Intestinal Obstruction*

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Intestinal Obstruction

Introduction

The problem of intestinal obstruction is a complex one. Its rational solution depends on an understanding of the multiple changes produced in the physiology of the organism.

Wangensteen has defined intestinal obstruction as any interference with the normal passage of the bowel contents. He divides the etiological factors into three groups, the mechanical, the neurogenic and the vascular. From the practical clinical standpoint, it is more important to determine whether an obstruction is strangulated or non-strangulated. The disturbances in physiology are primarily the same in both groups, but when the blood supply to the involved bowel is cut off, these abnormalities develop more quickly and the dangers of shock, perforation and peritonitis become urgent.

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Changes Produced By Intestinal Obstruction

1. *Water and Electrolyte Balance.* It has been known for a long time that infusions of normal saline prolong the lives of dogs with high small bowel obstruction. This fact was first demonstrated in 1912 by Hartwell and Hogart. Gamble and his co-workers, Haden & Orr, and others have confirmed these findings and have shown that in these high obstructions there is persistent vomiting and consequent loss of water and chloride. The amount of fluid loss may be tremendous. The gastrointestinal secretions amount to about 7000cc. in 24 hours and their electrolyte content is similar to that of the blood plasma and interstitial fluids; consisting largely of sodium chloride, water and carbonic acid. The intracellular fluid contains potassium, magnesium, phosphoric-sulphur and amino acids. This difference is important in preserving the intracellular fluid in the dehydration produced by vomiting. Emesis is not necessary to cause fluid loss in bowel obstruction. The distended bowel can form a reservoir which will hold a large volume of fluid. In rabbits, where vomiting does not occur in high obstruction, the water and electrolyte loss is just as great as in dogs. The vomiting mechanism may actually act as a safety valve and deflate the obstructed loop, preventing distension.

The result of the water and chloride loss is twofold:

(1) Dehydration occurs which results in an increase in blood viscosity and a decrease in blood volume.

(2) The organs of the body lose little fluid but the blood and interstitial spaces lose a great deal. This leads to shock (peripheral circulatory collapse), generalized tissue anoxia and vascular thrombosis. In the later stages, renal failure supervenes because of decreased renal blood flow and anoxia. With restoration of the fluid and electrolyte balance by I-V saline these factors are reversed.

2. *Plasma and Blood Loss*—It is evident that other factors must be present in most clinical cases of intestinal obstruction. McKittrick demonstrated that the use of intravenous saline did not lower the mortality and this experience has been confirmed by others. Fine showed that in addition to fluid and chloride loss, there was also loss of plasma into the obstructed bowel. This was more evident when distension ocurred and the bowel wall became more permeable. He was able to show that even in simple obstructions, the plasma loss could be considerable and unless replaced would lead to shock, renal failure and death. He demonstrated that dogs could be kept alive for longer periods with plasma than was possible with saline. It has since been shown that in a strangulated obstruction there is actually infarction of the bowel wall and loss of whole blood.

3. *Bowel Distension.* In many cases of low intestinal obstruction the effects of fluid, electrolyte and plasma loss are not striking, and replacement therapy does not relieve the condition. Wangensteen has shown that bowel distension itself can give rise to a series of pathological changes which may prove fatal.

The gas in the distended gut is derived from swallowed air (68%, diffusion of nitrogen into the bowel lumen (20%), and putrefaction within the obstructed loop (12%).

The effects of distention are general and local.

General:—Interference with respiration and circulation due to the mechanical effect of abdominal distension.

Local:—1. Interference with venous return in the bowel wall (congestion, cyanosis).

2. Increased permeability of bowel wall with transperitoneal absorption of toxins.
3. Decreased viability of bowel wall.
4. Perforation when intraluminal pressure reaches a high enough level.

Wangesteen showed that gastric intubation with continuous suction removed the major source of bowel gas,i.e., swallowed air and this resulted in a marked improvement in the treatment of intestinal obstruction. The next step was the development of an intestinal which could be passed to the site of the obstructing lesion and thus decompress the proximal bowel more effectively. Many such tubes have been devised, we have used the Miller-Abbott, Harris and Cantor type with good results. Intubation is most useful in the pre-and postoperative periods in mechanical obstruction and it is a life-saving procedure in paralytic ileus.

4. *Infection and Toxaemia.* Many workers have considered that there must be a toxic substance formed within the obstructed loop which gives rise to some of the manifestations of intestinal obstruction. A search of the literature reveals many agents which have been suggested as possible etiological factors. Scudder found that the blood potassium level was elevated in many of these cases and suggested that potassium poisoning might be important. It has since been shown that the rise in potassium merely follows the fall in sodium and is of no specific significance.

It has been noted clinically that sometimes when an obstruction is released there is a marked deterioration in the patient's condition as the blood supply returns to the involved bowel. This is probably due to increased absorption from the obstructed loop.

The recent work of Blain conclusively demonstrates that penicillin decreases the mortality of strangulated intestinal obstruction in dogs. The same is true of streptomycin. It is a well known fact that the bowel contains many organisms which are potentially pathogenic if they escape from the lumen. Cl. welchii, anaerobic streptococci and the colon group are the most important. In the presence of distension with impaired viability of the bowel wall, these organisms and their toxins may be absorbed and reach the peritoneal cavity and thus produce systemic effects. The old idea that gas gangrene antitoxin was beneficial in the toxaemia of intestinal obstruction may thus be based on fact. The present evidence indicates that there is a toxic factor in many cases of bowel obstruction, that it is bacterial in origin and that it may be controlled by antibiotic therapy.

Diagnosis of Intestinal Obstruction

The chief essential in the management of intestinal obstruction is early diagnosis. The sooner that corrective measures can be begun, the lower the

ultimate mortality will be. In a review of the cases seen at the Royal Victoria Hospital 20 to 30 years ago, the mortality was found to increase in proportion to the number of hours elapsing between the onset of symptoms and operation. This does not necessarily hold true today since we recognize the importance of correcting the physiological disturbances as a pre-operative measure, but it is true that mortality increases with delay in diagnosis and institution of treatment.

The most frequent sympton is pain which is of a crampy type, rising to a height at the peak of a wave of peristalsis and subsiding as the peristaltic wave subsidies. Later, when the bowel becomes paralyzed, pain disappears. It is important to realize that the patient may be seen in a free interval when the bowel is quiet and examination is not complete unless an attempt is made to stimulate peristaltic movement. Ausculation of the abdomen may yield valuable information. Borborygmi associated with a wave of pain is good evidence of the presence of a mechanical obstruction. Nausea and persistent vomiting are characteristic of small bowel obstruction but are not marked in the early stages of large bowel obstruction. In the late stages of both conditions the vomitus becomes greenish, brown and foetid.

Obstipation is usually present, but bowel contents below the obstructing lesion may give rise to a movement or an effectual enema after the onset of symptoms.

Distension is often present but its absence is apt to be misleading. It must be emphasized that in early small bowel obstruction distension is not detectable clinically and can only be recognized by X-ray.

The radiological diagnosis of intestinal obstruction is usually accurate. A flat plate of the abdomen shows distended loops of bowel which may be arranged in characteristic pattern. A film should always be taken in the upright position to visualize fluid levels in the gut. A barium enema is often useful in demonstrating the site of a large bowel obstruction but barium should never be given by mouth if there is any suspicion of intestinal obstruction. The bowel proximal to the lesion becomes filled with a cement-hard mixture which makes surgery much more difficult.

The most important means of diagnosis is accurate repeated clinical observation, and it is often better to explore early on suspision than late on a certainty.

Treatment of Intestinal Obstruction

Utilizing the principles outlined above, we have adopted the following plan of treatment in cases of intestinal obstruction.

Bowel obstruction does not constitute an indication for immediate operation but any undue delay is hazardous and is apt to be reflected in a higher mortality. The chief danger is that of strangulation. There is no certain means of distinguishing clinically between a strangulated and non-strangulated obstruction. In general, if the circulation of the bowel is impaired the onset is more acute, the course more rapid and the symptoms more severe. The pulse tends to be fast, and abdominal tenderness is more marked. These signs are not diagnostic, however, and their absence does not rule out the presence of strangulation. For this reason, we prefer to operate early as soon as the physiological status of the patient has been restored to a reasonable level.

1. Water and electrolyte loss are replaced by I.V. saline in adequate amounts. This is almost a specific measure in high small bowel obstruction and produces a dramatic improvement.
2. Plasma and whole blood must be given to replace plasma loss and prevent shock.
3. Intestinal distension is relieved by the use of gastric and intestinal ine tubation. It is sometimes difficult to pass the Miller-Abbott tub- and if this cannot be done easily the time is better spent restoring fluid and electrolyte balance and depending on gastric suction for decompression of the bowel. We have found the Harris and Cantor tubes easier to pass under flouroscopic control. Because of their larger lumens they are very effective in decompressing the bowel. Inhalation of oxygen may help by encouraging gas exchange.
4. Penicillin and streptomycin should be used to combat infection and forestall toxaemia. When the patient has responded to these measures and is in good condition, operation should be performed. The aims of surgery are to relieve the strangulated loop, resect gangrenous bowel if necessary and to remove the cause of the obstruction. In cases of large bowel obstruction the primary operation is often one of decompression and the lesion is removed at a later date.

Spinal is the anaesthetic of choice. A stomach tube with constant suction should be present throughout the operative procedure. This forestalls the danger of regurgitation and aspiration when the obstruction is relieved.

This is a brief outline of the modern management of intestinal obstruction. The importance of correcting the abnormal physiology initiated by the obstruction is emphasized. Having accomplished this, early operation is indicated.

Health at the Table

To enjoy life to the full, everyone wants to have the feeling of buoyant physical vigor that comes with good health. To aid good health, doctors say it is important to use care in the selection of the food we eat.

Certain foods are essential to maintain health. Milk, fruits, vegetables, cereals, meat and eggs are foods that provide calories in addition to elements that the body needs every day in vitamins, proteins and minerals. They should be included in the daily diet.

Acute Enteric Intussusception in an Adult, and in a Child

T. B. Murphy, M. D.

INTUSSUSCEPTION in adults is comparatively rare, and, when it does occur, it is more often a chronic than an acute process. Rowe in an analysis of 10 cases, which he reported in adults, states that clinically 8 were chronic and 2 acute.

It has been estimated that about 95% of all cases of intussusception occur in children. About 75% occur within the first year of life, and of these, about 70% are in boys.

In a series of 484 cases reported by Ladd and Gross, the age incidence was from 1 month to 11 years. Perrin and Lindsay have also reported a series of 400 cases, 78.5 of which were in children under the age of 2 years.

There are three main types of Intussusception:

(1) Enteric—small gut into small gut.

(2),—colon into colon. This type occurs in elderly people and accounts for 10% of cases.

(3) Enterocolic—ileum into colon. This is the common variety in infants, and it also accounts for 84% of all cases of intussusception.

In children, with the exception of an occasional Mackel's diverticulm, it is not usual to find a pathological basis for the event. In adults, on the other hand, idiopathic intussuception is a surgical curiosity. Almost all acute intussusceptions occuring in adults are initiated by some demonstrable lesion, such as benign tumor, ulcer, or Meckel's diverticulum. Morro, however, has recorded two cases in which abnormal peristalsis caused by hunger pangs, brought about the invagination. Dietary indiscretion and excessive purgation may also be contributing factors in so far as they excite hyperperistalsis of the small intestine.

Since a causative factor cannot be demonstrated in most cases of intussuception in children, Ladd and Gross in a series of 372 cases of intussusception, found a causative factor in only 5%, and since the enterocolic type is the most frequently encountered, several theories have been advanced to explain its occurence at this site, viz: that vigorous peristalsis in the ileum is encountered by antiperistalsis in the caecum. That excessive mobility of the caecum and ascending colon is a predisposing factor. That in infancy, the ileocecal valve protrudes markedly into the lumen of the caecum, and, this being the case, excessive peristalsis might carry the valve forward as the apex of the intussusceptum. That an upset in the normal co-ordination of muscular contraction in the bowel may produce a contraction of the circular muscle fibres at one part, and a relaxation of the circular muscle fibres immediately below. Contraction of the longitudinal muscle fibres would then draw the constricted portion into the relaxed portion, where it would remain invaginated.

I wish to report two cases of acute intussusception:

(1) In an adult.

(2) In a child.

Case 1.

History:

Mrs. W. B. admitted February 8th, 1948 at 9 A.M. A case of far advanced pulmonary tuberculosis with secondary tuberculous ulcerative enterocolitis. Occasionally suffered from constipation and usually relieved after taking one or two A. B. S. & C. tablets. On the evening of February 6th, she took three A. B. S. & C. tablets (had never taken more than two tablets on any previous occasion). The morning of February 7th, about 9 A. M. she had a very thorough bowel movement. One hour after this, she experienced slight colicky pains in the region of the umbilicus. The pains recurred at intervals of 15 minutes to one-half hour. Throughout the afternoon the pains were more severe and she vomited several times. That night she did not vomit but continued to have colicky pains. Sometime during the early morning hours, she does not remember quite when, the pain became continuous, and more or less confined to the right lower abdomen.

Examination:

She was examined the afternoon of her illness. The abdomen was soft. There was no appreciable tenderness. No mass was palpable. Rectal examination was negative. On examination the following morning, the abdomen was rigid. There was generalized tenderness, maximal, to the right of the umbilicus. On rectal examination there was marked tenderness around the caecum. No mass could be felt. There was no blood on the examining finger. The white blood count was 18,900. Differential count, 90% leucocytes and 10% lymphocytes. Urine analysis negative.

Clinical Diagnosis—Acute suppurative appendicitis.

Operation—February 8th, 1948 she was transferred immediately from the sanitorium to the general hospital and operated upon at 10 a. m. under combined spinal and intravenous anesthesia.

The appendix was delivered and found to be normal. The terminal ileum was then examined and then at a point about $2\frac{1}{2}$ feet from the ileocecal valve, an intussusception, 4 inches long was found. The intussusception was irreducible. Resection was carried out and a primary lateral anastomosis, ileum to ileum, performed.

Pathological Report—Specimen consists of a segment of small bowel. The bowel wall is quite thin, and on opening into the lumen, is occupied by a second portion of bowel which has telescoped into it. At the apex of the intussusceptum there is a raised mucosal area 2 x 1 cm. in diam. Microscopically there is marked congestion, and scattered haemorrhages through the tissues. Necrosis in many areas is noted. Numerous typical follicles containing epithelioid and giant cells are evident.

Intussusception of small intestine, tuberculous ulcer, and gangrene of the small intestine.

Progress—Uneventful recovery. Transferred to sanitorium, February 28th, 1948.

Case 2

History—Miss O. L., age 11 years, admitted March 27th, 1948, at 7.30 p.m. At noon today took colicky pains across the middle of the abdomen. Shortly after onset of pain she vomited three times. The pain was not relieved. About three hours after its onset, pain became continuous, and shifted to the lower right abdomen. Bowels did not move today. Since onset of pain she has had urinary frequency (7 or 8 times).

Examination—There was generalized abdominal rigidity, and tenderness. Maximum tenderness was over the upper right iliac region. There was marked rebound tenderness over the same area. On rectal examination there was marked tenderness high up on the right side. There was no blood on the examining finger. The white blood count was 14,500, leucocytes 87%, lymphocytes 10%, urine analysis sugar four plus, otherwise negative. Blood sugar 132 mgms%.

Clinical Diagnosis—Acute appendicitis.

Operation—Operated upon March 27th, 1948 at 10 p.m. The appendix was retrocecal. The superficial vessels of the appendix and caecum showed marked congestion. Appendectomy was performed. The terminal ileum was then examined, and at a point about 14 inches from the ileocecal valve an intussuception 6 inches long was encountered. This was reduced with difficulty. At the apex of the intussusception was an inverted Meckel's diverticulum. The affected segment of the bowel was purplish in color and of doubtful viabilily. Resection was carried out and a primary lateral anastomosis, ileum to ileum, performed.

Pathological Report:—Specimen consists of a segment of small bowel, measuring 16.5 c.m. in length and 2 cm. in diam. The central portion of this segment is discolored and is dull dusty red in appearance. 10 cm. from the end of this segment, there is a diverticulum measuring 3 x 2 cm. Attached to the distal end is a small piece of mesentery. Microscopically, there is an intense oedema of the bowel wall and early necrosis in some areas.

Intussusception of small intestie, infarction of the small intestine, Meckel's diverticulum.

Progress—Uneventful recovery. Discharged April 9th, 1948.

Comments

(1) Two cases of acute intussusception have been reported:
   (1) In an adult due to a tuberculous ulcer.
   (2) In a child due to a Meckel's diverticulum.

(2) Intestinal ulceration is the commonest complication of pulmonary tuberculosis. However, acute intussusception is a rare occurrence, and would perhaps have not occured in this case were it not for excessive purgation.

(3) An interesting observation made following the reduction of the Meckel's was that no matter how often the diverticulum was reduced, the inversion recurred almost immediately. The head of the Meckel's

felt thick, and heavy. The impression formed was that the weight of the head was sufficient to initiate the inversion of the Meckel's and then to invaginate the process into the ileum where it was gripped by peristaltic contractions and so produced the intussusception.

(4) A fairly extensive review of the literatures reveals that too much reliance should not be placed upon "feeling a mass" in these cases. Pure enteric invaginations are notably difficult to feel, even in the initial stages when the abdomen is soft. Later, when the abdomen becomes rigid and tender, it is obviously impossible to do so. Nor should too much reliance be placed upon finding gross blood in the stools. Spontaneous passage of blood from the bowel may occur, but is often a late sign in terms of the period available for early and effectve treatment. The same is true with respect to finding blood on the examining finger following rectal examination.

(5) In adolescents, intussusception is so regularly caused by a Meckel's diverticulm, that, following a careful history and physical examination a precise pre-operative diagnosis is often made by those who have a wide experience in these cases. By others, acute appendicitis or intestinal obstruction is not an uncommon pre-operative diagnosis. In adults, the signs and symptoms of acute intussusception differ little, if at all, from those in children, but because the condition is rare it is seldom correctly diagnosed pre-operatively.

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Acute Lead Poisoning Treated With B.A.L

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THE following is a discussion of the use of B.A.L. (2, 3,—dimercaptopropanol) in acute lead poisoning. The lead was ingested in the form of Goulard's Extract which is lead subacetate, an aqueous solution containing 22.5 grams of lead per 100 cc. Our patient took four ounces containing approximately 27 grams of lead. Cantatrow and Trumper[1] quoting Flury[2] state that the smallest oral dose of lead capable of causing acute lead poisoning is 5 mg. per kilogram of body weight; the fatal dose of lead acetate has been variously stated to be from 20 to over 50 grams. British Anti Lewisite, as the name implies, was first developed to counteract the arsenic war gases particularly Lewisite; it was used successfully against the arsenic gases both locally and systematically. Further work has shown B.A.L. to be effective against overdosage with arsenic and its therapeutic agents such as oxophen arsine hydrochloride as well as against toxic manifestations such as arsenical dermatitis. It has also been used successfully in the treatment of poisoning resulting from mercury, antimony, zinc, and chromates. Telfer[4] reports the use of B.A.L. in chronic lead poisoning in which the drug proved useful in "deleading" the patient. The development and use of B.A.L. has been reviewed by Salzberger and Baer[3].

The toxic effects of B.A.L. in the case report here presented were of a minor nature and consisted of nervousness, restlessness, insomnia, nausea, as well as marked tenderness at the site of injection; the patient would complain bitterly at the injection of each dose. Since then we have seen a clinical note by Tye and Siegel[5] in which they state that undesirable side effect such as "nausea, vomiting, headache, burning sensation of gums, nose and eyes, profuse lacrimation and salivation, abdominal cramps, flushing of face, tingling of extremities, burning of skin, feeling of constriction of the chest and restlessness" all were relieved by giving orally 50 mg. of ephedrine sulfate a half hour before each injection of B.A.L.

History—G. R., a twenty-two year old white male; occupation, assistant steward working in a ship's dispensary.

At approximately 9 p.m. on August 4, 1947, patient was admitted to the Victoria General Hospital with a history of having swallowed four ounces of Goulard's extract at about 5 p.m. on August 4th. He had begun to vomit soon after swallowing this material. The ship's doctor saw him about two hours after patient swallowed the extract and at that time gave him milk and egg white mixture by mouth. The note accompanying him to hospital states that his throat and larynx appeared markedly oedematous. On admission temperature 98.6°, pulse rate 72 per minute, respirations 22 per minute.

Physical Examination—Revealed a young white adult male lying in bed retching continuously, restless and apparently in great distress. Positive findings were—Tongue—coated with a thin whitish slough. Nasopharynx and posterior pharyngeal wall were mottled white in color and there was slight oozing of blood in spots over pharyngeal wall and from under the tongue. Cardiovascular system—negative. Blood pressure 120/68. Abdomen—

slightly rigid and tender on palpation. Central nervous system—negative. Laboratory examination on admission—Haemoglobin 14.8 gms., R.B.C. 5,020,000, W.B.C. 17,200. Urinalysis—negative. Sugar—negative. Albumin —negative. Microscopic examination revealed about 30 red blood cells per H.P.F.

Progress Notes—At the time of his admission he was retching continuously bringing up bright and altered blood in small amounts. The patient was very uncooperative and restless. Repeated attempts to pass a stomach tube were unsuccessful. Immediate treatment on admission consisted of saturated solution of magnesium sulfate given orally. Egg white and milk were given in copious amounts. Intravenous fluid therapy consisted of 1000 cc.'s of 5% glucose with normal saline, followed by 1000 cc.'s of 5% glucose in water. Calcium gluconate was given in 10 cc. doses intravenously every four hours.

B.A.L. therapy was begun within two hours of patient's admission to hospital and approximately six hours after the drug was taken. The dosage schedule for the B.A.L. was 2 cc.'s of a 10% solution of B.A.L. in peanut oil given intramuscularly every four hours for two days then 2 cc.'s every six hours for two days. Dose then reduced to 2 cc.'s of B.A.L. intramuscularly given daily for six more days. A total of 52 cc.'s of 10% solution of B.A.L. being given over a ten day period.

August 5, 1947—Continued to vomit small amounts of dark coloured fluid and some bright blood. Still uncooperative, heavy sedation being needed to keep him quiet. Sed. Rate 3 mm. fall in hour (normal 0-15).

Kahn test—negative. Blood sugar level was 104 mgms. per 100 cc., while the total N.P.N. was 49 mgms.%. The laboratory report on the peripheral blood showed the red blood cells to be of normal size and shape. No polychromasia or punctate basophilia noted at this time, twenty-four hours after ingestion of the lead. The white cell differential Schilling Count showed Juvenile 6.0%, Band Forms 17.0%, Segmented Polys 68.0%, Lymphocytes 7.0%, large monoculears 6.0%, Eosinophiles 0.0%, Basophiles 0.0%.

On August 6th, although the patient still complained of sore throat and vomited occasionally, he began to take fluids by mouth. The injections of B.A.L. seemed to cause him a great deal of pain. The blood sugar level was repeated and found to be 106 mgms. per 100 cc., while the N.P.N. was 40 mgms.%.

TABLE I

Lead Values in Blood, Urine and C.S.F.

1947	Urine per litre	Blood per 100 gms.	C.S.F. per 100 cc.
August 5- 6	2.3 mg.	0.152 mg.	.....
August 12-13	0.44 mg.	.....	.....
August 19	.....	.....	0.10 mg.
August 21	.....	1.114 mg.	.....
September 6	0.14 mg.	0.18 mg.	.....
April 9, 1948	.08 mg.	.05 mg.	.....

Table I illustrates the levels for lead content in the blood, urine and C.S.F. at various times during the course of the illness. A twenty-four hour specimen of urine for lead content gave a value of 2.3 mgms. per litre (high normal being 0.08 mgms. per litre). On August 12th, this level had fallen to 0.44 mgms. per litre and by September 6th the level in the urine was 0.14 mgms. per litre. By April 9, 1948, the urine lead was within normal limits.

In the blood stream on August 6th the level for lead was 0.152 mgms. per 100 grams of blood (normal being 0.08 gms. per 100 grams). While on August 21st, the level was 1.114 mgms. per 100 gms. of blood. On Sept. 6th, the lead level was done on whole blood giving a value of .18 mgms. per 100 cc. of whole blood while the plasma of this same specimen had a level of 0.10 mgs. per 100 cc., so the red blood cells contained 0.08 mgs. per 100 cc. of blood. On April 9, 1948, the blood lead was within normal.

On August 19th, the level of the lead in the C.S.F. was found to be 0.10 mgs. per 100 cc. of cerebrospinal fluid (the normal range being 0.015-0.038 mgs. per 100 cc.). Cantatrow and Trumper[1] state that the level of the lead in the cerebrospinal fluid in Plumbism bears no consistent relationship to the clinical picture nor to the concentration of lead in the blood.

During the first few days of the illness, the course was febrile, the temperature rising at times as high as 102° F., probably due to the associated gastroenteritis, but after the 6th day the temperature was normal.

A bromosulphthalein dye test for liver function done on August 12th showed 45.5% retention in 15 mins. with 31.5% retention in 30 minutes. But by August 27th, the B.S.P. test had reverted to normal, retention being 12% in 15 mins. and 4.5% in 30 mins. A lumbar puncture was done, the initial pressure being 120 mm. of water. The C.S.F. chlorides were 680 mgs. per 100 ml., otherwise, the fluid was normal. A sternal marrow puncture at this time revealed marked hyperplasia of the marrow involving both the myeloid and erythroid elements. Normal maturation noted. Many punctate basophils present. The appearances were those of a normoblastic and myeloid hyperplasia. The peripheral blood revealed a marked punctate basophilia with a polymorphonuclear leucocytosis.

On August 20th, the icterus index was 6 units. Fouchet's test was negative, as was also the van den Bergh reaction both direct and indirect. The blood picture on August 25th showed Hemoglobin 11.6 gms. R.B.C. 4,870,000. W.B.C. 12,500. Sed. Rate 30 mm.

The Mosenthal test showed a specific gravity relatively fixed at a low level, the range being 1,012-1,015 while the night urine totalled 1,080 cc., the day urine 870 cc. The phenolsulphonphthalein test showed 35% recovery in first hour and a total of 35% in two hours. A blood calcium was done to see if the lead had disturbed the Ca. level, but the value was normal, 10.0% mgs.

The total protein was 6.8 gms. per 100 cc., albumen 4.4 % gms., globulin 2.4%. The patient after the first week was co-operative and had few complaints; these being sleeplessness and the subjective feeling of marked weakness of his legs; this was not borne out on objective examination. No weakness of the wrist or hands was found. Colic was not noted nor was headache. A psychiatric examination was made. The consultants opinion being: "This man evidently passed through a neurotic or mildly psychotic episode but this

seems to have passed off now. He is mildly mentally retarded and possibly unstable. I would recommend his discharge to return home." Patient discharged on Sept. 8, 1948.

An eight month follow-up revealed normal values for kidney and liver function, blood picture was within normal limits, no basophilic stippling of red cells was seen. The amount of lead in the urine was 0.08 mgms. per litre. The level in the blood was 0.05 mgms. of lead per 100 gms. of blood.

Except for mild neurotic symptoms as noted in the history and which have apparently persisted, the patient is well.

Discussion

Cantatrow and Trumper[1] regard the upper limit of normal of the blood lead level as .080 mg. per 100 cc. while in the case presented the blood level reached 1.114 mgs. per 100 gms. of blood.

One estimation of the amount of lead present in plasma was done and as noted in the case history was .10 mgs. per 100 cc., while the total amount present in the whole blood was .18% mgs., so that 55% of the circulating lead was contained in the plasma and 45% was present in the red blood cells. The percentage present in the plasma was higher in our patient than the percentage found in normal persons but it is in agreement with the theory that as the amount of lead increased in the blood the precentage of it present in the plasma also increases.

In this case, the route of absorption of the lead was from the gastro-intestinal tract. Little or no absorption is said to take place from the stomach, its main function here is to aid in solution of the lead compounds. Goodman and Gilman[6] state that after the oral ingestion of lead compounds most of the absorption takes place in the upper duodenum.

From the intestine, the absorbed lead goes to the liver by way of the portal circulation. The rate of absorption is slow with a maximum being reached in 10-20 hours. The amount absorbed in experiments with mice ranged between 15-20% the proportion diminishing as the dose was increased.[7,8] Absorption ishind ered by administration of food, particularly milk, and by magnesium sulfate. The liver removes the lead from the portal circulation and excretes it in the bile from which it may be reabsorbed by the intestines, and in acute cases the amount of lead found in the liver is said to be large. Some of the lead is absorbed into the systemic circulation from whence it is partly excreted in the urine, so the lead in the body is excreted by way of the feces and urine. In cases of gastro-intestinal absorption the greater amount is excreted by the feces as it undoubtedly was in this case although the lead content of the feces was not estimated. Lead excretion in the urine was marked and the amount present in the urine did not seem to be correlated with the level of lead in the blood. This finding is in accordance with the Tompsetl and Anderson[9] and others quoted by Cantatrow and Trumper.[1]

The results of the bromosulphthalein liver function test in this case indicated hepatocellular damage which seemed to improve after three weeks. The patient's given reason for confusing the Goulards Extract for Castor Oil was that he was under the influence of alcohol. The simultaneous exposure to lead and alcohol may have accentuated any hepatocellular damage.

The effect of the lead on the kidneys in this case was seen by the appearance of numerous red blood cells on microscopic examination, but within a few days these R.B.C. had disappeared. Although the Mosenthal test later showed impairment in concentrating power of the urine as well as an increase in the amount of night urine, the P.S.P. also showed some impairment of elimination of the dye, so that there was evidently renal damage probably toxic nephrosis due to the heavy metal poisoning, although the presence of antecedent kidney damage cannot be ruled out.

The effect on the haematopoietic system was quite marked. The bone marrow showed a marked hyperplasia of both erythroid and myeloid elements with normal maturation. So there was no depressing effect on the bone marrow by the lead, rather a stimulation, perhaps secondary to the hemalytic effect of the lead on the red blood cells in the peripheral blood. The anemia present in this case was never severe so that the stimulation of the bone marrow may have been primary resulting from the large amount of lead present, rather than a secondary stimulation from anemia.

Peripheral blood smears within the twenty-four hours revealed no basophile stippling although the white blood series showed a marked shift to the left of the schilling count. The stippling showed up on later films both in the peripheral blood and the bone marrow. The cause of basophile stippling as put forth by Kay quoted by Cantatrow and Trumper[1] states that: "stippled cells are apparently young red blood cells that have been exposed to lead and the granules are probably aggregations of the basophilic substance into discreet masses."

At no time were nucleated red blood cells seen in the peripheral blood.

Summary

1. A case of acute lead poisoning due to ingestion of 4 ounces of Goulard's Extract containing approximately 27 grams of lead is presented which was treated successfully with B.A L.

2. There was evidence first of an acute gastro-enteritis which rapidly subsided. Hepato-cellular as well as renal damage was shown to be present. The liver damage showed functional improvement while the kidneys showed residual damage.

3. An eight month's follow-up revealed that the patient is carrying on a normal life with normal functioning liver and kidneys, blood picture within normal.

4. While the results reported here may have been gained without the use of B.A.L., the patient improved remarkably with this therapy and showed no harmful effects.

References

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3. Salzberger, Marion B. and Baer, Rudolph L. Development and Use of BAL, J.A.M.A., 133: 293-296 (Feb. 1), 1947.

4. Telfer, James G. Use of BAL in Lead Poisoning, J.A.M.A., 135: 835-837, Nov. 29, 1947.

5. Tye, Mavroy and Siegel, John M. Prevention of Reaction to BAL, J.A.M.A., 134: 1477 (Aug. 23), 1947.

6. Goodman. L. and Gilman, A. The Pharmacological Basis of Therapeutics, 1941, The MacMillan Co., New York.

7. Behrens, B. Arch F. exper. Path., 109: 332, 345, 353, 1925.

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9. Tompsetl, S. L. and Anderson, A. B. Biochem. J., 1851, 1935.

Sunlight for Sight

In dim light vision is greatly restricted and color are distinguished poorly, if at all. For perceiving details and distinguishing colors, a relatively bright light is needed.

If glare, either direct or reflected, is present it may cause discomfort and interfere with visual efficiency. For example, specialists say, it is undesirable to read in the sunlight even if the reading material itself is shaded. The eyes function best when there are not too great differences between the brightness of the working surface and the surrounding area.

The thirty-fourth annual meeting of the Medical Health Officers' Association, of Nova Scotia, will be held at the Keltic Lodge, Ingonish, Cape Breton, on Monday, September 13, 1948, commencing at 10 a.m. (Daylight Saving Time).

An interesting program has been arranged. Attention is drawn to the suggestion of the formation of a Nova Scotia Division of the Canadian Public Health Association. This matter will be up for discussion.

The Passing of The Chemist

Fifty years ago "The Chemist" was quite common in this province of ours. He was easy to identify having certain well marked features. As a rule he was quiet, gentlemanly, well mannered, and thoroughly trained in the art of compounding medicines—in fact he was a most useful member of society. True he was a bit of a "fakir" with his array of coloured bottles and the air of mystery and wisdom with which he personally handed you the bottle of medicine. He prescribed too on his own, but after all there was not much harm in that for it was usually the coughs and colds he catered to and the prescriptions were those he copied from the successful doctors in his community. In all, he was a respected member of the community, his chief job to compound and dispense at the request of the doctor.

Where is the chemist to-day? He is not extinct like the "Dodo" or the carrier pidgeon, but with the family doctor and his familar horse and buggy he has now passed into history. The pharmacist has taken his place and yet the pharmacist with his modern drug store looks no more like the chemist and his quaint shop than a modern up to date American hotel resembles an old English inn. The pharmacist is a business man and sells everything from contraceptives to beefsteak, (one pharmacist in Texas operates a butcher shop in connection with his pharmacy), prescriptions constituting a small part of his business probably not more than five per cent. He makes his living selling snacks and light meals, patent medicines, perfumes, soaps and heavens only know know what. In fact, it would be easier to list the articles the pharmacist does not sell than the ones he does. He spends little time in compounding medicines as the modern physician rarely orders a mixture of his own. The prescriptions of to-day usually read: Smih Jones & Co. Pill No. 222; Humbug & Co's. Misture Bronchitis, Tiddlebury & Son Anti-rheumatic Liniment, and so on. And so the compounding consists in pouring a few ounces of a mixture made in Montreal or Toronto or occasionally New York or London into a bottle, sticking the label on and taking every care to see that the cork is tight

How did this metamorphosis come about? It is a long story to tire our already weary doctors with.

The present status of the pharmacist is this. He is the agent of the manufacturers of pharmaceutical and biological preparations, and a friend of the doctors, although his friendly relationship, however, could hardly be likened to that of the old fashioned chemist and the family physician.

There is no moral to this story, perhaps it is better so. The facts are that the pharmacist and the doctors have one thing in common. They are both agents of the manufacturers. The only difference being the pharmacist gets his commission. The situation is a gloomy one and as yet there is no light on the Canadian horizon.

In the great country to the south of us there is a much closer friendship between the National Pharmaceutical Association and the Medical Profession Perhaps we in Canada will follow suit. We usually do.

DEFENCE MEDICAL ASSOCIATION OF CANADA NOVA SCOTIA DISTRICT

The Annual Meeting of the Defence Medical Association for the Nova Scotia District was held in the Garrison Barracks on June 11th with the President, Dr. E. F. Ross in the chair.

The slate of officers elected for 1948-1949 were:

President ..... Dr. J. A. Noble.

Vice-President. . . . . Dr. D. M. Grant.

Secretary-Treasurer . . .. Dr. C. M. Harlow

Asst. Sec'y-Treasurer . ..... Dr. Jack Charman

Executive: Dr. Angus Black; Dr. Robert MacDonald and Dr. Charles Elliot.

The object of this Association is to develop the efficiency of the Canadian Defence Medical Services by the dissemination of knowledge throughout the Dominion on Defence Medical affairs, thus creating a greater interest among a larger number of medical officers and civilian practitioners.

All doctors who have been connected with Reserve or Active Services are invited to become members. To do so, send one dollar ($1.00) to Dr. C. M. Harlow, Camp Hill Hospital, Halifax, N. S.

WANTED

Applications from graduates in medicine, either men or women, interested in employment in a public health programme in the southern part of the United States. Twelve new department buildings under construction. Moderate temperature. Little snow. Medical Licensure Bureau open to Canadian physicians. Apply to Doctor Felix J. Underwood, Executive Officer, Mississippi State Board of Health, Jackson, Mississippi, U. S. A.

Minutes of a Special Meeting of the Executive of the Medical Society of Nova Scotia

A special meeting of the Executive of The Medical Society of Nova Scotia was held at the Dalhousie Public Health Clinic, Halifax, N. S., on Monday, August 16th, 1948, at 2.30 p.m.

Doctor Eric W. Macdonald of Reserve presided. The following were present: Doctors H. G. Grant, D. M. MacRae, J. J. Carroll, R. M. Zwicker, D. J. Mackenzie, W. A. Hewat, C. L. Gosse, H. A. Fraser, J. F. L. Woodbury, A. E. Blackett, N. H. Gosse, D. K. Murray, G. R. Forbes, H. D. O'Brien, H. C. S. Elliot, P. E. Belliveau and J. R. Ryan.

Doctor Eric Macdonald opened the meeting by stating that the only thing to come up for consideration was the report of the Committee on Economics.

Doctor N. H. Gosse presumed that every member of the committee had received a copy of the report and moved that the report be received, which was seconded by Doctor D. J. MacKenzie and carried.

The report was then reviewed section by section, and after a long discussion on the various items Dr. N. H. Gosse moved—

Whereas, The principle of Health Insurance has been accepted by organized medicine in Canada, and

Whereas, Medically Sponsored Prepaid Medical Plans offer a means by which that principle may be applied and is being applied in most of the other provinces of Canada, and

Whereas, Such plans may properly be expected to develop so as to include different groups and strata of society that now require a high type of medical service without the fear of prohibitive or crippling cost, and

Whereas, It is widely held that medically directed plans are best calculated to effect this result while preserving the highest standards of Medicine and the present desirable doctor-patient relationship, and

Whereas, Under instructions from our Medical Society of Nova Scotia our Committee on Economics has produced a plan of Voluntary Non-profit Prepaid Medical Care which, in their judgment and in the judgment of this Society, offers reasonable hope of the fulfilling of these requirements and the realizing of these ideals,

Now be it *Resolved*, That the actions of the Committee on Economics be confirmed, that the plan prepared and submitted by the Committee be adopted, and that necessary steps be taken forthwith for its implementation.

It was seconded by Doctor D. K. Murray that this resolution be adopted.

Doctor N. H. Gosse thought that every medical man in the province province should have a chance to say something about the resolution, that a copy of the report of the Committee on Economics, a copy of the resolution, a ballot form and a return addressed envelope be sent to every doctor in the province.

Doctor N. H. Gosse moved that the secretary be instructed to send a copy of this report to every practitioner of medicine in this province, excepting those to whom the report has already been sent, together with a copy of the resolution, adopted by the executive, and a form of ballot which they will be asked to execute for or against the adoption of the resolution, and a return address-

ed envelope which may be returned to the secretary, and that the secretary be further instructed to prepare a report on the result of such plebiscite for pesentation to the executive at the annual meeting in Ingonish and further that voting on this project at the time of the annual meeting be held which will also be done by ballot of similar kind as that sent out to the province. This was seconded by Doctor W. A. Hewat and Carried.

It was moved by Doctor N. H. Gosse and seconded by by Doctor H.C.S. Elliot that the members of the executive from out of town who attended the meeting be paid ten cents a mile one way plus $10.00 for any who had to stay over night. Carried.

It was moved by Doctor P. E. Belliveau and seconded by Doctor R. H. Fraser that a vote of thanks be extended to Doctor N. H. Gosse and his committee for the very excellent, comprehensive and far reaching report they had brought in.

Meeting adjourned at 6.15 p.m.

LOCUM TENENS WANTED

Doctor A. A. Macdonald of Neil's Harbour, N. S., wants a doctor to take over his practice for a month, beginning either September 15th or October 1st. The remuneration will be $450.00 a month, plus 7c mileage up to 75 p.c. of the total mileage covered. Anyone interested kindly apply either to the Secretary or directly to Doctor Macdonald.

NOTICE

The ladies attending the convention are advised that as the evenings at Ingonish will be chilly in September, they should come with proper clothing. All members interested in golf should bring their clubs along as there is an excellent golf course in very good shape.

NINETY-FIFTH ANNUAL MEETING
OF THE
MEDICAL SOCIETY OF NOVA SCOTIA
"KELTIC LODGE", INGONISH, CAPE BRETON
SEPTEMBER 13th, 14th, 15th, and 16th, 1948

PROGRAMME

Monday, September 13th.

2.30 p.m. Executive Meeting.

Tuesday, September 14th

9.00 a.m. Registration.

9.30 a.m. First Business Session.

12.30 p.m. Adjournment.

2.30 p.m. Dr. Adrian Anglin , Junior Demonstrator in Medicine, University of Toronto, "The Management of Bronchial Asthma."
Discussion to be opened by Dr. T. M. Sieniewicz, Halifax, N. S.

3.30 p.m. Dr. C. W. Holland, Professor of Medicine, Dalhousie University, "The Importance of the Psychosomatic Approach in General Practice."
Discussion to be opened by Dr. A. E. Blackett, New Glasgow, N. S.

4.30 p.m. Dr. W. J. McNally, Lecturer in Otolaryngology, McGill University, "Some Remarks about Dizziness."
Discussion to be opened by Dr. W. MacIsaac, Sydney, N. S.

9.00 p.m. Informal Dance.

Wednesday, September 15th

9.30 a.m. Dr. Adrian Anglin, Junior Demonstrator in Medicine, University of Toronto, "The Management of Rheumatic Heart Disease."
Discussion to be opened by Dr. J .A. McDonald, Glace Bay, N. S.

10.30 a.m. Second Business Meeting.

1.00 p.m. Adjournment.

2.30 p.m. Dr. A. R. Morton, Commissioner of Health, Halifax, N. S., "Suggestions for the General Practitioner in Public Health."
Discussion to be opened by Dr. M. R. Macdonald, Sydney, N. S.

3.30 p.m. Dr. C. E. Kinley, Asscciate Professor of Surgery, Dalhousie University, "Cancer of the Colon."
Discussion to be opened by Dr. L. M. Morton, Yarmouth, N. S.

4.30 p.m. Dr. Daniel Blain, Director, American Psychiatric Association, Washington, Title to be announced.
Discussion to be opened by Dr. R. O. Jones, Halifax, N. S.

5.30 p.m. Adjournment.

6.30 p.m. The Medical Society of Nova Scotia Reception.

7.30 p.m. Annual Dinner.
Presidential Address.
Address by Hon. A. L. Macdonald, Premier of Nova Scotia.

Thursday, September 16th.

9.30 a.m. Dr. W. J. McNally, Lecturer in Otolaryngology, McGill University, "The Significance of Persistent Hoarseness."
Discussion to be opened by Dr. D. M. MacRae, Halifax, N. S.

10.30 a.m. Dr. Wm. Magner, President, Canadian Medical Association, "Jaundice."
Discussion to be opened by Dr. J. W. Reid, Halifax, N. S.

11.30 a.m. Dr. J. C. Wickwire, Liverpool, N. S. "Treatment of Congestive Heart Failure."
Discussion to be opened by Dr. G. W. Sodero, N. S.

12.30 p.m. Adjournment.

Water at Work

It was formerly thought that water taken at meals hindered digestion and that it was therefore a mistake to drink water at mealtime. It is now known that, although water dilutes digestive juices, these fluids operate more efficiently when diluted.

Water taken at mealtime is not harmful unless it is used merely to swill down unchewed food. Experts warn, however, that when the stomach is suddenly cooled, digestion is interrupted. So water with meals should be cool enough to make it palatable.

Variety in Vitamins

Variety in the lunch box often means the difference between an attractive meal and an indifferent snack. In making sandwiches, nutritionists say, it is best to use fresh bread of different kinds such as Canada Approved Vitamin B, in whole wheat, brown or white varieties, or rye, fruit or steamed brown bread.

In making sandwiches it is best to use soft butter—it spreads easily. One-half cup of milk may be beaten into one cup of soft butter to make it go further.

Personal Interest Notes

DOCTOR H. K. MacDonald of Halifax was presented with a formal expression of thanks of the Priory of the Venerable Order of St. John of Jerusalem in Canada in the presence of a group of railway officers and those interested in First Aid work at the Nova Scotian Hotel on July 21st. The presentation was made by Mr. W. E. Robinson, Vice-President and Gerald Manager, Atlantic Region, Canadian National Railways. Doctor MacDonald has been Medical Officer for the Canadian National Railways in Halifax since 1934.

Doctor Arthur H. Sangster, Dal. 1930, surgeon-in-charge of a number of hospitals in northern Scotland, visited his parents, Judge and Mrs. Sangster of Windsor, the early part of July.

Doctor and Mrs. L. B. W. Braine of Annapolis Royal spent a two weeks' vacation in Hartford, Connecticut, early in August.

Doctor and Mrs. J. F. K. Woodbury of Halifax and small daughter, Susan, enjoyed a two week's motor trip in Nova Scotia last month.

Doctor and Mrs. S. D. Dunn of Pictou left early in July on a vacation trip to Regina.

Doctor H. D. Lavers of Pictou left for Yarmouth early in July to relieve Doctor E. L. Eagles of the Department of Public Health at Yarmouth, who is at present on sick leave.

The BULLETIN extends congratulations to Doctor and Mrs. A. M. Wilson of Barrington on the birth of a son on July 12th, and to Doctor and Mrs. D. McD. Archibald of Bear River on the birth of a son, David MacDonald, on July 16th.

The marriage took place at Halifax on July 27th of Miss Edith Pauline Frances Shaw, R. N., daughter of Mr. and Mrs. G. T. Shaw of Bridgewater, and Doctor Arthur Kevin Carton, son of Mr. and Mrs. A. W. Carton of Fairville, N. B. Doctor Carton graduated from Dalhousie Medical School in May of this year.

Doctor Eric J. Cleveland, Dal. 1948, has been appointed to the medical staff of the Nova Scotia Hospital at Dartmouth.

Doctor and Mrs. K. A. MacKenzie of Halifax enjoyed a two weeks' trip to Toronto and Montreal the latter part of June.

NOTICE REGARDING THE CONDITION OF THE ROADS IN CAPE BRETON

As there is a certain amount of construction being done on the roads in Cape Breton, all members going to the annual meeting are advised to call at the office of the Department of Highways at Port Hawkesbury to receive instructions as to the best way to proceed from there to Ingonish.

Obituary

DOCTOR James Archibald McLellan, retired medical specialist, died at his home in Sydney, on July 29th, following an illness of many months. Doctor MacLellan was born at Economy eighty-one years ago, and graduated from Queen's Unniversity in 1891. He practised at Great Village and Oxford for ten years and proceeded to the New York Infirmary where he took a post-graduate course specializing in eye, ear, nose and throat. He went to Sydney in 1910 and practised there until 1938 when his son, Doctor J. Russell MacLellan took over the practice. His wife, the former Barbara Smyth of Sydney predeceased him in 1942, and surviving are three sons, Doctor J. Russell, Doctor C. Lorway and Donald, and a daughter, Miss Betty. Two brothers, Howard and Gus MacLellan, reside in Economy. The funeral was held at Sydney on July 30, and burial took place at Economy.

The death occurred at Moncton on July 15th of Doctor Robert Lowrey Murray, a brother of the late Hon. George H. Murray, who was premier of Nova Scotia for twenty-seven years. Doctor Murray was born at the Narrows, Cape Breton, in 1859, and graduated from the New York University in 1891. He practised in Pictou and Springhill, later becoming assistant superintendent of the Nova Scotia Hospital at Dartmouth. He retired in 1927 and lived at the North Sydney family home until three years ago when, in his declining years, he went to live with a daughter in Moncton. He had the genial nature of his illustrious brother and is held in kindly remembrance by members of the profession with whom he was acquainted. In his practice he was a typical old-time family doctor and took a deep interest in his patients. He was deeply interested also in his church and during his residence in Dartmouth was a faithful member of the Church of St. James. He was a sound man professionally and generally well informed, at home in a wide range of subjects, and an omnivorous reader. He is survived by his wife the former Isabel Mumford of Dartmouth, one son Donald, Winchester, England, and two daughters, Jean, Mrs. Kenneth Spencer, Moncton, and Kathleen, Mrs. T. Dolmont of North Sydney, and seven grandchildren. The funeral was held at Springhill on July 17th.

Dr. Matthew George Burris

Dr. Burris died suddenly at his home in Dartmouth on August 18. Until a few days before he had been enjoying his usual health. Then came a sudden cardiac catastrophe. Though extremely ill he appeared, after an interval, to be recovering from its immediate effects; then the end came.

A son of George and Janie Burris, he was born at Upper Musquodoboit on February 28,1887. There he grew up and came to Dalhousie University in 1903. In 1907 he received the degree of Bachelor of Arts, and in 1911 was graduated in Medicine. During these years, besides an excellent scholastic record, he established a reputation as an athlete which is still spoken of with respect and awe wherever Dalhousians of other days assemble. He was

captain of the football team of 1909, one of the greatest teams in Halifax and Dalhousie football history.

Following graduation he went to Kamloops, British Columbia, where at least one physician from the Musquodoboit Valley had preceded him. But he did not remain long. The call of the Atlantic coast was too strong, and, in 1912, he returned to establish himself in practice in Dartmouth. From the very first he was successful. He was skilful, he was kind, but above all he possessed an infinite capacity for taking pains. The simplest matter was treated with searching respect, and no stone left unturned in finding the way to amelioration or cure.

But like so many busy men he found time to do things for the welfare of the community. Following Great War I he was one of those who interested themselves in the foundation of a hospital in Dartmouth, and was a charter member of the Board of Trustees formed to promote the institution. He was for several years visiting physician at the Nova Scotia Hospital, and served for a period as a member of its Commission of Management. Although the undertaking involved considerable hardship and self denial he undertook the work of Assistant Surgeon on the Staff of the Victoria General Hospital where he remained until he felt that younger men of promise were coming forward who deserved the recognition and opportunity and could fill his place. In the performance of his duties at this institution he was at his best. Possessing marked mechanical ability he devised new methods of treating fractures and made many of the splints in his own workshop. Any piece of apparatus was a challenge to him to improve it. Days and nights were spent in the general wards of the Victoria General, only ending when urgent calls took him across the Harbour to his always busy practice. There he was beloved by his patients and respected by every citizen in the town. In civic matters, in all matters, he showed a degree of conservatism until he was sure of his ground. Then he pressed ahead as eagerly as the most enthusiastic.

For many years he was an active member of the Nova Scotia Historical Society. He was keenly interested in the early settlers of the Musquodoboit Valley and spent much profitable effort in searching their genealogies as well as their history and customs. He was at the time of his death a member of the Provincial Medical Board and a member too of The Medical Society of Nova Scotia and the Canadian Medical Association. He was a member and faithful attendant at the meetings of the Halifax Medical Society, where his frequent contributions were a delight to his admiring confreres. Few possessed his wide background of reading, and few could express themselves so well on such a wide range of subjects.

Golf was in later years his chief recreation and he played the game with sincerity and great enjoyment.

In his life there was much to admire and even more to envy. We admired him for his professional ability of a very high order, for his determination to get to the root of every matter, for his Christian sincerity and genuine goodness of heart. We envied his capacity to fully engage in a wide variety of interests, and his genuine pleasure in pursuing them all. Every person with whom he had intimate contact gained from his acquaintance. For man there can be no finer tribute paid.

To his wife, his daughter, Margaret, his brothers and sisters, the Bulletin extends its sincere sympathy.