty of McGill University in 1844, and graduated in 1848. Among his professors were Drs. Holmes, Hall, Robertson, Sutherland, Campbell and McCulloch, men who helped to make McGill what she is to-day. The lectures at that particular time were held in what is now called the old Arts building, for lack of a more suitable place. This was previous to the occupancy of the Côté Street building. Dr. William Wright, Emeritus

Professor of Materia Medica of McGill, and the late Dean of the Faculty, R. Palmer Howard, were his classmates; and Dr. Wright pays him the following tribute:—"My general memories of the late Dr. Christie while at college were very pleasant. He was an earnest, plodding student, and won the good opinion of those who knew him best, meriting the success he attained."

Sir William Hingston, also a fellow-student and a life-long friend, has this to say of him:—"At the threshold of my medical studies I had the privilege of becoming acquainted with Thomas Christie. His last year was my first, but circumstances drew the two (senior and junior) students together, and the friendship of 1848 grew and strengthened to the last. Thomas Christie was a painstaking student, and carried off the prize for chemistry in his year. His opinion on medical subjects was of the highest value, as it was the result of honest thought and reflection. I could not sum up my impressions of a noble character better than by saying that in all my friend's relations, social and professional, he was emphatically the Christian gentleman."

During the deardful ship fever epidemic in 1847 at Point St. Charles, Dr. Christie was one of the assistant physicians, and did noble service. In 1848, after graduating, he settled in Lachute, where for fifty years he was a hard working and successful practitioner, winning the respect and love of all. In his early days he had many hardships to undergo, having long journeys to travel on horseback, roads and carriages being unknown at that time. He had to amputate limbs alone, having to administer his own anæsthetic. His practice extended all through the lower Ottawa Valley. Four of Dr. Christie's sons and one son-in-law are graduates of McGill.

Dr. Christie was elected to the Canadian House of Commons in the Liberal interest in 1875, and represented the county of Argenteuil (save for a brief period) up to the time of his death. He was a faithful and conscientious member of parliament, and held the respect of his colleagues on both sides of the House. The following tribute is from the pen of a former colleague in the House:—"The death of Dr. Christie, M.P. for Argenteuil, removes one of the worthiest men who sat in Parliament. He was a Liberal of the old school and his demise makes the world much poorer. Although elected as a supporter of the Laurier Government, and, although he gave the Government faithful support, he often chafed under things that were done, things that he did not regard as compatible with Liberal principles. In certain matters he felt that justice and his conscience demanded a protest, and so he rose in Parliament, where his voice

was not often heard, and protested strongly against what he considered wrong."

Dr. Christie was an earnest Christian, and was for many years an honoured Elder of the Presbyterian Church and Superintendent of the Sunday-School. He was a strong advocate of the temperance cause and very liberal in supporting all worthy objects. In his professional career he frequently spoke a word in season to the sick and dying and tried to follow the example of the Great Physician. He belonged to the stern old Sabbath-observing Scotch school which is rapidly passing away, and which the world can ill afford to lose. His was a useful, blameless life, and he died full of those honours which good men cherish, and in the enjoyment of the respect of as wide a circle of friends and acquaintances as is ever possessed by public men.