A Clinical Lecture

ON THE

TREATMENT OF INJURIES OF THE HEART.

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BY JOHN BLAND-SUTTON, F.R.C.S.ENG.,
SURGEON TO THE HOSPITAL.

SURGEONS have known for centuries that penetrating wounds of the heart are not always fatal, even when the injury is inflicted by an instrument so gross as a rapier. Death is occasionally deferred many minutes or even hours. The famous surgeon Ambroise Paré, who, about 1552, discovered the use of the ligature instead of a red-hot iron to arrest bleeding after amputation of a limb, has placed on record an observation relative to a gentleman wounded in the heart during a duel. The injured man pursued his adversary 600 feet before he fell. Examples of this sort have multiplied since Paré's time, and we now know that the heart is very tolerant of traumatic insults. A remarkable case illustrating the tolerance of the heart to severe injury was recorded in 1834 by Thomas Davis. A boy made himself a gun out of the handle of a telescope, and to form the breech of the gun he had driven a plug of wood three inches into the handle of the fork, and made a touch-hole in the hollow part of the handle. When the gunpowder exploded it forced out the stick, which formed the artificial breech, into the boy's chest, between the third and fourth costal cartilages, half an inch to the right side of the sternum. Immediately after the accident the boy walked a distance of 40 yards to his home. He lived five weeks and two days after the accident. At the *post-mortem* examination a piece of wood 3 inches long and as thick as a cedar pencil was found in the right ventricle, encrusted with a coagulum as large as a walnut.

To come nearer our own times. In 1896, Mr. W. G. Spencer showed to the Clinical Society the heart of a man aged 28, who had been stabbed in the right ventricle seventy-nine days previously. The wound had been treated by plugging in order to arrest the bleeding. This man died from causes unconnected with the injury. At the *post-mortem* examination the wounds in the chest wall, the pericardium, and the heart were found firmly healed.

Six months before Spencer's case was communicated to the Clinical Society, a new method had been born for the treatment of stab wounds of the heart. In March, 1896, Farina, an Italian surgeon, had the courage to apply to a heart that had been stabbed the simplest and greatest canon of surgery concerning accidental haemorrhage, namely, arrest bleeding at the earliest possible moment. He did it by a recognized method for stopping bleeding in vascular muscular organs, by bringing the divided surfaces into strict and firm apposition by means of sutures.

Although Farina's epoch-making case is frequently referred to in statistical tables relating to the surgical treatment of stab wounds and gunshot injuries of the heart, except for a brief reference made by Durante to the International Congress of Surgery held in Rome, 1896, the details have never been fully published. In reply to a letter, Dr. Guido Farina sent me the following facts in December, 1909:

The first case of surgical interference on the heart which I had the opportunity of performing was carried out in March, 1896, at the Spedale della Consolazione.

The patient was a man 30 years of age who received a blow from a very fine and sharp dagger, in the fifth intercostal space in the parasternal line. The wound penetrated to the cavity in an oblique direction from above downwards and from without inwards. It wounded the pericardium and penetrated into the right ventricle. The wound in the myocardium was about 7 mm. long.

I removed part of the fifth costal, or rather I detached the cartilage of the fifth rib from the sternum and removed cartilage and rib for about 15 cm. Then I strongly retracted the fourth and sixth costal cartilages and retracting the pericardium, I arrived on the wounded heart. I sutured the wound with three silk sutures, and between these three par-

ticular points I placed two others of less importance. Everything went excellently until the fifth day, when a violent bronchopneumonia declared itself on the right side, and in three days killed the patient. The thoracic wound healed by first intention.

At the autopsy the wound in the heart was found perfectly healed. I begged our judicial authorities to let me have the heart for further study of the process of healing, but met with an energetic refusal. It was precisely because of my irritation at this fact that I have not published any communication on this interesting case.

Dr. Farina's letter was written in Italian, but my friend Dr. St. Clair Thomson kindly furnished me with the translation. Farina's method of treating punctured wounds of the heart was soon followed by other surgeons. The first complete success fell to Rehn (Frankfurt-on-Maine). In 1897 in a case of stab wound of the heart he opened up the intercostal space and resected the fifth rib. The right ventricle was wounded and this he sutured with success. The good consequences which have followed the surgical treatment of stabs and gunshot wounds of the heart have been very great during the past ten years. In 1909 Dr. G. T. Vaughan (Washington) was able to collect from the periodical medical literature of America (North and South), Germany, France, Spain, Italy, Canada, and England, 150 cases, including two cases (one of which was successful) under his own care. The evidence that he has collected, as well as the careful and skilful way he has analysed the reports and the facts, make it clear that primary suture of wounds of the heart is an established surgical measure for treating such serious injuries.

My interest in injuries of the heart was awakened very early in my career as a surgeon by an extraordinary assault which a drunken man made on his own heart. In 1887 some men were drinking in a beershop; one of them, a lad aged 20, was playing with a loaded revolver, and a companion made a bet with him that he was afraid to shoot himself in the heart. Astonishing as it may seem, the drunken boy fired the revolver into his chest, and was brought into the hospital in a collapsed state. When his clothes were removed, gastric contents were found between his skin and shirt, which clearly pointed to a wound of the stomach. The abdomen was opened, and a large hole in the stomach was closed with sutures; the food and beer were washed out of the general peritoneal cavity. The boy recovered consciousness after the operation, but had no recollection of his foolish wager and act. However, it cost him his life, for he died some hours later. At the *post-mortem* examination it was found that the bullet had entered the pericardium, ploughed a deep groove in the apex of the heart, torn away a piece of the diaphragm, and perforated the stomach. The fatal consequence was not due to the cardiac lesion.

This leads to the question, What causes death in fatal wounds of the heart? Death after injury to the heart may be primary or secondary.

PRIMARY CAUSES.

Death after a severe injury to the heart may be as sudden as when the heart stops beating from what is called "natural causes." Gunshot wounds in which a bullet traverses the heart are very fatal; it is stated that they are usually fatal within the hour. They may be instantly fatal. I once saw a man who five minutes before fired a revolver bullet into his heart. He was being arrested for embezzlement, and asked permission to get his hat and coat. He then snatched open his waistcoat, took a revolver from his pocket, shot himself exactly in the left fifth intercostal space as if he had previously measured it out, fell upon the floor, and died in a few seconds. In such cases the heart passes into a condition of shock, and ceases to beat; death takes place too rapidly for the fatal event to be attributed to loss of blood.

In these suddenly lethal injuries there is very little blood extravasated into the pericardial or thoracic cavities. The only reasonable way of accounting for such rapid death when the heart receives a severe injury is to believe that its nervous mechanism is paralysed. This is a bald statement, but no other explanation is available. It is recognized that any mechanical stimulation of short duration causes temporary arrest of the heart's action and systolic contraction.

A very common cause of rapid death from penetrating wounds of the heart is bleeding, and the fatal event in

these circumstances may be delayed for some hours. In investigating the manner in which death is brought about, we must realize that it is not always due to what may conveniently be called traumatic anaemia, but by compression, for the heart being completely enclosed in its bag or pericardium, the blood as it issues from the wound in the heart fills the pericardial sac, and this effused blood may, and occasionally does, exert such pressure on the big vessels issuing from the base of the heart, and so strangulates them, that the organ becomes literally suffocated, or drowned in its own blood. The rapidity with which death comes depends on the size of the wound in the heart. Until I realized this I often wondered why playwrights put long speeches into the mouths of players when they were mortally wounded by heart-thrusts. There is justification for the speech made by Mercutio after Tybalt ran his rapier into the chest of this quick-witted creation of Shakespeare:

"What, art thou hurt?" says Benvolio. To this Mercutio replies:

"Ay, ay, a scratch, a scratch; marry it is enough."

To Romeo's suggestion that the hurt cannot be much, Mercutio replies:

"No; 'tis not so deep as a well, nor so wide as a church door; but 'tis enough, 'twill serve: ask for me to-morrow, and you shall find me a grave man." (*Romeo and Juliet*, Act III, Scene 1.)

When the weapon with which the wound is inflicted is of a coarse kind, and the pericardium is damaged and unable to retain the escaping blood, death quickly comes. As an example of such an injury reference may be made to the way in which Abner killed Asahel:

With the hinder part of his spear he smote him under the fifth rib, and the spear came out behind him; and he fell down there, and died in the same place. (2 Sam. ii, 23.)

For a similar case see also Joab's treacherous murder of Amasa (2 Sam. xx, 10).

Wounds of the auricles are, as a rule, more rapidly fatal than wounds of the ventricles. This is capable of explanation. We know from observations on such a vascular and muscular organ as the pregnant uterus that its walls may be rudely divided by the horn of an ox, or skilfully split by the surgeon for many inches with a scalpel, yet the contraction of the muscular fibre of the uterus is so quick and powerful that the bleeding stops and very little blood is lost. In grave penetrating injuries of the uterus by bullets, knives, or the blunt instruments of the gynaecologist, and the clumsy tools of the criminal abortionist, death from bleeding is almost unknown. Similar conditions happen in the heart. It is a fact derived from common observation that punctured wounds of the heart by a needle, hatpin, or a stiletto are rarely fatal from bleeding. Moreover, in cases of stab wounds of the ventricles, when the chest wall has been opened up and the pulsating heart exposed to view, the blood may sometimes be seen spurting out of the wound in the ventricular wall during the contracting stage. In some conditions when the heart is thus exposed the surgeon finds free blood in the pericardial cavity, but cannot find the puncture; he then gently compresses the big vessels at the base of the heart and causes the cardiac cavities to become over-full, then the blood spurts through the hole in the heart's wall and reveals the position of the puncture.

It is true that large wounds of the heart cause death and small wounds may heal; few surgeons realize how tolerant the heart is of gross injuries. Bullets have been removed from its walls four months after their lodgement. There is also the remarkable case reported by Schloffer in which a youth aged 18 shot himself in the heart with a 7 mm. revolver. There was much shock for some hours. Next day the patient complained of pain in the right arm, and the limb presented signs of "ischemic paralysis"; the bullet was detected in the axilla. Two months and a half later the bullet was excised. The artery above and below the bullet was thrombosed. Schloffer offers as a satisfactory explanation of these facts that the bullet penetrated the chest, the wall of the left ventricle, and lodged in the cavity of that ventricle; thence it was projected as an embolus through the aorta, the innominate and the subclavian artery, to be arrested at the beginning of the axillary artery. The difficulties with the arm slowly dis-

appeared, and later signs of narrowing and insufficiency of the mitral valve declared themselves.

The heart may be traversed by a bullet and the patient recover. Connor recorded a case in which a boy, aged 15, was wounded in the cardiac region by a pistol bullet; he remained ill for some days, but was able to get about again, though he remained weak and anaemic. He died three years after the injury. It was found, on examining the heart after death, that the bullet had traversed the right ventricle, and opened the left ventricle and the right auricle; it was found at the root of the lower lobe of the right lung.

DIAGNOSIS.

When a patient comes under observation after a severe injury to the chest caused by a fall, or from being run over, kicked by a horse, gored by an ox, transfixed by the pole of a van or a carriage, shot accidentally by a friend, designedly by an adversary, or intentionally by himself; stabbed in a fit of jealousy, or in a civil broil, or in revenge, and in one or other of the one thousand and one ways in which such injuries are produced, it remains for the surgeon to decide whether the heart is injured, and if the heart has received serious injury; the surgeon must also endeavour to determine whether the injury concerns this organ alone, implicates other important structures, such, for example, as the lung, pleura, diaphragm, colon, stomach, or liver.

In surgical books the rules laid down for our guidance are clear, but it often requires some acumen as well as experience to ascertain the nature of the injury and its extent. Injured patients do not come under our observation with their injuries labelled; were this so our work would be simplified. It is easy to act when we know the conditions which require the action.

The heart when full of blood and discharging its functions, occupies a considerable space in the left half of the thoracic cavity. Under normal conditions a small portion passes across the middle line to the right side of the thoracic cavity and this portion is a part of the right auricle (in cases of transposition of viscera these relations are reversed). The left auricle lies in relation with the bodies of the thoracic vertebrae from the fourth to the eighth. The bulk of the right ventricle and part of the right auricle lie on the diaphragm, separated of course from this muscle by the pericardium. Although a large area of the pericardium is in relation with the anterior wall of the left half of the chest the greater part of this area has the anterior thin edge of the lung, and the pleura associated with it, lying between the pericardium and the chest wall. The area of the pericardium in actual contact with the chest wall is very small. These relations are important, because it is in a very small proportion of cases that the pericardium and heart are injured in punctured wounds of the chest unassociated with wounds of lung or pleura, and in a fair proportion of instances the peritoneum also, for the heart may be wounded by thrusts, malicious as well as accidental, from the back, as well as from the side, and from below as well as in the commonest of all directions from the front.

It is a fact that there is no unequivocal sign of injury to the heart. When a man or woman is seen with a knife, a long needle, or a dagger sticking in the cardiac region of the chest and the victim is living, the handle of the knife, dagger, or projecting portion of the needle moves synchronously with the beating of the heart.

The following extract from the *Iliad*, Book IV, is considered to indicate that Homer was acquainted with this sign of injury to the heart:

His lance bold Thoas at the conqueror sent,
Deep in his breast above the pap it went,
Amid the lungs was fixed the winged wood,
And quivering in his heaving bosom stood.

All surgeons who read the *Iliad* of Homer carefully will agree with Buckley's remark that "Homer is most anatomically correct as to the parts of the body in which a wound would be immediately mortal." Modern playwrights would not waste their time if they read some anatomy and surgery.

The heart may be wounded with a bullet, or a sharp instrument, and bleed profusely into the pericardial sac, and no blood escapes externally. A patient in this condition always exhibits symptoms the gravity of which are out of all proportion to the size of the external wound.

Then signs indicative of profuse internal haemorrhage (or traumatic anaemia) arise, such as shock, pallor, rapid pulse, cold sweats, sighing respiration, subnormal temperature and restlessness. If measures are not promptly taken to stay the bleeding, death is not long delayed. When the bleeding takes place into the pericardial cavity and the blood is retained in this bag, producing compression of the vessels, the clinical signs are often characteristic. The patient becomes blue (cyanosed) and breathes with difficulty (dyspnoea); there is an increase in the area of the cardiac dullness, and the sounds of the heart are muffled. The diagnosis of haemopericardium in the presence of such signs is not difficult to make. The amount of blood which the pericardium will hold is astonishing. A man, aged 23 years, received an injury to his heart whilst playing at football. Eventually Mr. C. Mansell-Moullin removed through an incision in the fifth intercostal space and drained away 6 pints of blood.

When the pleura and lung, as well as the heart, are injured, curious sounds may be heard on auscultation—splashing, whistling, gurgling, and similar weird noises.

When a cardiac injury is complicated with a wound of the pleura, air will rush in and out of the thorax with the respiratory movements and cause the blood to appear frothy as it issues through the external wound. It is estimated that in 80 per cent. of the wounds of the heart the pleura is injured likewise, and the importance of this is very great, for pleuro-pericardial infections are the common causes of death after operations performed for injury to the heart.

TREATMENT.

Previous to 1896 it was the custom to teach that in the majority of cases injuries of the heart do not admit of any treatment, and this is in a measure true to-day. In a well-known and widely used textbook published in 1896 it is stated that "suture of wounds of the heart has been proposed." In discussing the treatment of haemopericardium following injury the same writer adds: "Operation affords only the slenderest, if indeed any, prospect of good."

Severe injuries to the heart are still as fatal as formerly because life is destroyed so quickly that surgery has no chance; punctured wounds of the heart leading to haemopericardium are submitted to surgical treatment with fair prospect of success, and if there be no concurrent wound of the pleura the chances of success are great. The method of saving life in such circumstances may be definitely formulated; it consists in exposing the pericardium by fashioning an osteoplastic flap from the chest wall and turning it to one side so as to expose the pericardium; then, in opening this membrane and exposing the heart, finding the wound, and closing it by means of sutures.

Anaesthesia.

The question of administration of an anaesthetic in operations for exposing an injured heart for the purpose of applying sutures to the wound cannot be determined by rules; it must be left to the judgement of the surgeon. In some cases the patient has been so collapsed that an anaesthetic would have probably ended fatally. In such cases the patient, being in a state of collapse, would probably be insensible to painful sensations. In others the excitement would be so extreme as to render the administration of chloroform highly desirable. These remarks only apply to cases of primary suture. In operations for suturing a wound which has been inflicted some hours previously, as for extracting foreign bodies from its walls which have been embedded many days, or even weeks, the induction of unconsciousness by ether or chloroform is as necessary and as advantageous as in any of the common operations of surgery.

Operation.

The manner of conducting surgical operations for punctured wounds of the heart requires careful consideration. Sepsis is the common cause of failure. This is in part due to the difficulty of preparing the patient for the operation with the same thoroughness as in cases less urgent, but chiefly to the fact that the injury is inflicted with a dirty (septic) instrument or weapon, and if the pleura be injured, as is so commonly the case, air and germs have free access to the parts.

Although the method usually employed for exposing the heart consists in fashioning an osteoplastic flap from the chest wall immediately over the anterior surface of the heart, it admits of three modifications:

(a) The skin is incised at the left side of the sternum at the level of the third intercostal space, and carried out as far as the nipple line; a second incision is made parallel with this along the fifth intercostal space, and the ends of these incisions are joined by a cut parallel with the left border of the sternum. The costal cartilages are divided, and the flap thus formed is turned outwards; the pleura is stripped off if possible, and the ribs are divided or broken just beyond the costo-chondral junctions. The flap reflected in this way consists of skin, costal cartilages, intercostal muscles, and a section of the internal mammary vessels.

(b) This method may be reversed. The parallel incisions along the intercostal spaces are united by a vertical incision near the nipple line; the ribs are divided beyond their costo-chondral junctions, and the osteoplastic flap is turned towards the sternum. In both methods the pleural cavity is almost certain to be opened.

(c) In order to avoid opening the pleura and at the same time to make a good exposure of the heart, the vertical incision should be made on the right side of the sternum from the third to the fifth intercostal spaces, and the parallel incision should cross the sternum and extend outwards as far as the left costo-chondral junctions. The piece of the sternum thus involved and the costal cartilages of the fourth and fifth ribs of the right side are divided, and the osteoplastic flap thus formed is turned to the left side, the costal cartilages forming a hinge.

Whichever method be adopted, the surgeon can vary it to meet the needs of the cases. After reflecting the flap and arresting bleeding from vessels divided in the chest wall, access to the pericardial cavity is obtained by enlarging the wound already existing in the pericardium. The blood effused into it is carefully removed; in some cases it is large in quantity. It is preferable to remove the blood by sterilized dabs than to wash it out. The surgeon then seeks for the wound in the heart. In cases where the foreign body which inflicted the injury remains *in situ* the wound is readily found. In some fortunate instances the cavities of the heart are not penetrated and the blood oozes from the lacerated tissues of the heart, or from a large branch of, or from a coronary artery. When the bleeding is from an artery, the injured vessel should be ligatured with thin sterilized silk. It has happened that the blood in the pericardial chamber has been furnished by an injury to the internal mammary artery.

When the surgeon exposes the heart the wound in the auricular or the ventricular wall is usually seen at once, the blood issuing intermittently. Sometimes the wound is not so obvious; then by gently compressing the vessels at the root of the heart the cavities fill, and the leaking spot is seen. The wound may be large and blood gush out freely; this may be checked by gently compressing the walls on each side of the wound, or even introducing the finger as a plug.

When the surgeon finds the wound, and clears away the blood, he then closes the opening in the heart with sutures. The material used for this purpose is either thin sterilized silk or catgut. Of these silk is preferable, and it is most conveniently introduced with a curved needle. The number required varies with the size of the wound, and it is useful, if the wound requires a series of sutures, after introducing the first one, to use it as a retaining suture in order to steady the heart, and thus facilitate the process of suturing. It is preferable to use interrupted sutures; they should be passed in such a manner as to avoid the thread projecting into the cavity of the heart; such a thread might lead to the formation of a thrombus and a consequent embolus. It can be imagined that it is not always an easy matter to pass sutures successfully through the wall of the living heart, especially if it be beating tumultuously, as is sometimes the case during the progress of such operations. In tying the sutures care should be taken not to pull them too hard, or the tissues of the heart will tear. The number of sutures required to close a hole in the heart wall varies greatly. When the wound is effectively sewn up the surgeon should examine the posterior surface of the heart, for in stab wounds the

organ is sometimes completely transfixed. Success has followed operative treatment of such a severe injury.

It has also happened that bullets have traversed the heart completely and the aperture of entry and that of exit has been closed with sutures and the patient's life saved. In one remarkable instance a revolver bullet (5 mm.) entered the right ventricle and the aperture of entry was closed with sutures; on careful palpation the bullet was detected in the posterior wall of the left ventricle and removed with success (von Manteuffel). In this case the surgeon states that when the opening in the right ventricle was exposed a blood fountain $\frac{1}{2}$ metre high gushed out with each systole of the heart.

A remarkable case was reported in 1908 by Guinard. A garçon de café, aged 26, was shot in the chest and abdomen; one bullet entered the ninth intercostal space, 4 in. to the left of the spinous process. The abdomen was opened and nothing found. Four months later the man returned complaining of dyspnoea, cough, and inflammatory oedema of the chest wall below and to the outside of the nipple line. The x rays revealed the bullet an inch or so behind the ribs. The sixth rib was resected and the pericardium opened. The bullet (7 mm.), surrounded by a piece of the man's shirt, was extracted with forceps. He recovered in spite of an extensive pleural effusion. A piece of the man's coat had also been carried in with the bullet; it lay under the chest wall. When Guinard communicated his case to the Surgical Society of Paris the boy was in the hospital with a fistula. In reply to a letter (1910) Mons. A. Guinard kindly informed me that he had heard nothing more of the boy, so he came to the conclusion that he had remained well.

Some of the injuries to the heart are remarkable. Schubert reports a case in which a ball passed through the heart, and he succeeded in closing the opening of "entrance and exit"; the man recovered. Schubert is of opinion that the bullet traversed the intraventricular septum.

It has happened that a man sustains a serious damage to his chest, and the surgeon in charge suspects an injury to the heart; on opening the pericardium he finds the heart uninjured. In all cases of cardiac wounds which are treated by operative methods it is important that the surgeon should in the course of the operation examine the lung and pleura in order to ascertain their freedom, or otherwise, from injury. If the pleural cavity contain blood it must be removed carefully, and the hole in the pleura should be closed with sutures of fine silk. Blood, sometimes in large quantity, has been poured out from a wounded heart into the pleura; this has been removed in the course of the operation, and the pleura closed without drainage.

This is an important detail. Many surgeons, in reporting cases of cardiac suture in the last two years, insist on the avoidance of drainage, believing that some of the patients who have survived the immediate shock of the initial injury and the operation have died from septic sequelae. Some of these septic complications probably arose from secondary infection through the drainage tube.

It is stated that wounds of the auricles are more fatal than those of the ventricles. In Vaughan's list of 150 cases an auricle was wounded in 8. These numbers are too small to make any comparison of the relative danger of wounds of the auricles and ventricles reliable, but it raises suspicions of another kind, namely, the probability that wounds of the auricles are, as a rule, so quickly fatal that the patients with such injuries die before there is time to place them in the hands of a surgeon.

This is a matter of great importance; I have tried, but without results, to obtain facts in regard to the localization of fatal wounds of the heart which would enable a definite answer to be given to this question. In future it would serve a very useful purpose if those who had the opportunity of conducting *post-mortem* examinations upon men and women who lose their lives from wounds of the heart to accurately note the region of the organ which is injured. A score of such observations would be very valuable.

At the present time the mortality of the operation known as "suture of the heart" is about 65 per cent., according to Vaughan. He also shows in his excellent paper that the mortality of this operation has not diminished during the last twelve years. The secondary

causes of death in the majority of cases are pericarditis, pleurisy, pneumonia, and bronchopneumonia; some of these complications are due to the use of drain tubes.

In spite of the high mortality it is a matter for congratulation that surgery can save 35 per cent. of the patients suffering from a wound which untreated is usually mortal.

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Remarks

ON A

CASE OF PROBABLE OVARIAN PREGNANCY.

BY

BECKWITH WHITEHOUSE, M.S.LOND.,
F.R.C.S.ENG.,

ASSISTANT GYNAECOLOGIST TO THE GENERAL HOSPITAL, BIRMINGHAM.

THE literature of ovarian pregnancy increases rapidly, and each year adds its quota to the store of recorded cases. The last few years particularly have been lucrative in this respect. In 1908 Teacher and Bryce¹ published their well-known monograph on the early changes associated with normal uterine pregnancy, including a very valuable report on a specimen of early ovarian gestation. In August, 1909, appeared Norris's paper² on ovarian pregnancy, with the detailed account of a case and summary of previously recorded literature. Hastings Tweedy³ has recently described a specimen of this condition occurring in Ireland, and the current year has seen also the publication by Prince⁴ of a case of full-term gestation in this abnormal position. In spite of this mass of accumulating literature, however, little is known of the processes taking place in an ovary the seat of such an occurrence. The etiology and early pathology of the condition is still largely speculative, and the true facts can be reached only by the comparison of authentic records and the very careful investigation of every specimen that falls to the lot of the individual worker.

The case I now publish is wanting in some details, but it raises several points which may have an important bearing upon the work of others.

History.

The patient, E. J. B., 25 years of age, had been married for five and a half years. She had had two previous confinements, dated June 6th, 1905, and March 16th, 1908, respectively. The first pregnancy and labour were normal in every particular, but the second was noteworthy from the fact that menstruation was regular during the first three months. The catamenia were absent for three months following the second confinement, but recurred on June 16th, 1908. The function was regularly repeated till December 19th, the last period terminating on December 25th. Coitus occurred on two occasions during December, namely, the 12th and 26th. At 1 p.m. on December 31st, 1908, after pushing a heavy wringing machine, the patient was seized suddenly with acute abdominal pain, localized in the right iliac fossa. It was unrelieved by rest and fomentations. Vomiting occurred twice, but although faintness was present, she did not lose consciousness. The pain remained constant till 1 a.m. on January 1st, 1909. It then passed off, but recurred on the following day, when she rapidly became worse, and was admitted to the General Hospital, Birmingham, at 3.30 p.m.

On admission her condition suggested acute appendicitis. The abdomen was exquisitely tender, especially in the right iliac fossa. The abdominal muscles were rigid, and the percussion note over the above-named area was dull. The pulse-rate measured 132 at the radial artery, and the temperature registered 100.4° F.