

*Bulletin* of the  
**University of Minnesota Hospitals  
and  
Minnesota Medical Foundation**



**Roentgen Studies of  
the Small Bowel**

BULLETIN OF THE  
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and  
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I. ROENTGEN STUDIES OF THE EFFECTS  
ON THE SMALL BOWEL FROM  
EMOTIONAL DISTURBANCES

Jack Friedman, M.D.

Because of tradition, trends in training, and the nature of the roentgen method, diagnostic roentgenologists basically are organists and give consideration to variation in physiology secondary attention. Fundamentally this approach is probably correct as our greatest contribution to medicine is to seek out, localize and interpret disease processes as manifested by altered morphology. However, to fully recognize and evaluate organic changes, knowledge of the physiology of the organs examined is essential. It would not be amiss to point out to this group which is constituted largely of non-radiologists that such knowledge of altered physiology alone makes possible early recognition of intrabronchial, non-opaque foreign bodies or small bronchial tumors by the obstructive emphysema found in expiration as there is no structural change otherwise demonstrated. Visualization of the gall bladder and the renal tract are based on the physiology of excretion and concentration of various opaque contrast materials. Certainly it is understood that the radiologist could contribute little information about an organic cardiac lesion if he did not evaluate the physiological mechanics of cardiac chamber pressures in his consideration and interpretation of the morphological changes.

In roentgen examination of the gastrointestinal tract altered physiological activity largely causes distress to the radiologist in search of ulcers, cancers, polyps, inflammatory, and other organic lesions of the bowel by obscuring the structure. The delayed gastric emptying, the pylorospasm and antral spasm, with or without an associated organic lesion in the stomach must be correctly interpreted. The marked spastic contraction of the colon during a barium enema examination, the presence of marked secretions of mucous on the colonic wall are hazards which make recognition of small

tumors of the colon more difficult. Sharply defined, localized and fixed areas of spasm in the colon seen at times in multiple examinations have been called the filling defects of tumors, and I among others, to my chagrin, have snapped at that artificial bait. The aforementioned are just a few examples of the great number of physiological variations which are encountered by the radiologist and must be evaluated to avoid errors of false positive organic diagnosis or in missing a lesion.

Following the reports by Mackie et al.<sup>12,13,14,15</sup> in 1933 and 1935, and by Snell and Camp<sup>19</sup> in 1934 in which these authors observed "functional changes" in the roentgen picture of the small bowel mucosa in cases of sprue and chronic idiopathic steatorrhea, a considerable volume of literature has developed concerning these variations in the appearance of the small intestine which are primarily not due to structural changes in the small bowel but to a variation in physiology. Snell and Camp originally maintained that these roentgen changes of the small intestine were not specific and could be produced by other conditions. Later these mucosal pattern alterations were also observed in cases of vitamin deficiency and other nutritional disturbances and were therefore inaptly labeled as the "deficiency pattern" of the small bowel.

Ross Golden<sup>7</sup> of Columbia University organized the thinking on these phenomena and classified the conditions under which the altered mucosal pattern were observed. He believes these mucosal changes are primarily due to edema within the intestinal submucosa and are secondary to deranged function of the autonomic nervous system. He selected the term "disordered motor function" as the best description of this phenomenon. This terminology has been most universally accepted, although much difference of opinion exists as to the mechanism producing the varied altered mucosal pattern.

The small intestine exhibiting the roentgen change of "disordered motor function" will show either hypomotility

or hypermotility, segmentation clumping of the barium, coarse flocculation of the barium, coarsening and widening of the mucosal folds, and variably distended and contracted loops of small bowel. These findings are disseminated.

Classification of the various conditions alleged to produce the "disordered motor function" pattern in the small intestine is listed in Table 1.

For many years I have been impressed

TABLE 1

The Various Conditions Alleged to Produce the "Disordered Motor Function" Pattern in the Small Intestine.

- I. Disturbances of Nutrition<sup>7, 15</sup>
  - A. Pancreatic Insufficiency
  - B. Tropical Sprue<sup>14</sup>
  - C. Idiopathic Steatorrhea<sup>12</sup>
  - D. Celiac Disease
  - E. Hypoproteinemia
  - F. Hypopotassemia
  - G. Vitamin Deficiency<sup>13</sup>
  - H. Intestinal Parasites (Hookworm)<sup>11</sup>
- II. Secondary to Organic Disease in Bowel or Mesentery<sup>7</sup>
  - A. Chronic Peptic Ulcer
  - B. Ulcerative Colitis, Regional Enteritis, T. B. Enteritis
  - C. Intraabdominal Abscesses
  - D. Tumors in Bowel or Mesentery
  - E. Sclerosing Mesenteritis and Lipodystrophy of Mesentery
  - F. Mesenteric Adenitis
- III. Dysfunction Associated with Generalized Metabolic Disease<sup>16, 17</sup>
  - A. Hyperthyroidism
  - B. Lead Poisoning
  - C. Porphyria
- IV. Dysfunction Associated with Neurologic Disease<sup>9</sup>
  - A. Diabetic Neuropathy
  - B. Pernicious Anemia
  - C. Tabes Dorsalis
  - D. Vagotomy and Sympathectomy
- V. Administration of Food Stuffs with Barium<sup>5, 16, 17</sup>
  - A. Fats especially Fatty Acid
  - B. Hypertonic Saline and Sodium Bicarbonate
  - C. Carbohydrate
- VI. Retention of Fluid and Mucous in the Intestine<sup>7</sup>
- VII. Autonomic Blocking Drugs<sup>10</sup>  
Tetraethylammonium
- VIII. Allergy<sup>7</sup>
- IX. Emotional Disturbances

by the frequency which the "disordered motor function" pattern is seen roentgenographically and the marked infrequency in which clinical vitamin deficiency, sprue and the remaining conditions outlined in Table 1 as causative agents are observed. Emotional distress has been suspected of producing this roentgen picture but never adequately proved.

A recent report of Lowell S. Goin<sup>6</sup> deserves review. Goin studied a 54-year old white Jewish woman who suffered with attacks of vomiting, abdominal pain and diarrhea for a period of twenty-two years. She had undergone fifteen abdominal operations for this condition with no relief of symptoms. A small intestinal examination which was done after the subsidence of one attack showed a normal mucosal pattern. The patient stated to Dr. Goin that she believed her attacks followed the eating of pork. This patient believed herself emancipated from the rigid Hebrew dietary laws, but Dr. Goin conceived the idea that the eating of pork may have produced a subconscious conflict which manifested itself as an emotional storm with the bowel as the target area. To prove this contention he re-examined the patient at a later date and blended fat free, finely minced pork with the barium suspension for ingestion by the unsuspecting patient. She showed a normal mucosal pattern, and suffered no symptoms. A third examination was then done with ingestion of plain barium sulfate suspension. Immediately after the barium had been taken she was offered a small slice of roast pork. Within thirty minutes after eating the meat she experienced violent abdominal pain and a film of the abdomen showed a striking change in the pattern of the small bowel as compared to the other two examinations. Here then was an objective experiment in the attempt to differentiate the effect of suspected allergy from that of emotional distress on the mucosal pattern of the small bowel. It is of interest to note that in this case, reproduction of the patient's symptoms occurred with the changes in the pattern of the small bowel as well.

As examples of analogous studies on

the effects of emotion on the mucosa of the gastro-intestinal tract we are all aware of the classic work of Wolf and Wolff in their book Human Gastric Function<sup>20</sup>. These investigators directly observed the changes of the gastric mucosa with changes of mood and emotion in their patient with a gastric fistula, a present day Alexis St. Martin. These authors<sup>6</sup> and their colleagues also studied the effects of emotional distress on the mucosa of patients with fistulae of the colon. In fact, Dr. Clarence Dennis<sup>3, 4</sup> when at the University of Minnesota, observed reddening of rectal mucosa with petechia formation and hemorrhage of the mucosa through the proctoscope in a patient in whom emotional disturbance from fear and anxiety was produced during the examination.

There have been few reports of investigative studies of the effects on the small bowel from emotional disturbances in human subjects. Cannon<sup>2</sup> studied changes in motility of the small bowel in animals during emotional stress in 1929. Roth<sup>15</sup> and his co-workers recently studied the motility of the small intestine during emotional reaction in humans as determined by pressure recordings on a balloon introduced into the small bowel through a Miller-Abbott tube. They produced definite change in motility of the small bowel 7 times in 34 observations in 20 patients. No characteristic pattern of response was found. The author reviewed the work of others, who observed motility change in the bowel during emotional stress. I could find no reports in which investigative studies of the small intestinal mucosal pattern in humans were accomplished.

In roentgen studies of the small bowel the great number of factors which influence and produce the pattern of "disordered motor function" complicates the study of any single factor involved. The case of Dr. Goin was unduly complicated by the fact that the various examinations which demonstrated no true allergy but changes due to emotional effects were done on different days; secondly the time interval between the ingestion of the pork to the onset of symptoms and to the demonstration of

changes on the films was slightly prolonged; and thirdly the ingestion of the food with barium in the stomach could in itself affect the emptying of the stomach and could interfere with the normal small bowel mucosal pattern.

It was our belief that if we were to attempt to demonstrate the effects only of emotion on the small bowel mucosal pattern we must adopt a technique similar to any other experiment in which multiple factors affecting similar responses are involved. We must keep all factors constant and vary only the single factor, the effect of which was being investigated. The cause and effect relationship could thus be established.

The plan of the experiment therefore was to subject the patient to a small intestine study with use of plain barium sulfate in water. No additional food stuffs were to be administered during the procedure. The patient was to remain on the x-ray table during the examination. After the recording of a normal mucosal pattern an attempt was made by interview technique to alter the mood of the patient and to produce an emotional disturbance such as anger, fear, frustration, and self pity. Previous knowledge of the patient's psychiatric background was helpful in producing the desired effect but was not essential. The following four experimental case studies will be utilized to demonstrate the effects on the small bowel from emotional disturbances.

Case 1; A.S.: This is a 33-year old white unmarried female with principal complaint of frequent attacks of diarrhea, abdominal pain and fecal incontinence since 1942. The patient's symptoms started while she was nursing her father following a resection of a carcinoma of the esophagus. At that time her brother also had diarrhea which was diagnosed as ulcerative colitis. The patient's symptoms increased in severity in 1945, and she was treated for ulcerative colitis at the Mayo Clinic. In 1947 x-ray examination revealed an inflammatory lesion of the terminal ileum, cecum and ascending colon. A resection of this was done at the Mayo Clinic at that time.

The patient progressed fairly well following this for a number of years when another episode of diarrhea and severe abdominal pain, bowel incontinence, and bleeding had occurred. She asked to be admitted to the hospital because her symptoms were intolerable and she could not be cared for at home.

The patient was of low intellectual capacity and unattractive physically. During psychiatric interview she centered mainly about complaints of her diarrhea, the frequency, the quantity, and the quality of her stools. She would describe her stools in great detail and possessed great knowledge concerning what stools should consist of. In fact she established herself as a connoisseur on stools.

For many years she was hostile to members of her family, mainly to her mother who, she said, was old fashioned and did not understand her. She apparently idolized her father, and upon his death she had an aggravation of her symptoms. She stated the entire burden of managing the family and providing nursing care for her father rested upon her alone. Her brother neglected his obligations completely. Following her father's death in 1945 her brother managed some real property that was left to her and charged her a management fee which she resented in addition to his other deficiencies. A short time previously she fell in love with a newcomer to the community, a displaced person who was the first male to pay her attention. She was happy and free of symptoms during this time until the plans for their marriage. Her fiance insisted upon a marriage settlement before the ceremony, and on the slow realization she was being married for her small estate rather than her desirability as a wife, her symptoms recurred.

Proctoscopic examination demonstrated atypical areas of redness and ulcerations of the mucosa, and the rectum was long, narrow and not distensible. Roentgen examination of the colon showed a narrowed, constricted and spastic rectum and sigmoid. The haustra of the descending colon were absent.

On May 4, 1951 a small intestinal examination was done; the patient felt fairly well at that time. The immediate small bowel films at 30 minutes and at one hour showed normal mucosal pattern and normal distribution of the barium. An error in management occurred and the patient missed the two-hour follow-up and was brought down for the three-hour film at which time the bulk of the barium was in the colon. An adequate examination of the distal jejunum and ileum was unfortunately not obtained. In an attempt to salvage the examination another cup of barium suspension was administered. The one-hour film following the second administration of barium showed a difference of mucosal pattern as compared to the one-hour film at the original ingestion of barium. Certainly no vitamin deficiency or other lesions had occurred during this short interval. The patient sensed that a mistake had been made and was disturbed by this apparent neglect. It was thought the change of mucosal pattern could be due to her annoyance and inconvenience of being without food for an extra length of time.

Another examination was done on May 9th with attempt to see if the changes in the small bowel mucosa could be produced by the interview technique and better demonstrate the cause and effect relationship of emotional disturbance to the change in mucosal pattern. A record was made of normal mucosal pattern on the one-hour film. Discussion of the patient's symptoms and psychiatric background was attempted. The patient freely described the resentment she felt to her mother and brother. Recall of her brother's neglect of responsibility caused her great anger. However when recall was made to her thwarted love affair, the patient wept. During the course of this conversation films of the small bowel were exposed at regular intervals. In fifteen minutes the mucosal pattern of the small bowel was definitely altered from a normal appearance to a characteristic picture of "disordered motor function."

Case 2; M.S.: This 33-year old white female presented herself with symptoms

of epigastric distress of approximately one year's duration. She stated that she received some relief from pain by the use of milk and food and had periodic freedom from pain for as long as three to four weeks at a time. She had a considerable amount of nocturnal pain, but no melena, nausea or vomiting. In addition, but not concomitantly she had a one year history of constant right lower quadrant distress with a good deal of rumbling and bloating and feeling of heaviness in her stomach. Physical examination was negative. On August 31, 1951 she was demonstrated to have a duodenal ulcer.

The personality of this individual was known to this examiner inasmuch as she was a secretary in another department of the hospital. She was a voluble, well meaning girl who tried very hard to please, and in doing so inserted herself into everyone's business and vociferously expressed her ideas on any subject at any time whether the listeners were interested or not. Outwardly she did not appear disturbed by the response from many people to these actions, although basically she was a sensitive individual, and it was believed her volubility represented a personality defect for which she was forced to change many jobs and could not keep friends long.

On checkup examination for her duodenal ulcer on January 7, 1953 the small bowel examination was also accomplished. The one-hour and two-hour films demonstrated normal distribution of barium through the jejunum with a normal mucosal pattern. Interview technique was begun after the two-hour film. It did not take much effort to induce the patient to describe in detail her symptoms. She explained how her illness interfered with her social life and affected her ability to attract a potential candidate for marriage.

In response to questioning of the details of the onset of her illness, she claimed that the abdominal pain came on rather suddenly when she was in New York on vacation the year previously. I asked her what occurred in New York to cause the sudden onset of this pain at that

time. The room was darkened for fluoroscopy and I could not observe the probable blush that occurred on her face, but within five minutes of intermittent observation roentgenoscopically there was a change in the mucosal pattern of the small intestine recorded on the next film which reached its maximum in about fifteen minutes. Segmentation, clumping and flocculation of the barium occurred with coarsening of the jejunal mucosal folds. No attempt was made to delve further into the details of the visit to New York.

Case 3; C.L., Mt. Sinai Hospital:

This patient is an 8-year old white male child who was known to be sickly throughout his life. In past years he had suffered from wheezing on exposure to slight amounts of dust which his mother had called asthma. The child had complained of stomach aches for three years; these vague abdominal pains had no pattern to fit a clinical picture. The pains occurred frequently while at school, necessitating his return home. All these symptoms were due to allergy according to the mother. Her pediatrician, the referring physician, would not definitely accept this diagnosis, and thought a functional emotional state might be the cause of the distress. The child was allergic on skin testing to house dust and a few uncommon ingestants.

More detailed inquiry into past history revealed that an older sibling of the patient drowned in a creek near the family home when the patient was five months old. Following this the mother adopted an over-protective attitude for the patient to such a degree that she had insisted upon bus service for the patient to school when he was in kindergarten, although other children in the same neighborhood did not receive it. When the school principal became "uncooperative" and refused to extend this privilege, the mother herself brought the child to school every day while the other neighborhood children walked. The child was excused from gymnasium classes and he realized he was different from other boys in his class and could not compete in athletics as he stated "I'm not the athletic type." Physical examin-

ation was negative. Laboratory examinations were non contributory. X-ray examination of the colon on April 1, 1953 was negative.

Examination of the small bowel was undertaken on April 14, 1953. The esophagus, stomach and duodenum appeared normal. There was rapid emptying of the stomach and rapid motility through the small bowel so that in one hour the entire small bowel and the proximal colon were filled. The mucosal pattern of the small bowel was well visualized and uniformly distributed. There was a normal, fine, lacy pattern of the barium and no segmentation was observed.

Very superficial psychic probing was undertaken by the interview technique while the small bowel was intermittently observed fluoroscopically. The boy readily revealed that at school he was often beset by a bully who would "make fun of him and push him around." He would make an attempt to defend himself when physically abused but it apparently was a futile attempt as he stated he always was beaten quickly and forced to run away. The child believed that following some of these fights with the bully he would develop his abdominal pain. Films were exposed ten and twenty minutes following the onset of the interview and a marked change in the pattern of the small bowel was observed. There was segmentation of the barium, distention of some loops of bowel, contraction of others, widening of the folds, and coarsening of the mucosal pattern. The patient complained of a vague abdominal distress, although he did not actually have pain during the interview and associated with the roentgen findings of "disordered motor function."

Case 4; J.M.: This patient is a 40-year old white married female of Portuguese origin. She was a transient visiting in Minneapolis with the traveling troupe of a Broadway musical production although she herself was not a performer. She was admitted to Mt. Sinai Hospital on February 29, 1952 with a history of severe abdominal pain occurring the day previously which began in the right lower



quadrant and later became generalized. The pain was sharp, intermittent, and cramp-like. She had a normal bowel movement the morning before this pain had begun. The pain persisted through that day and the night, and was associated with vomiting and distention. The patient stated that with the cramps she could hear and feel gas in her abdomen. Anorexia was present and she had eaten no food since the onset of the symptoms, and would vomit more than the little liquid she would ingest.

The patient stated that in May of the previous year she had a similar such episode of intermittent cramps, nausea and vomiting, with increased bowel sounds. Following this earlier attack she was examined at a hospital in Chicago and on x-ray examination of stomach, small bowel and colon only a diaphragmatic hernia was observed.

On physical examination the abdomen was distended and there was no local tenderness. Borborygmi were heard on auscultation of the abdomen. Laboratory examination was non-contributory.

X-ray examination on February 29, 1952 demonstrated a few fluid and gas filled loops of small intestine, two of which were remarkably distended. There was only a small amount of gas in the colon. These findings were consistent with a small bowel obstruction. In view of the large quantity of fluid in these distended and fixed loops of small bowel the possibility of a strangulating obstruction was entertained.

The patient's older daughter of 22 years of age, who was an understudy to a star performer in this road company, telephoned to discuss the problem. The informant stated that as long as she could recall, when her mother was frustrated or angry, or remarkably disturbed she would have a similar such episode of vomiting and abdominal pain which would keep her in bed for periods as long as a week. In earlier years she would seldom call a doctor for this complaint, but as she became financially more affluent she could then afford the luxury of medical care during these episodes of

abdominal pain.

Her daughter stated that she knew an argument with the patient's most recently acquired husband had occurred the morning of the onset of her present illness. The informant stated, and later this information was confirmed and elicited in more detail from the patient by the surgical resident, that her husband of three-months' duration was not well disposed to her younger children appearing in this musical show, notwithstanding the fact that these children were his means of support. He was jealous of the attention his wife gave her children and he was perturbed because he could not constantly have the privacy he desired. A few days previously he had threatened the patient that he did not like the show, the music, or the cast anyway and was going to return to New York.

The major argument which precipitated her symptoms occurred when she had asked him to take the children for a walk. He violently refused to do this and began to pack his bags vociferously and angrily.

On March 4th after three days of hospital stay the patient's symptoms had completely disappeared and she was in a good emotional mood. She was brought to the x-ray department and hummed several tunes from the show while waiting. She informed me how much better a singer her daughter was than the star she understudied.

The esophagus, stomach and duodenum appeared normal, and the proximal loop of jejunum filled rapidly and revealed a normal mucosal pattern and remained normal until the time the examiner questioned her about the onset of her difficulties. At first she was reluctant to discuss them, and later as little time passed she described in great detail the argument with her husband and her annoyance at the fact that he would not accept her children, especially when their earnings supported him in a fashion to which he was not accustomed. Within a short time changes in the mucosal pattern became obvious, and in fifteen minutes

there definitely was a disturbed mucosal pattern recorded.

The patient was returned to her room while awaiting later films. Prior to being brought back for the two-hour film her husband coincidentally cooperated with the experiment when he telephoned her and gave her an ultimatum "to leave the hospital by three o'clock or else." When she returned for the last film she was obviously greatly disturbed, she was crying, complained again of abdominal cramps, borborygmi were heard and the small bowel mucosal pattern was obviously disordered. There was segmentation of barium in the small bowel loops with some contracted and some distended loops of bowel which compared favorably with the original abdomen films made at the onset of her hospital admission.

We believe we have in this case demonstrated the cause and effect relationship of the emotional disturbance to the distention of the small bowel loops to the disordered mucosal pattern, and to reproduction of the presenting symptoms of the patient.

Discussion: The significance of the fact that one can produce rapid alteration of the small intestinal mucosal pattern under roentgen observation by emotional disturbance requires critical evaluation. cursory assessment might suggest that herein we have explained the mechanism by which patients so frequently have symptoms without evidence of organic disease in the bowel. Certainly this conclusion is not warranted from the facts that have been presented. Of the four example cases presented only in a single case were the symptoms of the patient reproduced in association with the change in the mucosal pattern. In two of the four cases there was only a vague feeling of abdominal distress associated with the roentgen findings. In other cases examined but not herein reported no discomfort occurred with minor degrees in alteration of mucosal pattern.

A few supposedly normal individuals with no evidence of bowel symptoms underwent this examination for evaluation. In one of these changes of the mucosal pat-

tern was found. However it is probable that the superficial psychic probing that was done was not sufficient to find an area which actually produced deep emotional disturbance. It must be understood that the psychiatric interview technique was extremely superficial. As it was done by a radiologist and not a psychiatrist it was felt that meddling deep psychic probing by a person unqualified in psychiatry might cause as much harm and damage to the patient as deep probing and cutting by a person unqualified in surgery.

It is believed that these bowel mucosal changes may conceivably appear in normal individuals who are questioned in a way to cause emotional distress such as anger, remorse, fear and frustration and are not necessarily of pathological nature. Certainly we do not feel that the blush of embarrassment, the increase in blood pressure and pulse rate with fear and anger, and the other normally accepted responses of the body to stress and abnormal findings.

It is conceivable that the described changes in the mucosal pattern of the small bowel could be no more significant than the hyperemia of the blush or the outpouring of tears with emotional disturbances.

Further work is being considered to extend these studies in three directions. First we plan to evaluate more carefully the subjects psychiatrically so as to probe more deeply and thus create a greater stimulus to the bowel. Secondly, we plan to study the appearance of the bowel mucosa in patients having enterostomies and correlate the direct appearance of the bowel with the roentgen mucosal pattern. Thirdly, studies will be made to attempt to determine the mechanism by which the altered mucosal pattern occurs.

The results of these studies therefore have only demonstrated that emotional distress per se can induce an altered mucosal pattern in the small intestine and that it is not necessary for the patient to be deficient in foodstuffs or chemicals. Nor does the patient neces-

sarily have to be the victim of other diseases; nor do we have to assume that the administration of foods or retention of fluids in the bowel is necessary to produce this pattern. It is probable that emotional disturbances may be the most frequent single etiological agent causing this picture of "disordered motor function" of the small bowel.

#### Summary and Conclusions

1. Roentgen studies have demonstrated that emotional disturbances produced by interview technique can immediately alter the small bowel mucosal pattern from a normal mucosal pattern to one of "disordered motor function."
2. Reproduction of the presenting symptoms of the patient was not necessarily always present with the change in the small bowel mucosal pattern.
3. The altered small intestinal mucosal pattern is not necessarily a pathological entity but may be a functional variation within normal limits.

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## II. MEDICAL SCHOOL NEWS

### Coming Events

May 27 Minnesota Medical Alumni Association Luncheon for Senior Students  
June 8-13 Continuation Course in Electrocardiography for General Physicians  
June 8 Special Lecture: "The Auricular Arrhythmias;" Dr. Myron O. Prinzmetal,  
Los Angeles; Owre Amphitheater; 8:00 p.m.

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### Owen H. Wangensteen Surgical Education Foundation Established

At their May meeting, the University's Board of Regents approved the formation of the Owen H. Wangensteen Surgical Education Foundation which honors the Head of our Department of Surgery. Initial funds were donated by Doctors F. John Lewis, Associate Professor of Surgery; Richard L. Varco, Professor of Surgery; and Charles E. Rea, Clinical Associate Professor of Surgery. Purpose of the Foundation is to promote advanced surgical education, and Dr. Wangensteen will act as an advisor in the administration of the funds.

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### Distinguished Visitors on Campus

During the past two weeks the Medical School has been host to a number of distinguished visitors. Dr. Charles B. Huggins, Professor of Surgery, University of Chicago Medical School, delivered the annual E. Starr Judd Lecture on May 7 on the subject, "The Endocrinology of Mammary Cancer". Sir Alexander Fleming, discoverer of penicillin and Nobel Prize winner, gave the Duluth Clinic Lecture on May 12 before a large and appreciative audience. Sir Alexander also participated in a Symposium on Antibiotics on May 13.

Dr. Walter S. Burrage, Chief of the Allergy Clinic and Associate Physician, Massachusetts General Hospital, Boston, participated in the continuation course in Arthritis and Allergy. Dr. Alton Ochsner, William Henderson Professor of Surgery, Tulane University, spoke on "Carcinoma of the Lung" on Tuesday, May 19, in Todd Amphitheater.

Dr. George J. Thomas, Director, Department of Anesthesiology, University of Pittsburgh School of Medicine, was a recent guest of our Division of Anesthesiology. Dr. Thomas, who is Chairman of the American Society of Anesthesiologists' Committee on Operating Hazards, discussed "Fire and Explosion Hazards in Anesthetizing Areas" on Saturday, May 16.

Recent visitors to the Department of Bacteriology and Immunology included Dr. Thomas Norton of the Lederle Laboratories, Pearl River, New York; Dr. G. P. Manire, University of North Carolina; Dr. R. M. McAllister, Camden Municipal Hospital, New Jersey; Dr. Ernest H. Ludwig, University of Pittsburgh; and Dr. Wilbur Noyes, Sloan-Kettering Institute for Cancer Research, New York City.

Dr. Richard R. Trail, Papworth, England, lectured to the students in Physical Therapy and Occupational Therapy on May 13. Dr. Trail, who also took part in the Centennial Celebration of St. Joseph's Hospital in St. Paul and in the Minnesota State Medical Association Meeting, spoke on "Rehabilitation of the Tuberculosis Patient".

Ancker Hospital Research Laboratory to be Dedicated

Dedication of the Ancker Hospital Research Laboratory will take place on Monday, May 24, from 3:00 to 4:30 p.m. Guest speaker for the dedication ceremony will be Dr. Frank Mann, Director of Medical Research at the Mayo Clinic. Under the direction of Dr. Ivan D. Baronofsky, Associate Professor, Department of Surgery, this unit will be devoted to the advancement of research in surgical fields. The research laboratory was made possible largely through the efforts of Mr. Richard C. Lilly, member of the Board of Trustees of the Minnesota Medical Foundation, and with the very willing help and cooperation of the officials of the city of St. Paul, Ramsey County, and Ancker Hospital.

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Second Family Doctors' Day to be Held June 3

The second in the series of Family Doctors' Days will be held on Wednesday, June 3. All physicians are cordially invited to attend the very informal program which will be presented by the Department of Surgery and which will include the following:

- 11:00 a.m. Clinical-Pathological Conference; Todd Amphitheater, University Hospitals
- 12:00 noon Luncheon with Department of Surgery Staff; Powell Hall Recreation Lounge
- 2:00 p.m. Conference on Some Common Surgical Problems; Heart Hospital Theater

The response to the first Family Doctors' Day, which was held on April 29, was most enthusiastic. Almost 100 physicians attended the program presented by the Department of Medicine. Many volunteered that they enjoyed not only the program itself but the opportunity of returning to the Medical School and of meeting members of the faculty. The faculty in turn welcomed the chance to meet and talk with the practitioners of this area. We all look forward to the second Doctors' Day program.

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Dr. Zimmermann Receives Cancer Grant

Dr. Bernard Zimmermann, Research Fellow in the Department of Surgery and Cancer Coordinator for the Medical School, has been awarded a three-year grant by the American Cancer Society. The grant, which totals \$18,000, will enable Dr. Zimmermann to carry out studies of endocrine physiology and metabolic balance in relation to cancer and cancer surgery. His work will be carried out under the direction of Dr. Owen H. Wangensteen.

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Foundation Membership Activities

Through the personal efforts of Dr. Charles F. Code, Professor, Section of Physiology, Mayo Foundation, Rochester, 34 members of the staff of the Mayo Clinic have recently become Annual members of the Minnesota Medical Foundation. Dr. Code, who for many years has been a friend of the Foundation and who has served on its Board of Trustees, spent a good deal of time bringing to the attention of the members of the clinic the activities and objectives of the Foundation. We are delighted to have so many men from Rochester participating in the Foundation.

Faculty News

Dr. Ralph T. Knight, Professor and Director, Division of Anesthesiology, attended the recent meeting of the Missouri State Society of Anesthesiologists in Kansas City where he presented a scientific paper and spoke at the dinner meeting. He also attended the Western Conference on Anesthesiology in Los Angeles where he spoke as representative and President of the American Society of Anesthesiologists.

Dr. A. B. Baker, Professor, Department of Psychiatry and Neurology and Director, Division of Neurology, discussed "Bulbar and Respiratory Poliomyelitis" at the annual meeting of the Iowa State Medical Society on April 28. Dr. Fae Tichy lectured to the staff and students at the State University of Iowa Hospital on May 11 and 12.

Dr. Reynold A. Jensen, Professor, Department of Pediatrics and Psychiatry, addressed a recent meeting of the Rice County Medical Society at Northfield. On April 22 he participated in a continuation course in Dentistry for Children at the Center for Continuation Study. On April 28 he was the guest speaker at a dinner meeting of the Vanderburgh Child Guidance Center, Evansville, Indiana, where he discussed the general subject, "Why Child Guidance Clinics?" The following day he attended the annual meeting of the Indiana State Pediatric Society in Indianapolis where he spoke on the subject, "The Pediatrician and Mental Health - Responsibilities and Limitations." Dr. Jensen, Dr. Jack Wallinga, Instructor in Child Psychiatry, and Dr. Burtrum C. Schiele, Professor, Division of Psychiatry, also attended the annual meeting of the American Psychiatric Association in Los Angeles from May 4 to 8.

Dr. W. D. Armstrong, Professor and Head, Department of Physiological Chemistry, participated recently in a three-day Symposium on Fluorides at the Kettering Laboratory, University of Cincinnati. He discussed "The Deposition of Fluoride in Teeth and Bones."

Several members of the Department of Physiology attended the April meeting of the American Physiological Society in Chicago. Those attending included Doctors M. B. Visscher, N. Lifson, H. M. Cavert, G. G. Nahas, F. J. Haddy, E. B. Brown, V. Lorber, H. Billings, C. Heath, W. L. Adams, M. Cook, and F. Halberg. Dr. E. D. Grim attended the meeting of the Electro-Chemical Society of America in New York on April 13.

Dr. Maurice B. Visscher, Professor and Head, Department of Physiology, was the speaker at the Phi Beta Kappa initiation at St. Olaf College on April 10. The title of his address was, "Intellectual Freedom and Political Power." Dr. Visscher has been elected to membership in the Physiological Society of Great Britain and to honorary membership in the Argentine Society of Biology.

Under the auspices of the W. K. Kellogg Foundation, Dr. John L. McKelvey, Professor and Head, Department of Obstetrics and Gynecology, visited the Maritime Provinces in Canada during the week of May 4. He spoke on the subject, "Adenocarcinoma of the Endometrium" at the meeting of the Halifax Medical Society and also spoke at the meeting of the Cape Breton Medical Society.

On April 17 the University of Minnesota Press announced publication of "Physiological Foundations of Neurology and Psychiatry" by Dr. Ernst Gellhorn, Professor of Neurophysiology. In this new text Dr. Gellhorn presents the findings of extensive research on the physiology of the central nervous system and relates many of these findings to applicability in clinical and other fields.

III.

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL  
WEEKLY CALENDAR OF EVENTS

Physicians Welcome

May 25 - 29, 1953

Monday, May 25

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; W-612, U. H.
- 10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.
- 11:30 - Tumor Conference; Doctors Kremen, Moore, and Stenstrom; Todd Amphitheater, U. H.
- 11:30 - 12:30 Physical Medicine Seminar; Juvenile Rheumatoid Arthritis; Robert Good; Heart Hospital Auditorium.
- 12:15 - Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.
- 12:30 - Physiology and Physiological Chemistry Seminar; Studies on Absorption of Water from the Intestine; J. S. Lee; 214 Millard Hall.
- 1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.
- 4:00 - Pediatric Seminar; Reports of Pediatric Meetings; Staff Members; Sixth Floor West, U. H.
- 4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
- 4:30 - Public Health Seminar; 15 Owre Hall.
- 4:30 - 6:00 Physiology 114A and Cancer Biology 140 -- Research Conference on Cancer, Nutrition, and Endocrinology; Drs. Visscher, Bittner, and King; In vitro Serological Tests for the Mammary Tumor Agent; 129 Millard Hall.
- 5:00 - 6:00 Urology-Roentgenology Conference; C. D. Creevy, O. J. Baggenstoss, and Staff; Eustis Amphitheater.

Ancker Hospital

- 8:30 - 10:00 Tuberculosis and Chest Conference; Auditorium.
- 2:00 - 3:00 Surgery Journal Club; Classroom.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Eldon Berglund; Newborn Nursery, Station C.
- 10:30 - 12:00 Tuberculosis and Contagion Rounds; Thomas Lowry; Station M.
- 11:00 - Pediatric Rounds; Erling Platou; Station K.
- 12:30 - Surgery Grand Rounds; Dr. Zierold; Sta. A.



Monday, May 25 (Cont.)

Minneapolis General Hospital (Cont.)

- 1:00 - X-ray Conference; Classroom, 4th Floor.
- 2:00 - Pediatric Rounds; Robert A. Ulstrom; Stations I and J.

Veterans Administration Hospital

- 1:30 - Cardiac Rounds; Drs. Ebert and Berman, and Richards.
- 4:00 - Cardiac Conference; Drs. Ebert, Berman, and Simonson; Conference Room, Bldg. I.

Tuesday, May 26

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Pediatric Conference; L. G. Rigler, I. McQuarrie and Staff; 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.
- 12:30 - 1:30 Physiology 114D -- Current Literature Seminar; 129 Millard Hall.
- 4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.
- 4:30 - 5:30 Clinical-Medical-Pathological Conference; Todd Amphitheater, U. H.
- 4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
- 5:00 - 6:00 X-ray Conference; Presentation of Cases by Veterans Hospital Staff; Eustis Amphitheater, U. H.

Ancker Hospital

- 8:00 - 9:00 Fracture Conference; Auditorium.
- 9:00 - 10:00 Medical X-ray Conference; Auditorium.

Minneapolis General Hospital

- 9:30 - 10:30 Obstetrics and Gynecology Staff Rounds; William P. Sadler and Staff; 301 Harrington Hall.
- 10:00 - Pediatric Rounds; Spencer F. Brown; Stations I and J.
- 10:00 - Cardiac Rounds; Paul F. Dwan; Classroom, Sta. I.
- 10:30 - 12:00 Medicine Rounds; Thomas Lowry and Staff; Station F.
- 12:30 - Grand Rounds; Fractures; Willard White, et al; Sta. A.
- 12:30 - Neuroroentgenology Conference; O. Lipschultz, J. C. Michael and Staff.
- 12:30 - EKG Conference; Boyd Thomes and Staff; 302 Harrington Hall.
- 1:00 - Tumor Clinic; Drs. Eder, Cal, and Lipschultz.
- 1:00 - Neurology Grand Rounds; J. C. Michael and Staff.

Veterans Administration Hospital

- 7:30 - Anesthesiology Conference; Conference Room, Bldg. I.
- 8:30 - Surgery Staff Seminar; Intra-arterial Transfusion; Farrell Stiegler; Medical Conference Room, Bldg. I.
- 9:30 - Infectious Disease Rounds; Drs. Hall and Zinneman.

Tuesday, May 26 (Cont.)

Veterans Administration Hospital (Cont.)

- 9:30 - Surgery-Pathology Conference; Conference Room, Bldg. I.
- 10:30 - Surgery-Tumor Conference; L. J. Hay, J. Jorgens; Conference Room, Bldg. I.
- 1:00 - Review of Pathology, Pulmonary Tuberculosis; Conference Room, Bldg. I.
- 1:30 - Combined Medical-Surgical Chest Conference; Conference Room, Bldg. I.
- 2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff; Bldg. III.

Wednesday, May 27

Medical School and University Hospitals

- 8:00 - 9:00 Roentgenology-Surgical-Pathological Conference; Paul Lober and L. G. Rigler; Todd Amphitheater, U. H.
- 11:00 - 12:00 Pathology-Medicine-Surgery Conference; Pediatrics Case; O. H. Wangensteen, C. J. Watson and Staffs; Todd Amphitheater, U. H.
- 12:30 - 1:30 Physiology 114C -- Permeability and Metabolism Seminar; Nathan Lifson; 129 Millard Hall.
- 1:30 - 3:00 Physiology 114B -- Circulatory and Renal System Problems Seminar; Dr. M. B. Visscher, et al; 214 Millard Hall.
- 4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
- 5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Eustis Amphitheater.
- 8:00 - 10:00 Dermatological-Pathology Conference; Review of Histopathology Section; R. Goltz; Todd Amphitheater, U. H.

Ancker Hospital

- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium.
- 12:30 - 1:30 Medical Journal Club; Library.

Minneapolis General Hospital

- 8:30 - 9:30 Obstetrical and Gynecological Grand Rounds; William P. Sadler and Staff; Sta. C.
- 9:30 - Pediatric Rounds; Max Seham; Stations I and J.
- 10:30 - 12:00 Medicine Rounds; Thomas Lowry and Staff; Station D.
- 11:00 - Pediatric Seminar; Arnold Anderson; Classroom, Station I.
- 11:00 - Pediatric Rounds; Erling S. Platou; Station K.
- 12:15 - Pediatric Staff Meeting; Classroom, Station I.
- 1:30 - Visiting Pediatric Staff Case Presentation; Station I, Classroom.

Veterans Administration Hospital

- 8:30 - 10:00 Orthopedic X-ray Conference; E. T. Evans and Staff; Conference Room; Bldg. I.
- 8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker.
- 9:00 - Gastro-Intestinal Rounds; Drs. Wilson, Nesbitt, Zieve, Hay and Goodnow.

Wednesday, May 27, (Cont.)

Veterans Administration Hospital (Cont.)

- 12:30 - X-ray Conference; J. Jorgens; Conference Room, Bldg. I.  
2:00 - 4:00 Infectious Disease Rounds; Main Conference Room, Bldg. I.  
4:00 - 5:00 Infectious Disease Conference; Wesley W. Spink; Conference Room, Bldg. I.  
7:00 p.m. Lectures in Basic Science of Orthopedics, Conference Room, Bldg. I.

Thursday, May 28

Medical School and University Hospitals

- 8:00 - 9:00 Vascular Rounds; Davitt Felder and Staff Members from the Departments of Medicine, Surgery, Physical Medicine, and Dermatology; Heart Hospital Amphitheater.  
9:00 - 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.  
12:30 - Physiological Chemistry Seminar; Viral Inhibition and other Properties of Synthetic Polypeptides; James Jarvis; 214 Millard Hall.  
1:30 - 4:00 Cardiology X-ray Conference; Heart Hospital Theatre.  
4:00 - 5:00 Physiology-Surgery Conference; Todd Amphitheater, U. H.  
4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.  
5:00 - 6:00 Radiology Seminar; Thoracic Surgery Conference; R. L. Varco, et al; Eustis Amphitheater, U. H.  
7:30 - 9:30 Pediatric Cardiology Conference and Journal Club; Review of Current Literature 1st hour and Review of Patients 2nd hour; 206 Temporary West Hospital.

Ancker Hospital

- 8:00 - 10:00 Medical Grand Rounds; Auditorium.

Minneapolis General Hospital

- 9:30 - Neurology Rounds; Heinz Bruhl; Station I.  
10:00 - Pediatric Rounds; Spencer F. Brown; Station K.  
10:00 - Psychiatry Grand Rounds; J. C. Michael and Staff; Sta. H.  
11:30 - 12:30 Clinical Pathological Conference; John I. Coe; Classroom.  
1:00 - Fracture - X-ray Conference; Dr. Zierold; Classroom.  
1:00 - House Staff Conference; Station I.  
2:00 - 4:00 Infectious Disease Rounds; Classroom.  
4:00 - 5:00 Infectious Disease Conference; Wesley W. Spink; Classroom.

Veterans Administration Hospital

- 8:00 - Surgery Grand Rounds; Conference Room, Bldg. I.  
8:00 - Surgery Ward Rounds; Lyle Hay and Staff; Ward 11.

Thursday, May 28 (Cont.)

Veterans Administration Hospital (Cont.)

- 11:00 - Surgery-Roentgen Conference; J. Jorgens; Conference Room, Bldg. I.  
1:00 - 3:00 Metabolic Disease Conference; Drs. Flink, Heller, and Jacobson, and Rolin.

Friday, May 29

Medical School and University Hospitals

- 8:00 - 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.  
10:30 - 11:50 Medicine Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.  
10:30 - 1:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department, U. H.  
11:45 - 12:50 University of Minnesota Hospitals Staff Meeting; Causes and Correlates; Alan E. Treloar; Powell Hall Amphitheater.  
1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.  
3:00 - 4:00 Neuropathological Conference; F. Tichy; Todd Amphitheater, U. H.  
4:00 - 5:00 Physiology 124 -- Seminar in Neurophysiology; Ernst Gelhorn; 113 Owre Hall.  
4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.  
4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.  
5:00 - Urology Seminar and X-ray Conference; Eustis Amphitheater, U. H.

Ancker Hospital

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

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Wallace Lueck; Station J.  
10:30 - Pediatric Surgery Conference; Oswald Wyatt; Tague Chisholm; Station I, Classroom.  
12:00 - Surgery-Pathology Conference; Dr. Zierold, Dr. Coe; Classroom.  
1:00 - 3:00 Clinical Medical Conference; Thomas Lowry; Classroom, Station M.  
1:15 - X-ray Conference; Oscar Lipschultz; Classroom, Main Bldg.  
2:00 - Pediatric Rounds; Robert Ulstrom; Stations I and J.

Veterans Administration Hospital

- 10:30 - 11:20 Medicine Grand Rounds; Conference Room, Bldg. I.  
1:00 - Chest Follow-Up Conference; E. T. Bell; Conference Room, Bldg. I.  
2:00 - Autopsy Conference; E. T. Bell and Donald Gleason; Conference Room, Bldg. I.