

*Bulletin* of the

University of Minnesota Hospitals  
and  
Minnesota Medical Foundation



Injuries and Perforations  
of Rectum and Sigmoid

BULLETIN OF THE  
UNIVERSITY OF MINNESOTA HOSPITALS  
and  
MINNESOTA MEDICAL FOUNDATION

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I. INJURIES AND PERFORATIONS OF  
THE RECTUM AND SIGMOID COLON

Earl D. Myers  
William C. Bernstein

The extremely serious complications subsequent to injuries and perforations of the rectum and lower sigmoid colon have placed this entity in a position of great importance in the field of rectal and colonic surgery. The urgency of rapid and accurate diagnosis following such injuries and the necessity of prompt and efficient treatment is known to all colorectal surgeons and has been stressed repeatedly by numerous authors. From a mortality rate of forty to 60 per cent of all cases in World War I following haphazard and ill-advised methods of treatment to a mortality rate of six to ten per cent in World War II, the treatment of patients suffering from this type of injury is still improving and it does not seem unreasonable to predict that the mortality statistics will approach the zero mark as our surgical technics, chemotherapy and antibiotics improve. Better understanding of the anatomical and pathological factors involved in these injuries and the marked advance in our knowledge of the treatment of shock and of the principles of pre- and post-operative care have also contributed greatly to the lowering of mortality statistics. Since 1940 there have been no deaths from traumatic perforations or accidental wounds of the rectum and lower colon in this hospital. Approximately twelve to fifteen such injuries have been treated during this period.

Injuries of this type are rather uncommon in civilian practice and any given surgeon not associated with a large general hospital may not see more than one or two cases during an entire professional career. During periods of military conflict, however, the incidence of rectal and colonic injuries rises sharply and many such wounds may be found on the wards of military hospitals caring for combat injuries. During World War I rectal wounds and perforations made up 2.4% of all cases of injuries to abdominal and

pelvic viscera. During World War II Taylor and Thompson reported seventy wounds of the large bowel, many of which involved the rectum, in a ten month period during which time there were 5000 admissions. In contrast to this, I.D. Jones reports four cases in 74,000 admissions to the Royal Victoria Infirmary.

It is the purpose of this presentation to review the more salient features of this subject and to point out the more important changes which have occurred in our thinking and consequently in our handling of these injuries. In addition to the early and accurate diagnosis and prompt treatment mentioned above, lowering of the mortality rate depends upon the avoidance of complications and upon the reduction of the severity of the late sequelae. During the past ten years much progress has been made in this direction and with our present knowledge and armamentarium further improvement can be anticipated. In view of the current warfare in Korea and of the imminence of a possible expansion of the theatre of war, the authors feel that this subject is not only timely but pertinent to the training of the physicians and surgeons who may be called upon to treat combat casualties in the near future.

Etiology:

Impalement of the rectum as a result of falling from heights or from jumping on to loads of hay or straw is thought by Seybold to be the most common traumatic lesion of the rectum in civilian practice. He found 200 cases of impalement in the literature up to 1939. These injuries are most common in agricultural regions and the handles of pitchforks are most frequently the offending instruments. Corn stalks, dry weeds standing upright, sticks of wood and upright projections of chairs have also penetrated the anal orifice. Perforations of the wall of the rectum or sigmoid colon by a proctoscope is not as uncommon as we would like to believe and over 60 cases of this type have been reported. We are certain, however, that many more perfora-

tions have occurred during proctosigmoidoscopy that have not been reported. Pratt and Jackman have discussed perforations due to enema tips. They have found 20 cases in the literature and add two others. Interestingly enough, they found this accident occurring most frequently in two types of patients: pregnant women at term and elderly patients beyond the sixth decade of life. They report a mortality of 40% for this group. In the proctology clinic at this hospital we frequently see minor abrasions and tears of the rectal mucosa inflicted by enema tips. These wounds could easily be prevented if the attendants administering enemas were taught to lubricate the tips well and were instructed to insert the tip no further than beyond the grip of the sphincters. Injuries to the rectal mucosa are similarly inflicted by fever thermometers which are pushed too far into the rectum by over-enthusiastic nurses and mothers. Foreign bodies of all descriptions have been reported in cases of rectal trauma. A not uncommon type of injury has been caused by playful mechanics in garages who have forced compressed air into the anal canals of their colleagues who are bending over or who are in the squatting position. Air under pressure will penetrate the clothing and, if directed properly, will inflate and rupture the bowel wall.

Rectal wounds and perforations occurring during war time are most often the result of penetrating bullets or explosive fragments. Crawling on the ground exposes the buttocks to the bullets and fragments and, because of the funnel-like topography of this region, the fragments are easily deflected into the rectum. A common type of rectal wound seen in the South Pacific Theatre during World War II was caused by the explosion of booby traps set off by soldiers jumping into innocent-looking fox-holes.

Perforations of the upper rectum and lower colon may result from deep fulguration therapy for polyps in these areas. We are certain that many minor perforations occur that are undiagnosed. We have found evidence of this upon exploration of the abdomen for other reasons subsequent to the fulguration.

### Anatomy:

Anatomically the rectum is a rather unusual organ in that it is both intra and extraperitoneal. This fact accounts for the increased seriousness of rectal wounds and perforations as compared with similar injuries in other parts of the large bowel. The rectum begins at the rectosigmoid junction and ends at the pectinate or anorectal line, a distance of from 14 to 16 cm. The rectosigmoid junction usually lies in front of the third sacral vertebra, and it is at this point that the mesentery of the large bowel ends and the tenia coli spread out and unite to form the longitudinal muscle layer of the rectum. On the upper third of the rectum the peritoneum covers the anterior and lateral surfaces. On the middle third the peritoneum covers only the anterior wall while the lower third has no peritoneal covering. The rectum is, therefore, mostly retro and infraperitoneal. The peritoneum of the recto-vesical pouch dips down anteriorly for variable distances and in some cases may be 7 cm. or less from the skin of the anterior anal wall. The shortness of this distance is not generally appreciated but must be kept in mind when treating rectal injuries since apparently low lying rectal perforations may in fact penetrate the peritoneal cavity. An excellent example of this fact will be pointed out in case history #4.

The rectum is ensheathed in a condensation of fascia called the fascia propria or the endopelvic fascia. This endopelvic fascia is continuous with the fascia covering and supporting the other pelvic viscera. Thus, the anterior part of the endopelvic fascia is known as the vesical layer and forms the anterior and lateral ligaments of the bladder. Its middle portion crosses the floor of the pelvis between the rectum and seminal vesicles in the male to form the recto-vesical layer. Its posterior portion passes around the rectum, forming for it a loose sheath which attaches firmly around the anal canal. This sheath is known as the rectal layer of the fascia propria. The rectum actually lies in a

potential infraperitoneal space made up of the two supralelevator spaces and the retrorectal space. This is limited by the pelvic floor below, the pelvic peritoneum above, laterally the levator ani and coccygei muscles, anteriorly the urogenital triangle and posteriorly the sacrum and coccyx. The space contains an areolar tissue rich in blood vessels and lymphatics. It is invested in a rigid fascial layer and can only expand within the limits of the fascial boundaries. Areolar tissue is notable for its susceptibility to spreading infection and perforations into the perirectal spaces contaminate these areas with fecal material containing virulent organisms. Drainage of the supralelevator and retrorectal spaces is accomplished by opening into the retrorectal space via a posterior approach entering the lateral spaces through this wound.

#### Pathology:

The type of injury inflicted upon the anus, rectum or colon and the extent of the injury is dependent upon the circumstances of the accident and the nature of the penetrating body. The wounds may be superficial or deep, extraperitoneal or intraperitoneal and vary from small lacerations or abrasions to massive excavations often seen following exploding missiles. In some of the serious wounds seen in warfare the entire gluteal regions have been torn away and the lower rectum and anus evulsed. Large blood vessels like the superior hemorrhoidals may be injured and may lead to massive sudden hemorrhage or to delayed and intermittent bleeding. In the more severe and major type of injury the surrounding structures are also often involved. Thus we may see injuries to the lower genito-urinary tract, especially the bladder, the lumbosacral plexus, the bones of the hip and pelvis and the other intraperitoneal viscera. Perforations of the rectum due to thermometers and enema tips usually occur on the anterior wall of the ampulla. The latter may be especially serious if any solution is injected intraperitoneally or intramurally in which case a large slough of the rectal wall may occur.

Feder has called attention to the conditions of warfare which often exist where the soldiers have neither the time nor the proper facilities to heed the defecation reflex when it occurs. These soldiers develop rectal constipation (dyschesia) and may not defecate for several days. The rectum distends, the curvatures become more pronounced, and the surface area of the organ exposed to a passing missile is greatly increased. This accounts, in part, for the high incidence of rectal injuries in the last war.

Infection is the major complication of rectal perforation. If the injury is intraperitoneal, the fecal contamination will cause peritonitis, and in extraperitoneal injuries pelvic cellulitis and abscess formation occur. These abscesses may travel upward and involve the retroperitoneal and subdiaphragmatic spaces. Taubenhaus has recently reported a case of extraperitoneal perforation due to a splinter of wood in which a large retroperitoneal abscess formed which dissected under the anterior abdominal wall where it was drained.

Perirectal hematomas due to injury of the pelvic soft tissues may form and may devascularize the rectum and cause sloughing and perforation. These hematomas are very prone to infection and abscess formation. Case #3 is that of a large dissecting hematoma treated at this hospital.

#### Symptoms and Diagnosis:

The symptoms of rectal and colonic injuries vary as a rule with the severity and the extent of the lesion. Injuries occurring in civilian practice are usually of a less extensive nature than those seen in battle. Any patient giving a history of trauma to the perineum, buttocks or anal region should be suspected of having sustained a rectal injury and a detailed account of symptoms should be noted. The amount of initial pain or bleeding may not be an accurate index of the extent of the in-

jury. If intraperitoneal perforation has occurred, abdominal pain and vomiting may be present. Shock may be mild or severe but should always put the examining physician on his guard. In war injuries where multiple organs or structures are often involved the degree of shock is usually very marked.

All patients suspected of having rectal or colonic wounds should be given the advantage of a very careful and painstaking examination which includes external inspection, digital and proctoscopic procedures. X-rays of the abdomen and pelvis are also very helpful.

The inspection of the wounds may at times reveal the presence of a perforation. More often, however, the perforation may not be detected until the wound is debrided or probed or until the endoscopic examination is performed. Blood may be seen coming from the anal canal and its presence is indicative of intrarectal damage. Ecchymosis of the skin of the buttocks or perineum is often seen in blunt injuries. If, during an abdominal exploration, extravasated blood is seen below or behind the peritoneum, a perforating wound of the rectum should be suspected.

On digital examination a low perforation may be felt or a spicule of bone, wood, shell fragment or other foreign body may be encountered. Sharp pieces of chicken bones, fish bones and tooth picks are occasionally caught in the crypts of Morgagni and may cause perforation at that level. These foreign bodies are easily felt on digital examination. The examining finger may detect areas of induration, fluctuation or tenderness in the area of trauma or perforation. Blood on the examining finger or mixed with the feces which is on the glove may indicate the presence of the injury.

The endoscopic visualization of the lining of the rectum and lower sigmoid colon is the most important procedure in the diagnosis of injuries of these structures. If the bowel is empty the examination is easy but in the presence of a filled rectum the examination is a diffi-

cult one. If there is a good likelihood of intrarectal injury or if shock is present an enema is contra-indicated. The examiner must then reconcile himself to spend a considerable amount of time in cleaning the stool out through the proctoscope. This may be a tedious process but the results justify the means. The patient can be examined in the inverted position if his condition permits but an adequate examination can be performed in the Sims position if the patient is too ill to stand much moving. Air insufflation must be used with extreme caution and in small amounts. Feder in reporting on 668 cases of injury to the buttocks found 39 intrarectal wounds. Most of these would have been missed if proctoscopy had not been performed.

X-rays of the abdomen and pelvis should be used to study the course of missiles and to reveal the presence of bony injuries. It should always be kept in mind that bowel perforations are produced not only by the bullets per se but by the spicules of fragmented bones. Air under the diaphragms and fluid in the peritoneal cavity may also help to determine the extent of the injuries. Complete urologic studies are often necessary to rule out injury to the lower urinary tract.

Caution should be exercised in the use of the barium enema x-rays in rectal injuries. If a perforation is suspected, barium should not be used. Barium enema x-rays are indicated, however, in the study of old rectal injuries. Lipiodol and sodium iodide solutions are also used to identify sinuses and fistula tracts in this region.

We cannot stress the need of accurate diagnosis too much in this subject. Only by the detection of the injuries and the institution of prompt and effective treatment can most of the serious complications and sequelae be avoided.

### Treatment:

The treatment of major injuries to the rectum and lower colon has undergone a very marked change during the past thirty years and as better and more efficient chemotherapeutic and antibiotic drugs are made available, continuing change and progress in our approach to this problem is envisaged. During World War I the treatment of rectal injuries consisted of suturing the superficial wounds and giving whatever supportive treatment was available. Colostomy was reserved for the more severe and obvious bowel perforations and the operation was not resorted to until the patient was almost in extremis. Opening the abdomen in the presence of an already overwhelming infection merely added to the hazard and the very high mortality attendant upon this series of circumstances was inevitable. Very little progress was made in the treatment of these injuries during the 1920's and the early 1930's. About 1935 the more courageous surgeons began to explore the abdomen soon after the patient was brought to the hospital if a perforation was suspected. Repair of the bowel wound and complementary colostomy proximal to the perforation reduced the morbidity and mortality of these injuries markedly. It was during this latter period that farmers who had been impaled on pitchfork handles could be promised some hope of recovery. Prior to that time practically 100% of these patients succumbed to their injuries. With the coming of World War II a new approach to rectal injuries was begun. The Surgeon General upon advice of competent consulting surgeons directed that all rectal wounds which were suspected of having injured the deeper structures were to be treated by drainage of the perirectal spaces through a posterior approach and a colostomy. This type of treatment, even without the advantage of sulpha compounds and antibiotics was responsible for reducing the mortality of rectal wounds to the figure mentioned above, namely 6 to 10%. As the war progressed and with the addition of better facilities together with adequate whole blood, plasma, suction siphonage and antibiotics the mortality continued to decline.

Under conditions which prevail in civilian hospitals during times of peace no hard and fast rules can be laid down for the treatment of these patients. To say that every patient who has sustained some type of perforating wound of his rectum should have radical posterior drainage and colostomy at once would be sheer folly. We shall attempt, therefore, to suggest a rational approach to the management of these injuries.

Superficial wounds of the perineum and buttocks which have not penetrated the rectum are treated in the same manner as superficial wounds in any other part of the body. If the wound penetrates into the ischioanal fossae or tears into the anal or rectal muscles the wounds should be debrided and left open. Wide, shallow wounds should be created which will stay open without packing. There is much less danger of anal incontinence from a large clean wound than there is from a closed wound which subsequently becomes badly infected. Clean lacerations involving the anal sphincters should be sutured as soon as possible after the injury has occurred.

If upon proctoscopic examination no evidence of perforation is visible and if there is no suspicion of intraperitoneal damage the patient can be expected to make a rather rapid and complete recovery. Penicillin, streptomycin, aureomycin and chloromycetin all have their place in the treatment of these patients.

Perforating wounds of the rectum which are definitely below the peritoneal reflection and which have not involved the bladder can also be treated conservatively at the present time. After recovery from the initial period of shock, these patients do very well with supportive treatment plus the judicious use of antibiotics. If the temperature does not rise and if no signs of spreading infection ensue one is justified in pursuing a conservative course. If, however, there are signs of a spreading infection or of intra-

abdominal complications the radical drainage of the perirectal spaces and a colostomy should be performed. Sepsis may occur within a few hours after injury and, if so, the radical treatment is indicated.

Patients who have suffered intraperitoneal perforations should be explored by laparotomy as soon as possible after the injury. If the bowel wound is sutured within a period of one or two hours from the time of injury it is doubtful if colostomy is necessary or advisable. Case #2 deals with a perforation from a proctoscopic examination which was repaired within a period of an hour after injury. The patient recovered and was ready to leave the hospital in a very short period of time. Perforations which have been present for longer periods of time are probably best treated by closure of the opening plus a colostomy.

If signs of peritoneal irritation develop following fulguration therapy for polyps of the rectum or colon the patient should be watched very carefully. Deep fulguration may result in peritoneal irritation without an actual perforation being present. If, however, some signs of peritonitis are present and if the x-ray plates show evidence of air under the diaphragms the abdomen should be explored immediately and the perforation closed.

Rectal and colon injuries suffered in military combat present a somewhat different problem because of the necessity of hurried diagnoses and the lack of ideal or adequate facilities and personnel. Standard procedures are therefore necessary to assure adequate treatment for as many casualties as possible. Laufman cites a case of a German soldier who suffered a perforation of the rectum and who received no medical care for six days. Penicillin therapy was then started but no surgery was performed. Complete recovery ensued. Laufman questions the criteria which are available for determining when surgery is really necessary and concludes that there are no reliable criteria available. He admits, however,

that under conditions of warfare when patients must be evacuated and where the skill of the surgeons in rear installations is now known that colostomy and drainage of the perirectal spaces is advisable. His ideas concerning rectal wounds in civilian hospitals are substantially the same as those which we have herein suggested.

In the performance of a colostomy for perforating wounds of the lower colon we prefer a transverse colostomy of the type described by Wangenstein. Two glass rods are placed under the exteriorized loop of bowel and adhesive traction from either side serves to separate the stomata and to more completely divert the fecal stream.

Several technics have been described for establishing adequate drainage of the retrorectal and supralevator spaces. The posterior rectal space can be entered through a curved incision inferior to the coccyx (Hurt), a hockey stick incision with a vertical arm on the side of the greatest involvement (Jarvis) or a linear incision parallel to the side of the sacrum dividing the fibres of the gluteus maximus near its origin (Jones). The coccyx and part of the sacrum may or may not be removed in order to secure more adequate exposure. Some authors routinely remove the coccyx while others do it only if the bone is damaged or infected. Colcock feels that there is less chance of a chronic sinus or a painful scar if the coccyx is not removed.

After the rectum is exposed the fascia propria is incised, making it possible to bluntly dissect the rectum from its sacral attachments so that both lateral spaces as well as the posterior space can be drained. Openings in the pelvic peritoneum and perforations in the rectal wall may be sutured at this time. If a large wound for drainage has been established we feel that there is a lesser chance of getting a persistent fistula when the wound in the bowel wall is closed than when the perforation is left open. This is a point of some dispute and

some authors maintain that the wound in the rectum should be left open. This type of wound will, of course, heal much faster and better if a colostomy is done at the same time.

#### Complications and Late Sequelae:

Complications of rectal injuries are many and of a very serious nature. Intraperitoneal perforations lead to peritonitis, intra-abdominal abscesses, obstruction and death if left untreated. Local strictures of the bowel frequently are seen following infected wounds. Infraperitoneal lacerations may lead to fulminating sepsis if the deep perirectal spaces are involved in the infection. Gas gangrene of the gluteal muscles, dissecting abscesses and fistulae are not uncommon following deep rectal wounds. Comminuted fractures of the pelvic bones may be followed by osteomyelitis and the abscesses in this region may communicate with the fistulae of the rectum. Injuries to the bladder and urethra often are unrecognized and may complicate the picture. These should be treated as soon as recognized in order to avoid further extravasation and late fistula formation.

Massive wounds of the buttocks often destroy large areas of sphincter muscle causing anal incontinence. These injuries are at times very difficult to repair and may call for colostomy.

Tenner reported seven cases of persistent high fistulae following rectal perforations. These fistulae had persisted from 3 to 5 months following colostomy. Cures were obtained by excising the fistulae, closing the opening in the bowel and packing the cavity. McCune treated 41 cases of late anorectal injuries at Walter Reed General Hospital. Most of these had incontinence as the chief complaint and required one or more plastic operations to the gluteal regions and sphincters before sphincter control could be restored. In the very severe type of injury with complete loss of sphincter muscle and with fistula formation a colostomy and resection of the

rectum may be advisable, whereas a resection with a pull-through of good bowel with preservation of the sphincters can be performed for multiple fistulae if the anal continence is good.

#### Case 1.

Mr. , a white male, age 54, was administering an enema to himself in his cabin in northern Minnesota. He was in the squatting position for the enema when a crash of thunder threw him to the floor. The enema tip was forced into the rectum by the impact and the patient experienced a severe pain between his rectum and his bladder. He was alone in the cabin and could not call for help. During the night he passed a considerable amount of blood from his bowel. It was noon the next day before a neighbor came to his cabin and took him to Minneapolis. He was not seen by his doctor until 36 hours after the accident. The patient was hospitalized and proctology consultation was called. Proctoscopic examination revealed a perforating wound of the anterior rectal wall just lateral to the prostate. Free pus was coming through the wound. The patient's temperature was 100°. Penicillin and streptomycin were administered parenterally and sulphathalidine was given by mouth. Hot Sitz Baths were ordered and the patient placed on a low residue diet. The temperature reached normal on the third day and did not rise again. The wound in the rectum took about three to four weeks to heal. At that time the patient developed signs of urinary urgency and bladder irritation. Urologic consultation was called and a complete examination of the genito-urinary system failed to reveal signs of pathology. The urinary symptoms cleared up after therapy was administered. It is now 15 months since the accident and there have been no late sequelae to his injury.

#### Case 2.

A 60 year old white male was undergoing proctosigmoidoscopic examination in the outpatient department of the University Hospital. When the distal end

of the scope was in the sigmoid colon, the patient suddenly attempted to change his position on the table. The examiner was unable to withdraw the scope in time to avoid injury of the bowel wall and as a result a tear in the sigmoid colon occurred. The examiner withdrew the scope and arranged for the patient to be taken to the operating room for immediate surgery. When the abdomen was opened the tear was easily found and repaired. The patient made a very rapid and uneventful recovery and left the hospital on the 5th postoperative day.

#### Case 3.

, a white male, age 14, was admitted to the University Hospital 8 hours after he had fallen while straddling a log. Bright red blood was noted escaping from the anal canal shortly after the accident. The patient stated that he had not had a bowel movement for four days prior to the accident. On admission to the hospital the patient complained of colicky, lower abdominal pain. There was no tenderness or rigidity. There was a decrease in the peristaltic sounds. There was marked ecchymosis of the perianal skin and bright red blood was seen coming from the anal canal.

Digital examination revealed a large cystic mass which practically occluded the lumen of the rectum. Proctoscopic examination revealed a bulging mucous membrane which was very hemorrhagic.

The patient was watched closely for 24 hours during which time his hemoglobin dropped appreciably and the patient developed signs of peritoneal irritation in the lower abdomen.

Abdominal exploration was then carried out and a large jagged rent in the musculo-serosal layer of the rectum in the longitudinal direction was found. Free blood was found in the pelvis and lower abdomen while a large dissecting hematoma was present in the infraperitoneal spaces. The rent in the serosa was closed and bleeding was controlled by sutures and Gelfoam pack. A transverse colostomy was then performed. The patient made an un-

eventful recovery and came in for closure of his colostomy 2 $\frac{1}{2}$  months later.

#### Case 4.

A colored, unmarried female, age 30, was recently examined in a proctologic clinic and an anal fissure and low rectal stricture were found. It was determined that the stricture was due to lymphopatheæ venerea. Surgical treatment of the fissure and dilatation of the structure was recommended. The patient entered the hospital and underwent surgery as advised. The operating surgeon attempted to dilate the stricture after the anesthetic was administered and after the initial stretching he felt something "give way". Examination revealed that he had torn into a very low-lying peritoneal pouch. The peritoneum in this case came down to within a very few centimeters of the anal canal. The surgeon sutured the wound, opened the abdomen and performed a transverse colostomy. The patient made an uneventful recovery.

#### Summary and Conclusions:

1. Early and accurate diagnosis and treatment of rectal and colonic injuries is imperative.
2. Severe perforating wounds suffered in military combat are best treated by radical posterior drainage and colostomy.
3. In civilian practice conservative therapy in extraperitoneal injuries is justified if the cases are seen early and if there are no complications. If signs of sepsis are present or if spreading infection ensues, radical posterior drainage and colostomy is indicated.
4. Intraperitoneal injuries must be explored and repaired. Colostomy is not necessary if the perforation is closed within an hour or two after the accident.

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## II. MEDICAL SCHOOL NEWS

### Coming Events

December 15 - 16	Continuation Course in Obstetrics for General Physicians
January 4 - 6	Continuation Course in Geriatrics for Physicians
January 22 - 27	Continuation Course in Ophthalmology for Specialists
Jan. 29 - Feb. 10	Continuation Course in Clinical Neurology for General Physicians Internists, and Pediatricians

### Continuation Course In Clinical Chemistry

Dr. John P. Merrill, of the Department of Medicine of the Peter Bent Brigham Hospital and Harvard Medical School, Boston, will be on our campus as this Bulletin goes to press to participate in the continuation course in Clinical Chemistry being presented at the Center for Continuation Study December 7 - 9.

Dr. Merrill will speak on lower nephron nephrosis and the management of acute renal failure, subjects in which he and his co-workers have been doing extremely interesting investigative work. Dr. Merrill will recount his experiences with the artificial kidney in his discussion of renal failure.

Dr. F. R. Keating, Jr., of the Mayo Foundation, will emphasize the role of radio-iodine in the diagnosis and treatment of thyroid disorders in his presentation on Saturday morning, December 9. The course is presented under the direction of Dr. C. J. Watson, Professor of Medicine, and Dr. Gerald T. Evans, Director of Hospital Laboratories and Professor of Medicine.

\* \* \*

### Dr. May Receives Mead Johnson Award

Dr. Charles D. May, Associate Professor of Pediatrics, received the annual Mead Johnson Award at the October 18 meeting of the American Academy of Pediatrics in Chicago. The award was given in recognition of Dr. May's investigations in the field of intestinal insufficiency.

### Dr. Linton Speaks to Surgical Staff

Dr. Robert Linton, Associate Professor of Surgery, Harvard University, and member of the Department of Medicine of the Massachusetts General Hospital, spoke to members of the Department of Surgery and their guests at the regular Surgical Conference on Saturday morning, December 2.

Dr. Linton, who is well known in medical circles for his work in vascular surgery, discussed the management of arterial aneurysms. He described, with the aid of lantern slides and motion pictures, his technique using fine steel wire in the treatment of aneurysms of the aorta and its major branches. Dr. Linton had previously spoken before the Western Surgical Society which met in Minneapolis.

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### Obstetricians Return to Campus

Three former University of Minnesota Medical School faculty members, who now head departments of obstetrics and gynecology in other medical schools, will return to our campus December 15 and 16 to participate in a continuation course in Obstetrics. Dr. Emil G. Holmstrom, University of Utah Medical School, Salt Lake City; Dr. Curtis J. Lund, Louisiana State University Medical School, New Orleans; and Dr. Charles E. McLennan, Stanford University Medical School, San Francisco, will return as visiting faculty members in a course given for general physicians under the direction of their former chief, Dr. John L. McKelvey, Professor of Obstetrics & Gynecology.

III.

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL  
CALENDAR OF EVENTS

Visitors Welcome

December 10 - December 16, 1950

Sunday, December 10

University Hospitals

- 9:00 - 10:00 Surgery Grand Rounds; Station 22.  
10:30 - Surgical Conference; Todd Amphitheater.

Monday, December 11

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Medicine Conference; L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.  
9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; M-109, U. H.  
10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.  
11:00 - 11:50 Physical Medicine Seminar; Scoliosis Due To Paralysis; Ralph E. Worden; E-101, U. H.  
11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Eustis Amphitheater, U. H.  
12:00 - 12:50 Physiology Seminar; Effect of Sex Hormones on Enzymic Content of Tissues; Ruth Harris; 214 Millard Hall.  
12:15 - 1:20 Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.  
1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.  
4:00 - 5:00 Pediatric Seminar; Tuberculosis in Children; Rosalind Abernathy; 6th Floor West, U. H.  
4:00 - Public Health Seminar; 113 Medical Sciences.  
4:30 - 5:30 Dermatological Seminar; M-436, U. H.  
5:00 - 5:50 Clinical Medical Pathologic Conference; Todd Amphitheater, U. H.  
5:00 - 6:00 Urology-Roentgenology Conference; C. D. Creevy, O. J. Baggenstoss, and Staffs; Powell Hall Amphitheater.

Minneapolis General Hospital

- 9:00 - 10:00 Pediatric Rounds; Dr. Lowry; 5th Floor.  
1:00 - 2:00 Staff Meeting; Classroom, 4th Floor.

Monday, December 11 (Cont.)Minneapolis General Hospital (Cont.)

2:00 - 3:00 Journal Club; Classroom, Station I.

Veterans Administration Hospital

- 9:00 - G. I. Rounds; R. V. Ebert, J. A. Wilson, Norman Shriffter; Bldg. I.  
 11:30 - X-ray Conference; Conference Room; Bldg. I.  
 1:00 - Metabolic Disease Rounds; N. E. Jacobson and G. V. Loomis; Bldg. I.  
 4:00 - Medical Surgical Conference; Conference Room, Bldg. I.

Tuesday, December 12Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology Pediatric Conference; L. G. Rigler, I. McQuarrie and Staffs; Eustis Amphitheater, U. H.  
 9:00 - 12:00 Cardiovascular Rounds; Station 30, U. H.  
 12:30 - 1:20 Pathology Conference; Autopsies; J. R. Dawson and Staff; 102 I. A.  
 3:15 - 4:20 Gynecology Chart Conference; J. L. McKelvey and Staff; Station 54, U. H.  
 4:00 - 5:00 Physiology-Surgery Conference; Electrocardiographic Changes During Endotracheal Intubation; F. VanBergen; Todd Amphitheater, U. H.  
 4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.  
 5:00 - 6:00 X-ray Conference; Presentation of Cases by Veterans Hospital Staff; Drs. Fink, O'Loughlin, et al.; Eustis Amphitheater, U. H.  
 8:00 - Journal Club; E-101; U. H.

Ancker Hospital

- 8:00 - 9:00 Fracture Conference; Auditorium.  
 1:00 - 2:30 X-ray Surgery Conference; Auditorium.

Minneapolis General Hospital

- 8:00 - 9:00 Pediatric Rounds; Dr. Adams; 4th Floor.  
 8:30 - Pediatric Allergy Rounds; Dr. Nelson; 4th Floor.  
 9:00 - 10:00 Pediatric Rounds; F. H. Top; 7th Floor.

Tuesday, December 12 (Cont.)Veterans Administration Hospital

- 8:45 - Surgery Journal Club; Conference Room; Bldg. I.
- 8:30 - 10:20 Surgery Conference; Seminar Conference Room, Bldg. I.
- 9:00 - Infectious Disease Rounds; W. Hall.
- 9:30 - Surgery-Pathology Conference; Conference Room, Bldg. I.
- 10:30 - 11:50 Surgical Pathological Conference; Lyle Hay and E. T. Bell.
- 10:30 - Surgery Tumor Conference; Conference Room, Bldg. I.
- 1:00 - Chest Surgery Conference; J. Kinsella and Wm. Tucker; Conference Room, Bldg. I.
- 1:30 - Liver Rounds; Samuel Nesbitt.
- 2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff; Bldg. III.
- 3:30 - 4:20 Autopsy Conference; E. T. Bell and Donald Gleason; Conference Room, Bldg. I.

Wednesday, December 13Medical School and University Hospitals

- 8:00 - 8:50 Surgery Journal Club; O. H. Wangensteen and Staff; M-109, U. H.
- 8:00 - 9:00 Roentgenology-Surgical-Pathological Conference; Allen Judd and L. G. Rigler; Todd Amphitheater, U. H.
- 11:00 - 12:00 Pathology-Medicine-Surgery Conference; Surgery Case; O. H. Wangensteen, C. J. Watson and Staffs; Todd Amphitheater, U. H.
- 5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Powell Hall Amphitheater.
- 5:00 - 7:00 Dermatology Clinical Seminar; Dining Room, U. H.
- 8:00 p.m. Dermatological Pathology Conference; Todd Amphitheater, U. H.

Ancker Hospital

- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium.
- 3:30 - 4:30 Journal Club; Surgery Office.

Minneapolis General Hospital

- 9:00 - 10:00 Pediatric Rounds; Dr. Lowry; 5th Floor.
- 12:15 - Staff Meeting; Classroom, 4th Floor.

Wednesday, December 13 (Cont.)Minneapolis General Hospital (Cont.)

3:00 - 4:00 Pediatric Rounds; E. J. Huenekens; 4th Floor.

Veterans Administration Hospital

8:30 - 10:00 Orthopedic-Roentgenologic Conference; Edward T. Evans and Bernard O'Loughlin; Conference Room, Bldg. I.

8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker.

11:00 - EKG Conference; Myocardial Infart I; Ernst Simonson; Conference Room, Bldg. I.

2:00 - 4:00 Infectious Disease Rounds; Main Conference Room, Bldg. I.

4:00 - 5:00 Infectious Disease Conference; W. Spink; Conference Room, Bldg. I.

7:00 p.m. Lectures in Basic Science of Orthopedics; Conference Room, Bldg. I.

Thursday, December 14Medical School and University Hospitals

9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; M-109 U. H.

10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.

11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Todd Amphitheater, U. H.

12:00 - 1:00 Physiological Chemistry Seminar; Newer Studies on the Chemistry of Chromosomes; Orlyn Engelstad; 214 Millard Hall.

4:00 - 5:00 Physiology Seminar on Circulation; High Energy Phosphate, 116 Millard Hall.

4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.

5:00 - Bacteriology Seminar; Some Applications of Tracer Techniques to the Study of Immunological Reactions; Norman Boucher; 214 Millard Hall.

5:00 - 6:00 X-ray Seminar; Thoracic Surgery Conference; R. L. Varco, et al; Eustis Amphitheater, U. H.

7:30 - 9:30 Pediatrics Cardiology Conference and Journal Club; Review of Current Literature 1st hour and Review of Patients 2nd hour; 206 Temporary West Hospital.

Minneapolis General Hospital

8:00 - Pediatric Rounds; Forrest Adams; 4th Floor.

9:00 - 10:00 Pediatric Rounds; F. H. Top; 7th Floor.

10:00 - Pediatric Rounds; Adult Contagion.

Thursday, December 14 (Cont.)Minneapolis General Hospital (Cont.)

- 11:00 - 12:00 Clinical Pathology Conference; Large Classroom.  
 11:30 - Pediatric Conference; Main Classroom.  
 1:00 - 2:00 EKG and X-ray Conference; Classroom, 4th Floor.  
 2:00 - EKG and X-ray Conference; Classroom, Station I.

Veterans Administration Hospital

- 8:00 - Surgery Ward Rounds; Lyle Hay and Staff.  
 9:15 - Surgery Grand Rounds; Conference Room; Bldg. I.  
 11:00 - Surgery Roentgen Conference; Conference Room, Bldg. I.  
 1:00 - Chest Rounds; William Stead.

Friday, December 15Medical School and University Hospitals

- 8:30 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.  
 9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U.H.  
 11:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.  
 10:30 - 11:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department, U. H.  
 11:45 - 12:50 University of Minnesota Hospitals Staff Meeting; Head Pain; Lawrence R. Boies and Jerome A. Hilger; Powell Hall Amphitheater.  
 1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.  
 2:00 - 3:00 Dermatology and Syphilology Conference; Presentation of Selected Cases of the Week; H. E. Michelson and Staff; W-312, U. H.  
 2:00 - 4:00 Physiology Conference; 214 Millard Hall.  
 3:00 - 5:00 Neuropathology Conference; F. Tichy; Todd Amphitheater, U. H.  
 4:00 - 5:00 Clinical Pathological Conference; A. B. Baker; Todd Amphitheater, U. H.  
 4:15 - 5:15 Electrocardiographic Conference; 106 Temp. Bldg., Hospital Court, U. H.  
 5:00 - 6:00 Urology Seminar; Absorption After Ureterosigmoidostomy; C. D. Creevy; Eustis Amphitheater.

Friday, December 15 (Cont.)Ancker Hospital

1:00 - 3:00 Pathology-Surgery Conference; Auditorium.

Minneapolis General Hospital

9:00 - 10:00 Pediatric Rounds; Dr. Lowry; 5th Floor.

9:30 - Surgery-Pediatric Conference; O. S. Wyatt & T. C. Chisholm; 4th Floor.

Veterans Administration Hospital

10:30 - 11:20 Medicine Grand Rounds; Conference Room, Bldg. I.

1:00 - Microscopic-Pathology Conference; E. T. Bell; Conference Room, Bldg. I.

1:30 - Chest Conference; Wm. Tucker and J. A. Myers; Ward 62, Day Room.

3:00 - Renal Pathology; E. T. Bell; Conference Room, Bldg. I.

Saturday, December 16Medical School and University Hospitals

7:45 - 8:50 Orthopedic X-ray Conference; Wallace H. Cole and Staff; M-109, U. H.

9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; E-221, U. H.

9:00 - 10:30 Pediatric Grand Rounds; I. McQuarrie and Staff; Eustis Amphitheater, U. H.

9:15 - 10:00 Surgery-Roentgenology Conference; J. Friedman, O. H. Wangensteen and Staff; Todd Amphitheater, U. H.

10:00 - 11:30 Surgery Conference; O. H. Wangensteen and Staff; Todd Amphitheater, U. H.

10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.

10:00 - 12:50 Obstetrics and Gynecology Grand Rounds; J. L. McKelvey and Staff; Station 44, U. H.

Ancker Hospital

8:30 - 9:30 Surgery Conference; Auditorium.

Minneapolis General Hospital

8:00 - Pediatric Rounds; Forrest Adams; 4th Floor.

9:00 - 10:00 Pediatric Rounds; F. H. Top; 7th Floor.

11:00 - 12:00 Pediatric Clinic; Charles May; Classroom, 4th Floor.

Veterans Administration Hospital

8:00 - Proctology Rounds; W. C. Bernstein and Staff; Bldg. III.

8:30 - Hematology Rounds; P. Hagen and E. F. Englund.