CONTENTS

Cancer of the Stomach

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CARCINOMA of the stomach comprises one-third of all malignant tumors in males. All statistics indicate that it is much more common in men than women, owing to the frequency of involvement of the breast and uterus in the latter. In the female it comprises about one-fifth of all malignant cases.

An interesting investigation was carried out by Dwyer, Blackford and Turner. They analyzed 3000 consecutive patients with gastro-intestinal complaints. After a thorough investigation they found that only 15% had an organic lesion of the stomach and duodenum, 8% of the group had duodenal ulcer, 1.5% had gastric ulcer, and 4% had gastric carcinoma. Thus one may carry out an exhaustive investigation of gastro-intestinal complaints and find in the end no organic lesion in 85%. Only 4% will suffer from gastric carcinoma, yet if we analyze these figures in another way, we will find that of all those with an organic lesion of the stomach and duodenum, 20% will be caused by cancer. In other words, of patients who present themselves suffering from an organic lesion of the stomach one in five will have cancer.

How important is this disease in the economic life of a country! There are 1200 deaths yearly in Canada from cancer of the stomach. Five per cent of all deaths after the age of forty are due to it. It is estimated that in the U. S. A., 35,000 persons die annually from this dread disease. The apparent increase in the incidence of carcinoma of stomach is generally ascribed to three factors: greater precision in diagnosis, more accurate statistical data on mortality, and the fact that a larger number of people are living beyond the age of forty years.

Etiology—The frequency of relationship of gastric cancer to ulcer has been a much debated point. More than twenty years ago Wilson and MacCarty of the Mayo Clinic and Moynihan in Leeds, held the view that 70 per cent of gastric cancers originated from simple ulcers. The view of distinguished pathologists to-day is strongly against this teaching. Ewing of the Memorial Hospital found that not more than 5 per cent of gastric ulcers showed a malignant change. He explains the infrequency by the different interpretation of the histological picture. To one pathologist the presence of isolated epithelial cells and atypical tubules in the margin of an ulcer, means malignancy; to another pathologist, this microscopic abnormality is explained by the distortion produced by contracting fibrous tissue and partially by a regenerative process. The clinical history and follow up are strongly against the frequency of gastric ulcer becoming malignant. The ulcer cases have as a rule a long history and occur in younger people. The patient with cancer develops symptoms suddenly between the ages of forty and sixty years. As a rule digestion has been perfect in the past. Balfour of the Mayo Clinic investigated over a thousand patients who had a gastro-enterostomy for ulcer. Of these cases less than 5 per cent died from cancer, in spite of the ulcer not having been removed. Of the 5 per cent, probably several were really malignant at the time of operation. This strong clinical and pathological

evidence indicates that not more than 5 per cent of cancers develop from a previous ulcer. It is well known that cancer of the duodenum is so rare, as to be a pathological curiosity.

There are some who hold the view that the polypoid form of gastric carcinoma develops on the basis of chronic gastritis. A study of this subject indicates that chronic gastritis is only exceptionally a forerunner of a malignant lesion. Carcinomatous polyps are very rare in the stomach, in contrast to their frequent association in cancer of the rectum and large intestines. In early cases of carcinoma there is often very little change in the hydrochloric acid content of the stomach. Achlorhydria develops later and is due to a gastritis, which did not precede but is secondary to the cancerous lesion.

Pathology—The great majority—60%—of carcinomas occur in the prepyloric region of the stomach. Lahey has pointed out from his large experience, that all ulcers on the greater curvature are invariably malignant. The remaining sites are the lesser curvature and cardiac end. It used to be held that simple gastric ulcers occurred most frequently on the lesser curvature and hardly ever in the prepyloric region. Recent knowledge has shown that benign ulcers do occur in the prepyloric region. MacCarty, years ago, stated a dictum that holds good to-day, that any ulcer with a crater over 2.5 cm. in diameter is almost certainly malignant. This is an important point on deciding whether to do a resection or not.

There are three main types of carcinoma in the stomach, which may be classified as to their gross appearance. The massive or proliferating form, which projects like a mushroom into the cavity of the stomach, occurs most frequently near the pylorus. The ulcerated form is the more common type. It occurs near the pylorus, lesser and greater curvatures. The edges of the ulcer are raised and indurated. The base is usually of a larger diameter, 2.5 cm. and over, than in the case of a simple peptic ulcer. The third and last type is the infiltrating type, the so-called leather bottle stomach. The stomach is very small and has very much thickened walls. The whole stomach is involved from the cardiac orifice to the pylorus. Microscopically the picture is largely dense fibrous tissue, with a few malignant cells scattered here and there. It resembles the atrophic scirrhus carcinoma occurring in the breast of aged women, except the expectation of life is much shorter.

The lymphatic spread of carcinoma of the stomach is chiefly to the lymph nodes along the lesser curvature and around the head of the pancreas. The next most common spread is to the nodes in the great omentum, about halfway along the greater curvature. It is important to remember that the nodes along the remainder of the greater curvature are seldom involved. In doing a resection of the stomach it is of vital importance to remove the lesser curvature as high as possible, and about half the greater curvature. Metastases are frequently found in the liver and the pelvis. The latter probably occur by malignant cells becoming free in the peritoneal cavity and drop to the pelvis by gravity. In the female these transplants frequently involve the ovaries and form the so-called Krukenberg tumor. Mistakes have been made by removing the ovarian tumors and overlooking the primary focus is the stomach. A rectal or vaginal examination should be invariably made as a routine, in the physical examination of a gastro-intestinal case. Another not uncommon metastasis is to a node above the inner end of the left clavicle. Virchow was first to point out that this metastasis occurred via the thoracic

duct, which empties into the junction of the internal jugular and subclavian veins. Never overlook palpating for enlargement of Virchow's node, as it renders the case inoperable at once. Blood stream spread to the lungs and bones is uncommon compared to malignant lesions occurring in the breast.

Symptoms—If we are to save more lives by the earlier recognition of carcinoma of the stomach, it must be through the general practitioner. He must not wait for the late text book symptoms, before referring his patients to a hospital where a thorough investigation may be carried out. Vomiting, wasting, pallor, palpable mass, are all late signs. It must be generally taught that any person over the age of forty, who first complains of some epigastric distress after food, slight loss of appetite, should be at once considered as possible carcinoma. Precious weeks and months are wasted by prescribing alkaline powders and a non-irritating diet. Remember that most early malignant growths have their symptoms relieved by such a programme. The first step in the investigation is to carry out a gastric analysis, particularly for the presence or absence of free hydrochloric acid. There are three other conditions which commonly cause an achlorhydria besides carcinoma. They are chronic cholecystitis, 5 to 8 per cent of persons in perfect health have no free hydrochloric acid, and pernicious anaemia. The most important step is a barium examination by a competent and experienced Roentgenologist. In a very high percentage of cases he will be able to detect a filling defect of an early carcinoma. The stools should be examined for occult blood. If positive, the patient should be put on a meat free diet for three days and then repeat the tests. A blood picture should be done to determine if secondary anaemia is present and also to rule out pernicious anaemia. Endoscopic examination of the gastric mucosa is coming to the forefront during the last few years. Schindler has devised a flexible gastroscope, which can be passed with a high degree of safety. There are certain blind areas in the stomach, particularly the neighbourhood of the pylorus and posterior wall which cannot be seen. At present this method does not compare with cystoscopy, in the accuracy of the observations made. As further experience is gained, it is bound to be a valuable method in differentiating between a benign and malignant ulcer.

In patients with a long history of epigastric distress after food, relieved by alkalies, we must think of the possibility of malignancy developing in a benign ulcer. X-ray examination will demonstrate the ulcer, most commonly on the lesser curvature. To determine if surgery should be carried out, the patient should be put to bed for three weeks. Prescribe alkalies and a non-irritating diet. At the end of three weeks occult blood should have disappeared from the stools. The symptoms should be relieved. A repeat X-ray examination should show the crater smaller or healed. If these criteria are not fulfilled then radical surgical treatment should not be delayed any longer.

Prognosis—It is universally recognized that the only possibility of cure is by surgery. Radium and X-ray have not any possibility of success in this common and very fatal disease. At the present time fifty per cent of cases are inoperable when referred to the surgeon. Of those cases explored it is only possible to do a resection in twenty-five per cent. A very strong plea for earlier diagnosis is evident by the figures that only one patient in four is operable at the present time, on account of widespread infiltration of the stomach and metastases to the liver, pelvis, Virchow's node, etc. The only

possibility at the present time of improving the appalling death rate, of the most frequent site of cancer in the body, is by an early diagnosis. A large palpable mass does not necessarily render a case inoperable. The polypoid type of carcinoma forms a large mass, but often metastasizes later. Balfour of the Mayo Clinic has published the most favourable statistics; in a thousand resections he states about fifty per cent are alive and well at the end of three years, providing the lymph nodes were not involved. Twenty per cent were alive at the end of three years, if the lymph nodes were involved. Out of all patients who have a resectable carcinoma about twenty per cent survive the five year period. This means out of a hundred patients applying for treatment for carcinoma of the stomach about five have a chance of a five year survival (20 per cent out of the 25 per cent resectable cases). The mortality of the operation varies from 20 to 30 per cent, in the hands of skilled surgeons with a large experience. It is very much higher than in the case of resections for simple duodenal and gastric ulcers. The latter cases are usually younger and their general condition is much better than malignant cases.

Treatment—Radical surgery offers the only chance of cure in this very fatal disease. A large mass if not fixed, does not necessarily render the case inoperable. The benefit of an exploratory operation should be given unless distant metastases are palpable. The commonest sites for these are the liver, pelvis and Virchow's node above the inner end of the left clavicle.

The patient should be prepared for operation by washing out the stomach and if dehydrated by giving intravenous fluids with five per cent glucose. They should be invariably matched for a blood transfusion. The anaesthetic of choice is spinal anaesthesia. Pontocaine is suitable for an operation lasting one and a half hours. Nupercaine will produce an anaesthesia lasting three to four hours.

On opening the abdomen it is essential to palpate the growth very carefully to determine the amount of spread along the lesser curvature. It has been necessary to do a total gastrectomy, because of lack of enough uninvolved lesser curvature to make an anastomosis. The gastro-colic omentum should be opened and the ulcer carefully palpated for infiltration of the pancreas. The lymph nodes are palpated along the lesser and greater curvatures. Enlargement of nodes does not necessarily render the case hopeless, as in some cases the enlargement is due to an inflammatory change. The liver should be palpated for metastases and the pelvis examined for transplants.

If there appears to be a reasonable chance of cure, a partial gastrectomy should be proceeded with. We are in the habit of doing a Polya anastomosis of the jejunum to the open end of the stomach. We select a loop of jejunum about twelve inches from the duodeno-jejunal flexure. Finsterer advises closing a portion of the stomach and doing the anastomosis to a much smaller opening. This is said to prevent too rapid emptying of the stomach. We have tried the DePetz clamp for introducing two rows of fine clips. There are difficulties in its use. We have returned to an anastomosis, without using clamps. It is safer to tie off the bleeding vessels in the mucosa. A blood transfusion is given as a routine.

Following the operation a Levine nasal tube is introduced into the stomach and continuous suction is made by the Wagensteen bottle. Intravenous saline and 5% glucose are given continuously by the drip method, into the long saphenous vein. No fluids are given by mouth before three or four days. At that time one ounce of water is given every hour and gradually increased.

Total gastrectomy has been performed several times by Lahey and others. The indication is chiefly for the leather bottle type of carcinoma. The mortality is about fifty per cent. The prospect of cure is slight, but life is prolonged and made much more comfortable.

Gastro-enterostomy is seldom performed to-day as a palliative operation, because it scarcely prolongs life and the opening is apt to become blocked by spread of the growth. A partial gastrectomy, even in the presence of metastases in the liver, gives a great deal of comfort and prolongs the life of the patient. He dies a much less painless death than if the ulcerating carcinoma is left in the stomach, to grow unimpeded.

*Sulphanilamide and Sulphapyridine:

A brief survey of their uses, concentration in the blood and cerebro-spinal fluid and toxic effects.

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SULPHAPYRIDINE (M and B 693 or dagenan) is active against all types of pneumococci, but sulphanilamide only against Type III (streptococcus pneumoniae). It acts better, too, in staphylococcal septicaemia and in gonorrhoea. Briefly it is effective where sulphanilamide is effective, and in addition where the latter fails, acting also well in broncho-pneumonia due to mixed infection (Gaisford). Banks claims that sulphapyridine is equally effective in meningococcal meningitis, his statistics showing a considerably higher mortality in cases where antitoxic serum, alone or with sulphanilamide, was given against no mortality in 28 and 34 cases treated by sulphanilamide and sulphapyridine respectively. The spinal fluid concentration should be 5 mgm. per 100 c.c.s for 3 days and a lesser concentration for 5 or 6 days. This is obtained by a dose of 3 gms. (45 grains) daily to infants and 9 gms. (135 grains) to adults. The sulphapyridine may be given intramuscularly, intravenously or per rectum every 4 to 6 hours when oral administration is impossible owing to vomiting. For rectal use it can be suspended in a small bulk of alkalinized saline; intramuscularly diluted to 5 per cent and 1.5 per cent for intravenous use. However, such measures are only necessary for initial treatment. As mentioned subsequently sulphapyridine is absorbed and excreted more slowly than sulphanilamide and reaches the cerebro-spinal fluid more slowly. Hence in severe meningitis cases it is advisable to give an initial dose of sulphanilamide and then carry on with sulphapyridine. Sulphapyridine is probably the drug of choice for any case of severe pyrexia, where bacteriological diagnosis is doubtful (Whitby).

Both drugs do not act well when there is considerable tissue breakdown due to suppuration as in gonorrhoeal and streptococcal cases with abscess formation or peritonitis. This may be due to inaccessibility of the organisms, (supported in cases of empyema by injecting the drug into the pleural cavity —Meakins), but it is probably also due to the breakdown products of the tissues stimulating bacterial growth and making the organisms less susceptible to the drugs. Hence the necessity of surgical measures in conjunction and the use of local antiseptics, such as acriflavine which Browning has found more effective.

Some prefer the use of red prontosil to sulphanilamide (colorless) in puerperal fever (Kennedy), and in bacillus coli pyelitis of pregnancy. Both of them are valuable in acute widespread cases of tonsillitis but are of no benefit in scarlet fever or malaria. Only a temporary improvement has resulted in subacute bacterial and acute ulcerative endocarditis cases.

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*Paper read at Dalhousie University Refresher Course, September, 1939.

Absorption and Excretion:

Sulphanilamide reaches its maximum concentration in the blood in 3 hours and falls to zero in 24 hours while sulphapyridine reaches its maximum in 4 hours but does not fall to zero for 48 to 72 hours. Both are absorbed from the small intestine and find their way to all secretions. The cerebro-spinal fluid concentration is nearly as great as that of the blood. (Oxalated blood is used for the test).

Sulphapyridine seems to be selectively absorbed into the corpuscles of the blood and 90 per cent is excreted by the urine. Its rate of excretion is controlled by the rate of flow of the urine and not by its concentration in the blood plasma. Buttle claims that, in order to obtain the best therapeutic effect, it is necessary to maintain a constant concentration in the blood and this is got by doses at 4 and 6 hourly intervals. A concentration of 10 mgm. per 100 ccs. of blood are required for severe infections and this is obtained by a dosage of 1 gm. (15 grains) per day to every 20 lbs. of body weight. As noted above sulphapyridine is absorbed and excreted more slowly and reaches the c.s. fluid more slowly. Hence in severe meningitis it is advisable to give an initial dose of sulphanilamide and then continue with the former.

The dosage scale of both are similar. In lobar pneumonia 5 gms (77.5 grains) is given in the first 12 hours, followed by 1 gm. (15 grains) four hourly for a week. This gives a blood concentration of 8 to 10 mgm. per 100 ccs. As there is evidence that pneumococci can become insensitive to the drug after prolonged treatment, it is better to use a high concentration than a low one for long periods, but Durel states that there is no advantage in giving exceptionally high doses since after a time the concentration in the blood ceases to increase in proportion to the dose.

Results of Typing of Pneumococci in Nova Scotia in 1938-39:

Up to August 1939, 73 sputa, 2 cerebro-spinal fluids and 2 pleural fluids were examined for pneumococci and typed where possible, employing the Neufeld Reaction with swelling of the capsules (Quellung phenomenon) by type pneumococcal sera. (32 types in all). Of these, 45 were able to be typed. One sample of sputum gave two separate types (XI and XVI). Twenty-six belonged to Types I, II and III, i.e., 57.8 per cent; 19 belonged to the remaining 29 types i.e., 42.2%.

Analysis of types of pneumococci found

Number	Type	Percentage
3	I	6.7
16	II	35.6
7	III	15.6
4	IV	8.9
1	V	2.2
2	VI	4.4
4	VII	8.9
1	VIII	2.2
1	XI	2.2
2	XVI	4.4
2	XVIII	4.4
1	XX	2 2
1	XXVII	2.2
1	XXIX	2.2

The predominating type proved to be Type II, and such is found in Birmingham, England and in New York, while Type I infection is greatest in Glasgow. Type III infection, here, was next common, and is regarded as the most virulent variety.

Thirty-two specimens failed to give a positive Neufeld typing reaction and the reason for this appears to be that saliva and not true sputum was sent; some were cases of broncho-pneumonia of streptococcal origin; some were from cases of bronchitis, bronchiectasis or even tuberculosis and lastly sulphapyridine had been given before the specimen was taken.

Where difficulty in obtaining a suitable sample of sputum, especially in children, is experienced, it can be obtained by a laryngeal swab or by irritating the throat by a tongue depressor so that the patient coughs onto the swab.

As typing of pneumococci is a tedious time consuming process, especially before one can come to the conclusion that they belong to no type, care should be taken to observe the above points.

Effect of sulphapyridine on pneumococci:

It causes all types to lose their capsules and this they do in much the same time and as far as I can determine there is no variation in resistance of the different varieties. The capsules tend to swell still further and disintegrate and then fail to react with the specific antisera in times varying from 12 hours to 3 days. The first and most noticeable change is a reduction in the actual numbers of pneumococci, but no increased phagocytosis was found in the sputum. Hence, the sputum sample should be sent before commencing treatment. One may ask, why bother to type the pneumococci at all? It is of value for statistical purposes and for Type III cases where sulphanilamide may be tried, should sulphapyridine fail to react, and lastly should anti-pneumococcal serum treatment be desired.

The action of the drugs is widely stated to be one of bacteriostasis. Browning sums the matter up by saying that while it is under the action of the drugs, the body behaves much as the normal body does to those bacteria of non-pathogenic type, which are gradually destroyed. Their chief action would be to alter the reactivity of the host, shown by the rapid reduction of the pyrexia in pneumonia. However, it is impossible to exclude some gradual direct action on the metabolism of the bacteria taking place in the infected subject. It does not cause a universal stimulation of the reticulo-endothelial system.

Toxic Symptoms:

Gaisford, who had a mortality of 5.4% in 637 cases of lobar pneumonia against 20% in the previous year, observed the development of clear serous effusions in some cases but no increased incidence of empyema; to him it seems probable that these effusions corresponded to aborted empyemata. McDermott, on the other hand, claims to have had more operative cases of empyema and considers that sulphapyridine inhibits resolution in pneumonia, possibly due to the leucopenia. Likewise, Beckwith Whitehouse states slow sclerosing phenomena might follow. But, Gaisford observed no toxic effects in 1000 cases to which he has given sulphapyridine and attributes this to the fact that intensive treatment was given early and for short periods, while no ambulant cases were treated.

Cyanosis or blueness of the skin: This is not associated with respiratory distress and is not considered a symptom which should deter the physician from further administration of the drug. It is due to the formation of pigment from the condensation products of the drug itself.

Sulphaemoglobinaemia and methaemoglobinaemia, both of which are intracorpuscular, have not given rise to serious conditions. The former is due to the union of the intestinal hydrogen sulphide with haemoglobin, a reaction which is catalysed and incidentally more readily provoked by sulphanilamide. It can be avoided by with-holding purgatives, except very mild ones such as liquid paraffin, or by giving a low residue diet, excluding eggs.

Methaemoglobinaemia causes no trouble as it is rapidly reconverted into haemoglobin on cessation of treatment. It is more readily induced by sulphapyridine but can readily be cleared up by intravenous administration of methylene blue (Campbell).

Nausea with epigastric pain and occasional vomiting appear during the first day or two but subsequently disappear so that they can be neglected in most cases where there is an indication to continue the drug, or the latter may be given per rectum. These symptoms along with mental depression are perhaps the most troublesome symptoms in the case of sulphapyridine but are no more common than with sulphanilamide.

Drug Fever may occur 7 to 12 days after the onset of taking. A temperature of 102° F. sometimes with a rash on the exposed parts of the body is got but disappears on withdrawal of the drug. It may be easily confused with a recrudescence of the original infection, although usually the drug has been stopped in the latter case. The condition is suggested to be due to liberation of the lysed products of the bacteria.

Rash—A purpuric, scarlatiniform, morbilliform or maculo-papular rash, either general or patchy and occasionally itchy occurs in about 6% of cases, disappearing when the drug is with-held.

Nervous symptoms of mental depression, headache, dizziness occur especially with ambulant cases. Palpitation, tinnitus, and peripheral neuritis (rare with sulphanilamide but more common with uleron), occasionally a transient aspermia in gonorrhoeal cases and a degree of acidosis may result.

Agranulocytosis is by far the most serious condition produced. Slight degrees of lymphocytopenia are relatively common but 15 cases of true agranulocytosis, 6 of which have been with sulphapyridine, with 9 deaths have been recorded. It may well be that it is commoner than is, at present, considered as it is impossible to diagnose unless a blood count is done. Amidopyrine and arsenicals should not be given at the same time as they also tend to produce this condition. Agranulocytosis is particularly common in cases which have not responded well to the drug. The only associated symptoms are intense headache, fever and a deterioration of the general condition. All patients who receive the drugs for more than 10 days should have a blood count every third day and this is especially important in those with continued fever, accompanied with deterioration in their general condition.

The treatment of agranulocytosis is pentnucleotide injections and repeated blood transfusions with heparinized and not citrated blood (citrate damages the leucocytes). The donor may be given an intramuscular injection of nuclein 4 or 5 hours before the blood is taken to produce a leucocytosis.

Haemolytic Anaemia on rare occasions may be found in the first few days of treatment. It may be accompanied by jaundice and haematuria. There have been no fatal cases and the condition probably depends on the original infection. Concretions in the renal tract have also been recorded.

References:

1. Discussion at the B. M. A. Meeting, Aberdeen B. M. J. July, 1939, (Banks, Gaisford, Kennedy, Anderson, Whitehouse, McDermott and Campbell).
2. Browning: B. M. J. July, 1939.
3. Buttle: ibid.
4. Durel Halpern, Dubost and Allinne: Presse Médicale, 1939, 47; p. 920.

A Case of Lymphosarcoma in a Child

Presenting an Interesting Problem in Diagnosis

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History:

A MALE white child, aged 5 years, was admitted to Dr. Weatherbe's service in the Children's Hospital, Halifax, in June 1939, with a firm hard mass about the size and shape of a half orange, situated to the left of the median line on the vertex of the scalp. It was about 2″ in diameter, freely movable and not attached to periosteum nor involving the cranial bones, nor was there any intracranial communication. It had been steadily growing to its present size for the past three months but apparently gave no pain or caused any special discomfort. The skin over its centre was reddened and excoriated. Several small discrete glands of the upper anterior cervical chain on the left side were palpable, moderately enlarged and firm, but not definitely hard. A biopsy of one of the latter showed some necrosis and granulation tissue formation with a diffuse round cell infiltration, obscuring the normal structure of the lymph node. The latter appearance indicated a malignant sarcomatous transformation of small round cell type but the chronic inflammatory change complicated the picture and presented a difficult problem in diagnosis. A small portion of the central area of the mass in the scalp was, then, excised 6 days later. The gross appearances revealed a whitish rather firm thickening of the scalp tissue with a degree of superficial ulceration. Histological examination showed a diffuse infiltration of the subcutaneous and deeper tissue by small round cells of lymphocyte type with practically no stroma, which had the characters of a small round cell sarcoma.

In the interval between the biopsies mercury was administered by mouth on the possible assumption that the condition might be luetic, but the latter was not borne out by histological examination.

Shortly after the biopsy the new growth on the scalp disappeared entirely but the glands in the neck and the general condition of the patient remained the same. Physical examination, otherwise, proved negative. The blood picture showed: Haemoglobin 54%; Red cell count 3,750,000 per cu. mm; white cell count 2,000 per cu. mm; Differential Count 70% lymphocytes but no shift to the left of the Schilling Count; except for a moderate degree of hypochromic microcytic anaemia no other special feature was noted, there being no evidence of pernicious anaemia or leukaemia.

About a month subsequent to admission the tonsils which were apparently enlarged and infected were removed and during convalescence the patient developed scarlet fever, being removed to the Infectious Disease Hospital for the usual quarantine. While there all evidence of glandular enlargement disappeared except for a few small pea-sized nodes on both sides of the neck, and the child now seemed apparently well. This rather contra-indicated the pathological diagnosis, but shortly after his return to the Children's Hospital about 6 weeks later the mass on the scalp recurred and a second smaller one of similar type just in front of the original one also developed, as well as a

definite generalised glandular enlargement throughout the body, (confirmed by X-ray of the mediastinum). The liver, now, was palpable, extending about an inch below the right costal margin, and the spleen was enlarged to twice its normal size. A firm nodule, too, had recurred in the right tonsillar fossa. Although still alive approximately 6 months after his first admission to hospital the end is apparently near, about 9 months after the lump on the scalp was first noticed.

Differential Diagnosis:

The question arises whether the mass in the scalp is the primary or whether the lymph nodes are originally involved. If one views the case from the latter angle the problem becomes somewhat clarified. In the differential diagnosis the following should be considered:—

1. *A simple chronic lymphadenitis*:

This is excluded by the subsequent course of the case and the absence of histological evidence.

2. *An Infective Granuloma*:

A negative Kahn test of both mother and child, the absence of any other clinical signs and the histological appearance of the growths are all against syphilis.

As regards tuberculosis one immediately excludes the miliary and caseous types, as there is no evidence in favour of them either locally or generally and this is similarly true of the hyperplastic type, no focal arrangement of large cells being found.

3. *A Blood Dyscrasia*:

Leukaemia is ruled out particularly by the initial blood picture and two others made after returning from the Infectious Disease Hospital. It is worthy of note that a relative lymphocytosis of 70 per cent is not an excessive elevation for a child of this age. Of course, an aleukaemic phase must be considered but here the subsequent blood pictures failed to reveal any change in the total count and the histological examination of the lymph nodes did not reveal any undue packing of the sinuses or blood vessels with lymphocytes.

Von Jaksch's Anaemia pseudo-leukaemia infantum invariably shows some leucocytosis and a more marked anaemia and general debility of the patient than were present in this case.

4. *Lymphadenoma (Hodgkin's Disease)*:

Although the clinical picture rather closely simulated this condition as there was some associated pyrexia of Pel-Ebstein type, the biopsy definitely excluded it, there being no local eosinophilia, no Dorothy Reed or lymphadenoma giant cells or diffuse fibrosis found, nor was there the pleomorphism of the cells such as is got in a so-called Hodgkin's Sarcoma. Again, the absence of a polymorphonuclear leucocytosis, marked anaemia and general deterioration of the child's condition all failed to support this diagnosis.

5. *A Neoplasm*:

With the exclusion of the foregoing a diagnosis of a neoplasm alone is left. A benign lymphoma is easily disposed of as such remains localised to one lymph node for a long time and rarely extends to other glands unless a malignant change develops.

Endothelioma of the cervical lymph glands, too, is a possibility, but likewise it remains localized for quite a time and its cells are of the large reticuloendothelial type and not of the small variety such as was present here.

Malignant neoplasms are excluded histologically with the exception of a primary small round-cell sarcoma of the scalp, but this usually shows blood-borne metastases to the lungs and bones. Such were not disclosed on X-ray examination. There was nothing to suggest a malignant melanoma or a secondary carcinoma, even of the transitional-cell or lympho-epithelioma type, which may be found as a small primary growth in the lymphoid tissue of the nasopharynx, and may be overlooked clinically, the first sign being the enlarged cervical glands.

The diagnosis thus rests between a lymphosarcoma and a small round-cell sarcoma, but it is doubtful if true round-cell tumours arise from any other mesoblastic tissues than lymphoid, brain and bone marrow. Ewing[1] states that he has been forced to conclude that with rare exceptions small round-cell growths are either lymphosarcomas or small cell carcinomas and that they usually invade lymph nodes. With this we agree, and feel sure that we are dealing here with a primary lymphosarcoma originating in lymphoid tissue.

In differentiating conditions of the lymphoblastoma group, leukaemia, lymphadenoma and lymphosarcoma, considerable difficulty may be experienced and it may not always be possible to do so with any degree of exactness, but the following points are of importance:—

1. The disappearance of the mass following excision of a portion for biopsy favours lymphosarcoma. Koschier[2] reports regression of a tonsillar growth after removal of a portion of tissue for diagnosis, followed by a recurrence in the abdomen.

2. The disappearance of all clinical evidence of the disease, following an acute infectious fever. Ruff[3] collected a series of recent reports, illustrating the regression of lymphosarcoma after infectious diseases and irradiation, and Ewing[4] records a similar regression of the original lesion in the pharynx after extirpation but that with rare exceptions the process recurs.

3. The presence of fever is often a prominent symptom in lymphosarcoma but anaemia and cachexia may not appear until toward the end of the disease, unlike Hodgkin's Disease. In the former the patient does not appear to be very ill until shortly before death, while the typical Hodgkin's case is feeble, emaciated and cachectic for a long period. A leukosarcomatosis is described but atypical cells are present in the tumours and in the blood in such numbers as to suggest leukaemia (Martin-Matthewson[5], Warthin[6]), but often the distinctions between the two cannot always be sharply drawn.

4. The recurrence of the mass in the tonsillar fossa, shortly after removal of the tonsils, suggests a primary origin there.

5. The final development of the disease in a wide-spread generalized manner after a period of apparent quiescence is customary in the less acute forms of lymphosarcoma (Ewing[7]).

6. The histological appearances strongly support a diagnosis of lymphosarcoma.

Lymphosarcoma may occur clinically in two forms, an acute type with a rapidly fatal issue in a few months while the growth is chiefly local, but wide-spread extensions and metastases are commonly observed, and a more chronic form where the more generalized features predominate and death occurs with-

in a year. Here we are dealing with a case of the latter variety with the original focus most probably in the tonsils, as evidenced by the rapid recurrence, but one cannot exclude a primary involvement of the cervical lymph nodes. The mass in the scalp, which brought the condition to light, is evidently a metastatic manifestation in aberrant lymphoid tissue. This has secondarily involved the skin of the scalp with ulceration.

Summary:

1. A primary lymphosarcoma of the tonsils with marked involvement of the scalp, cervical lymph nodes, and subsequently generalised metastases, is described.
2. The differential diagnosis is discussed.
3. The presence of fever and regression of the growth in the scalp after biopsy and general regression following an attack of scarlet fever present interesting features in an unusual case.

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Alimentary Response in Cardio-Vascular Disease

MORRIS JACOBSON

THE gastro-cardiac syndrome—anorexia, epigastric distress, a feeling of fulness after meals, flatulence, nausea—occurs in clinical medicine sufficiently often to be of interest to the general practitioner as well as to the specialist and surgeon. The literature deals extensively with the many aspects of this problem; cases are cited in which cardio-vascular lesions were masked by gastric symptoms, and lesions of the alimentary system obscured by cardiac signs and symptoms.

Physiologic Basis—Any adequate discussion of the subject should include a review, however brief, of the anatomic and functional relationshi of the two systems. The heart[1], with its enclosing membrane, the pericardium, is situated in the middle mediastinum, one-third of the organ being to the right and two-thirds to the left of the mid-line. The inferior surface is directed downward and rests upon the upper surface of the central tendon of the diaphragm. The pericardium above surrounds the great vessels at the base of the heart. Below it is attached to the central tendon of the diaphragm. The esophagus, beginning at the level of the cricoid cartillage passes downward in the posterior mediastinum to empty into the cardiac end of the stomach.

Below the bifurcation of the trachea the esophagus is in contact with the posterior surface of the pericardium opposite the left auricle. It then has a varying relationship with the aorta.

The stomach occupies an oblique position in the epigastrium and left hypochondrium. The fundus is in contact with the under surface of the left half of the diaphragm and when distended pushes upward and so encroaches upon the space naturally occupied by the heart and left lung. This part of the stomach may reach as high as the fifth rib, behind and above the position of the apex beat of the heart.

The innervation of the thoracic and abdominal viscera is derived from the autonomic nervous system. The vagus and sympathetic cord[2] arises from the dorsal nucleus of the medulla and cells in the lateral horn of the spinal cord respectively and are distributed by a vast and complex system of ganglia and plexuses to the viscera and vessels in the thorax and abdomen. This combined system conveys motor, sensory, secretory, inhibitory, vasodilator and vasoconstructor and tonic impulses to the organs they innervate.

The coronary arteries to the heart muscle, the coeliac axis to the upper abdominal viscera, the superior mesenteric and inferior mesenteric arteries all arise from the anterior surface of the aorta; each related to its corresponding sympathetic plexus at its origin and all branches are accompanied by a net work of fibres to their visceral terminations.

The relationship of the two systems is not merely anatomic but includes functional interdependence. Arthur Grollman[3] has shown by carefully controlled experiments that the pulse rate, systolic pressure, cardiac output, and oxygen consumption are all increased after a heavy meal; the arterio-

venous oxygen difference is diminished. The cardiac output remained elevated for a number of hours. The amount of work the heart has to do is markedly increased by gastro-intestinal function.

The gastro-cardiac syndrome depends on three factors (1) Anatomic proximity, (2) Circulatory mechanism (3) Nervous mechanism.

Pathologic Anatomy. Three hundred autopsy records of the Department of Pathology, Dalhousie University and Victoria General Hospital were examined. In seventy-two of this series the primary or contributory cause of death was listed as cardiac failure, myocarditis all types, subacute bacterial endocarditis, pericarditis, vascular disease all forms; alimentary lesions in this series of seventy-two cardio-vascular cases were: Esophagus 4, Stomach 20, Duodenum 4, Small Intestine 2, Liver 4, Gall Bladder 1.

The oesophageal lesions consisted of varicosities at lower end in the three cases; in one oesophagitis.

The most common lesions found in the stomach involved the vascular mechanism; petechial haemorrages, haemorrhagic areas in mucosa, and submucosal haemorrhages. Gastritis, acute, chronic and atrophic, is described in quite a number of cases; superficial erosion was present in two cases and pyloric ulcer in one case.

The duodenum revealed chronic ulcer in three cases and congestion of the mucosa in one. The small intestine showed congestion of the mucosa in two cases. The liver showed congestion and fatty degeneration. The gall bladder showed stones in one case.

The gastric mucosa seems to respond readily to disturbances in the circulatory mechanism.

Clinical Aspects. A cardiac patient who has been under the observation and treatment of M. J. for the past few years illustrates well the gastro-cardiac syndrome. The presenting symptoms in this case are mainly gastric but a thorough investigation by the ordinary methods reveals no lesion in the gastro-intestinal tract. The circulatory system presents ample evidence of disease both in the heart and the vessels. The symptoms are brought on by effort and by emotional distress, and are improved by rest and digitalis therapy.

Mrs. H. D., age 51.

Complaints: 1. Pain in the abdomen. 2. Nausea and vomiting of blood. 3. Pain in the head. 4. Shortness of breath.

Family History: Father died of heart disease.

Personal History: Married 32 years. Had 16 pregnancies. 11 children living.

Previous Illnesses: 1. Pul. Tbc. 2. Pleurisy. 3. Pneumonia. 4. Tonsilitis.

Present Illness: Had repeated attacks of symptoms noted under complaints. These usually follow hard work or emotional upsets.

Physical Examination: Patient is a white obese woman of about stated age, in apparent distress. No jaundice or cyanosis. Slight oedema present at ankles. Ht. 5′ 3″. Wt. 150 lbs. P. 88. R. 22. T. 98.4. B. P. 170-90.

Head and Neck: Pupils regular and equal; reaction normal. Most teeth had been removed; pyorhea around lower incisors. Tonsils enlarged and infected.

Cardio-Vascular System: Pulse of moderate quality; occasional missed beats. Radials reveal a moderate degree of sclerosis. Apex beat in fifth interspace; diffuse. Occasional extra-systoles present. Systolic murmur found in aortic area; conducted up and down the sternum.

Respiratory System: Breathing somewhat labored. Chest symmetrical. Expansion equal; lungs resonant. A few moist rales heard at both bases posteriorly.

Abdomen: Extremely adipose. Tenderness present in upper abdomen. No spasm, rigitity or abnormal masses palbable.

Special Examinations:

Blood: Kahn and Hinton tests. Negative.

Stool: Occult blood; Positive (++) on two occasions; once negative.

Gastric analysis: Acidity. Normal. Blood. Present in all specimens.

Mucus. Present in excess.

Pus. Epithelial and red cells present.

Blood: Hbo. 85%. Blood chemistry normal.

X-rays of Lungs and Heart: Negative for evidence of pathology.

Diagnosis: 1. Aortic Regurgitation. 2. Arterio-Sclerosis. 3. Commencing cardiac failure.

The diagnosis of cardio-vascular disease does not necessarily exclude the possibility of a primary lesion in the alimentary tract. Great care was especially indicated in this case. The patient is in the cancerous age; the symptoms, abdominal pain, nausea and vomiting of blood are very suggestive; the laboratory findings, blood in stool and in gastric contents add to the suspicion that organic disease of a serious nature may be present in the digestive system. The roentgenogram, however, rules out that possibility and so it is fair to assume that the gastric symptoms are secondary to the cardio-vascular conditions found.

The anatomic changes in the upper abdominal viscera in this patient, as well as the processes involved in these changes can be visualized with some degree of accuracy. A day of unusual physical activity places an extra burden on the left ventricle already working at full capacity, which it is unable to carry. The regurgitant stream of blood falling back into the left ventricle during systole results in increased intra-cardiac pressure; increased intravenous pressure and impeded return of blood to the right heart. There is a dilatation of capillaries in the pulmonary circulation and exudation of fluid in the lung tissue. The vessels in the liver dilate and that organ becomes engorged with blood. The arterioles and capillaries in the gastric mucosa becomes dilated, the endothelial lining damaged and actual haemorrhage occurs. In addition there is probably some degree of gastritis.

Riesman[4] points out that congestion of the gastric mucosa is a frequent occurrence in cardiac decompensation and loss of appetite, gaseous distension, and epigastric pressure are often the first signs of a failing heart. A very difficult diagnostic problem is presented by angina pectoris[5], coronary disease or cardiac aneurysm the symptoms of which may closely simulate an acute surgical condition in the upper abdomen. Operative procedure under these conditions would be disastrous.

The relative incidence of gastric symptoms in cardiac disease is well illustrated in the study made by John T. King[6] on two hundred ambulant cardiac cases.

	Pain and Tenderness	Flatulence	Indigestion	Nausea Vomiting
Hypertension—100 cases	9	13	13	8
Cardiac Disease without hypertension—100 cases	12	20	21	8

The symptoms may be brought on by a meal or by exertion. Enlargement of the liver is a common finding in cardiac disease. Its relative incidence in various heart conditions is interesting.

		Enlarged Liver
Cardiac Disease with hypertension	(100 cases)	12%
Hypertension	(100 cases)	11%
Aortic Insufficiency	(50 cases)	12%
Mitral stenosis and Aortic Insufficiency	(28 cases)	25%
Mitral stenosis	(50 cases)	42%

The frequency of enlarged liver in mitral disease is especially to be noted. In this condition the liver seems to act as a reservoir in the impeded circulation and shows chronic venous congestion and fatty infiltration.

Most clinicians[7],[8],[9] are agreed that the vast majority of cardiac patients suffer from flatulence, anorexia, nausea, vomiting, dysphagia, jaundice or abdominal pain sometime during the course of the disease; that the symptoms are rarely seen when compensation is well established; that the hepatic enlargement and gastric symptoms may be earliest signs of a failing heart.

Conclusion: Changes in the mucosa and vessels of the alimentary tract are a frequent result of cardio-vascular disease; the gastric mucosa shows these changes earliest and in the greatest number of cases.

In suspected disease of the alimentary canal the circulatory system should be thoroughly investigated.

I wish to express my gratitude to Professor R. P. Smith for making his records available to me and for his co-operation.

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Canal to Life

H. B. Atlee

RADIOLOGICAL studies, blowing like fresh winds through that troublesome channel, the female pelvis, are not only dusting off but bowling over some of our previous conceptions of it. The female pelvis we studied so diligently at college with its rigid diameters and unalterable contours has become a strangely variable thing, now with an inlet that is transversely oval, now with one longitudinally oval and still again with one heart shaped—and with every one of its planes from inlet to outlet varying as the type of pelvis varies. We are finding moreover in the variable shapes of the female pelvis part of the explanation for such complications as transverse arrest, persistent posterior position, and why we sometimes have to do a Caesarian section in a pelvis with normal external measurements. What we are learning, in fact, is that the female pelvis, like the female face, varies from woman to woman, and that in the same way that one face will have too long a nose, so one pelvis will have too forwardly projecting a sacrum (see Fig. III) and in the same way that one woman will have ears that stick out too far from the side of her head, another will have ischial spines that stick too far into the pelvic cavity (see Fig. VI).

So also as there are basic human facies—Mongolian, Negroid, Caucasian —there are archetypes of female pelves. These are pictured in Fig I—the gynecoid, anthropoid, android and platypelloid types, as they are cumbrously called. But while some pelves are typically gynecoid, or anthropoid or android, there is great variation within the types and in some cases an individual pelvis will be a combination of types: the forepart android, for instance, and the rear part gynecoid. For purposes of brevity and clarity, however, it is useful to speak as though all pelves did fall precisely into the four groups.

THE FOUR ARCHETYPES

The Gynecoid or female type of pelvis:

The inlet of this pelvis (see Fig. I) would be almost circular if it weren't for the projection of the sacral promontory, and this pelvis is sometimes called the circular type. But the projection of the promontory makes the inlet a transverse oval—that is to say the antero-posterior diameter is slightly less than the transverse. It is typically a shallow pelvis, the measurement from brim to ischial tuberosity being short. The side walls tend to be straight, the sacrum has a good hollow and the ischial spines do not project into the canal or are not themselves large and prominent: the subpubic angle is wide (see Fig. IV, 793). There are three distinct planes—the transverse oval of the inlet, the circle of the excavation (Fig. IIC) or widest part, and the antero-posterior oval of the outlet. To enter this pelvis to best advantage the average-sized fetal head (that is to say a head that fits it fairly snugly) must lie with its sagittal suture in the transverse. To leave it the head must normally rotate through a right angle in order to bring the sagittal suture into the long antero-posterior diameter of the outlet.

This mechanism is at variance with our traditions. We were taught that normally the head entered the pelvis in an anterior oblique diameter—as an L.O.A. or and R.O.A.—and that it rotated forward through an eighth of a circle to get its long diameter into the long diameter of the outlet. We now know that no matter what the position at the onset of labor, granted a fetal head that fits the pelvis fairly snugly (the usual state of affairs), the head must enter the pelvis in the transverse (L.O.T. or R.O.T.) and begin to rotate anteriorly (or posteriorly) when it strikes the resistance of the pelvic floor—and not before. Of course if the head is small in proportion to the pelvis, it may enter in any position and be born readily in any position: we all encounter occasionally a face to pubis that is an easy, normal labor. But where the head approximates in size the canal (and the canal presents a transversely-oval inlet) whether it *begins to enter* the latter as an anterior, a posterior or a transverse, it has become a transverse by the time *it has entered.*

The Android or Male type of Pelvis:

The inlet of this pelvis (Fig. I) is heart or wedge-shaped. The ileopectineal lines extend backward almost in straight lines to the widest transverse diameter which lies much closer to the sacrum than in any other type of pelvis. This pelvis is typically much deeper from the brim to the ischial tuberosity than the gynecoid—which means that it presents a longer bony canal to the fetal head (Fig. IV.792). The sacrum tends to splay forward (Fig. IIIA) shortening the antero-posterior diameter of the excavation and the outlet. The side walls tend to slope inward giving, together with the forward-splayed sacrum, a more or less funnel shape to the pelvis (Fig. IV.790)—although this is not the case in all android pelves. The ischial spines are larger and tend to project further into the canal (Fig. VI). The subpubic angle (the angle made with one another by the descending rami of the pubes) is more acute than in the gynecoid (Fig. IV.792) thus tending to push the head back against the tip of the sacrum.

Difficult labor is more likely to occur in this than in any other of the archetypes. The wedge-shaped forepelvis pushes the head into the rear-pelvis, but the rearpelvis (the part between the widest transverse diameter and the promontory) is itself restricted. When the head has entered the pelvis, it may be held up absolutely at the outlet by the general funnel shape, or it may be arrested in a transverse position by the prominent ischial spines or in the persistent posterior position and have to be delivered by forceps or some other manoevre. This is the rogue among the archetypes, and is much more common in white women than in other races.

The Anthropoid or Ape-like Type:

This pelvis is common among negro women. The inlet approaches an antero-posterior oval, the antero-posterior diameter being greater than the transverse (Fig. I). This antero-posterior oval carries on all the way through the pelvis from inlet to outlet (Fig. IID). It is usually a shallow pelvis, although often the sacrum has an extra segment, but the latter bone has a good splay backward—a good hollow. If this type of pelvis is small, the ischial spines may seriously narrow the midpelvis. The subpubic angle is ample. Where this type of pelvis is large, the head may enter in any position, but

when it approximates the size of the head, the latter must enter with the sagittal in the oblique or directly antero-posteriorly. If the head enters in the posterior oblique, there is a great likelihood of it continuing in that position and being born face to pubis. If the pelvis is roomy, it will easily be born as a posterior; if the pelvis is smallish, it will become arrested as a persistent posterior and will have to be rotated before delivery can be effected. Unlike the android this type of pelvis does not present any characteristic hazards to the fetal head, and labor is usually normal and easy.

The Platypelloid or Flat Type:

This pelvis, (Fig. I), whose inlet forms a flatter transverse oval than the gynecoid but is otherwise very like a gynecoid, is not a common type and is more prevalent in the white than the colored woman. Sometimes the excavation is a transverse oval (Fig. IIA) rather than a circle. If there is difficulty in this type of pelvis, it is usually at the inlet: once that is passed labor progresses normally. This type must not be confused with the deformed flat pelvis due to rickets, etc.: it is, like the other pelves that have been described, a variation of the normal—a normal variation of a normal female pelvis.

Mixed Types:

All manner of variations of the above types occur (Fig. VI). In classifying these the shape of the posterior pelvis, that is the part posterior to the widest transverse diameter, is taken as the first part of the type name. For instance where the posterior pelvis is male and the anterior female, the name of this mixture would be android-gynecoid—and so on. Most pelves really belong to this mixed type, but for ease of classification are placed in that particular archetype group which they most resemble.

Occurrence of Archetypes:

Studies of a large series of female pelves gives somewhat the following occurrence-rate of the various types:

	Female White	Negro
Gynecoid	41.5%	42 %
Android	32.5	16
Anthropoid	23.5	40.5
Platypelloid	2 5	1.5

While the gynecoid is the commonest single type in both white and negro, it occurs in less than 50% of all pelves. In the negro the anthropoid is almost as common, but the android is a poor third. In the white woman, on the contrary, the android is considerably commoner than the anthropoid. The flat type is almost twice as common in the white as in the negro.

It has been found that the type of pelvis has no relation to the general body build of the patient. Why should it? Are people with long noses always tall? Yet how often do we hear medical men making this suggestion. Repeated X-ray studies have shown that in women of identical build, the pelvis will not only vary in type but in size, and that women with pelves of the same type and size will vary tremendously in build.

Effect of Pelvic Type on Obstetrical Presentation:

X-ray pictures taken early in labor show the following effect of the pelvic shape on the fetal presentation:

	Post. Oblique Positions	Transverse Positions	Anterior Oblique Positions	Direct Occipito-Anterior
Gynecoid	10%	69%	20%	1%
Android	20	71	8	0
Anthropoid	28	37	17	17
Mixed types	18	60	16	5

This table brings out very clearly the fact that where the inlet is a transverse oval (as in the gynecoid and android types) the vast majority of fetal heads enter in the transverse; and where the inlet is an antero-posterior oval (anthropoid) the majority enter in the oblique or direct antero-posterior.

EFFECT OF PELVIC TYPES ON LABOR

In the Gynecoid Type:

What happens normally in this type of pelvis is as follows: The head enters in the transverse or anterior oblique and passes through it practically in the transverse. Until it strikes the pelvic floor, the head is not flexed, but lies midway between flexion and extension and so presents an oval to the planes through which it passes. But when it contacts the levatores it becomes flexed and now presents a circle to the pelvic planes. In this shape the vertex rotates anteriorly in the bony gutter in front of the ischial spine, the nape of the neck finally pivots under the pubic arch and the head is born by extension. In all cases where the head rotates anteriorly, no matter in what position it entered the pelvis, the above description is true.

This normal mechanism occurs so readily in the gynecoid type for the following reasons. (1) Because of the shape of the inlet the head is pushed neither towards the back nor towards the front of the pelvis. (2) It therefore tends to strike the pelvic floor slightly in front of the ischial spines, thus escaping transverse arrest by them, and thus making rotation along the gutter in front of them more likely. (3) A further factor tending against arrest by the spines is the fact that the pelvic side walls do not splay inwards but are vertical. (4) There is a good hollow to the sacrum into which the forehead can rotate without hindrance. (When the sacrum splays forward, it tends to splint and hold the head in the transverse arrest position.)

In the Anthropoid Type:

Since this pelvis presents an antero-posterior oval the head enters more frequently in the anterior or posterior oblique than in the transverse. Because this antero-posterior oval continues all the way through the canal, the head that has entered in the anterior oblique or the direct anterior will be readily born by anterior rotation. But if the head has entered in the posterior oblique it is more likely to continue all the way through the pelvis as a posterior than to rotate into an anterior. Since this type of pelvis tends to be ample in size, the head that has rotated posteriorly may be born spontaneously face to pubis.

Where there is arrest it will be for the following reasons (1) the head has got caught between the spines in transverse arrest. (2) The head has rotated posteriorly and become impacted.

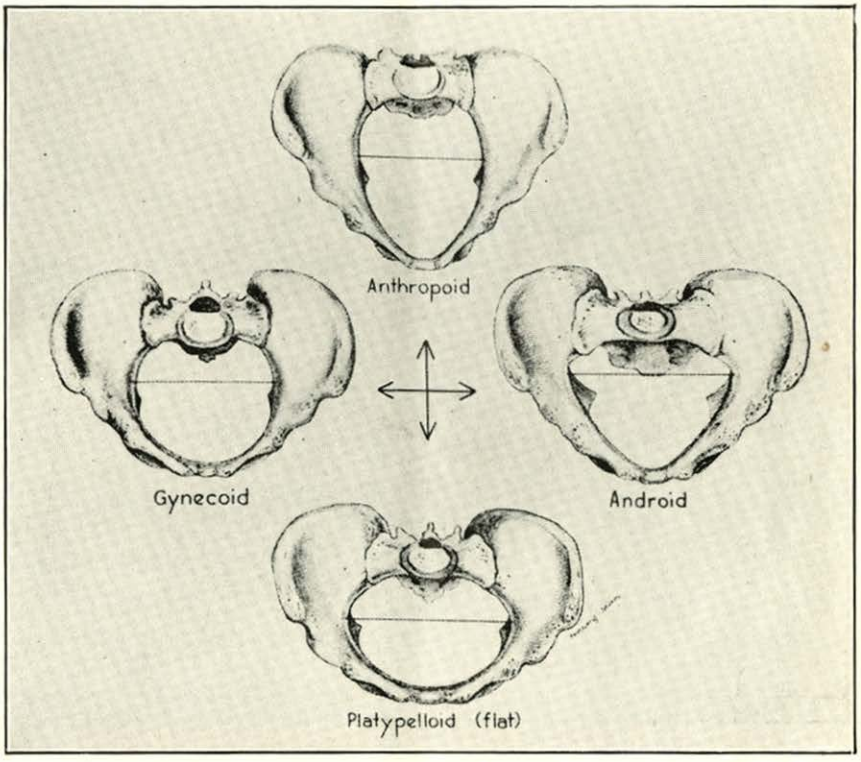


FIGURE I

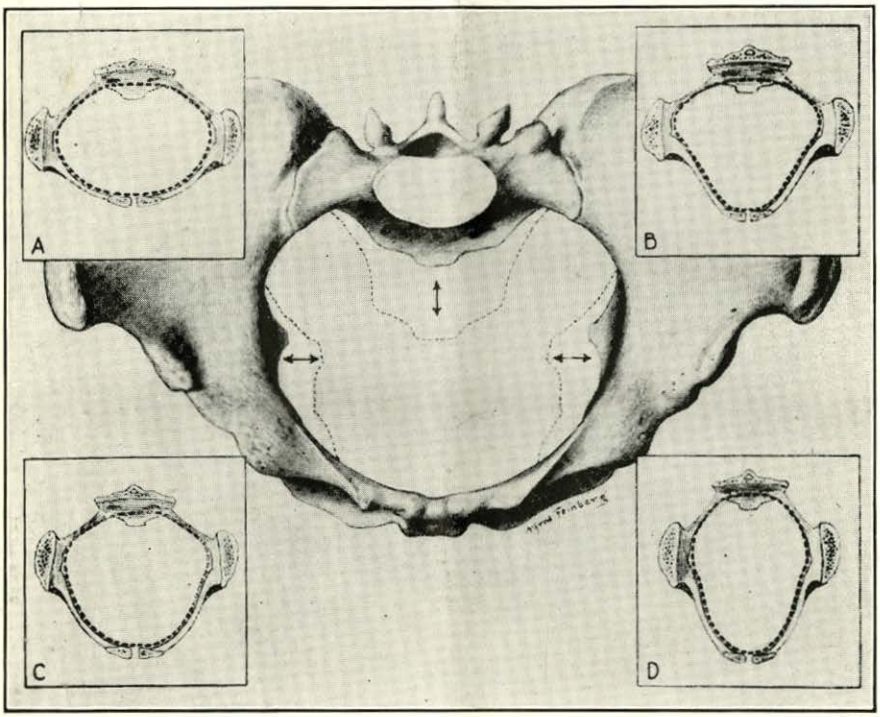


FIGURE II

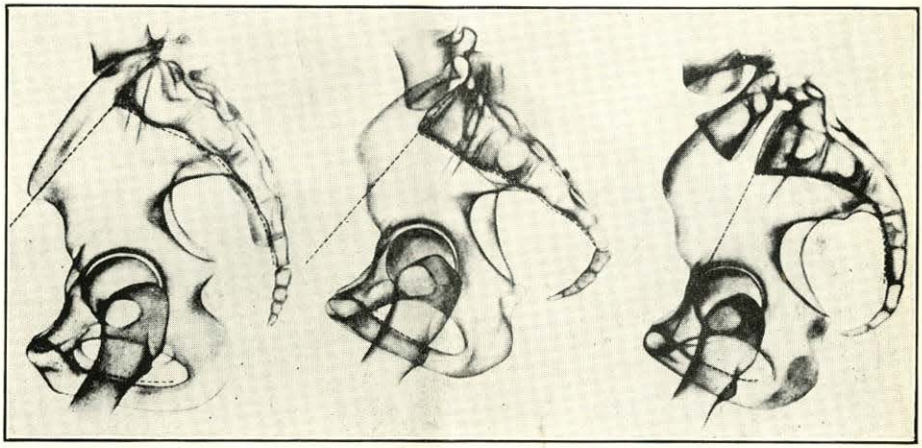


FIGURE III—Curviture and Inclination of Sacrum

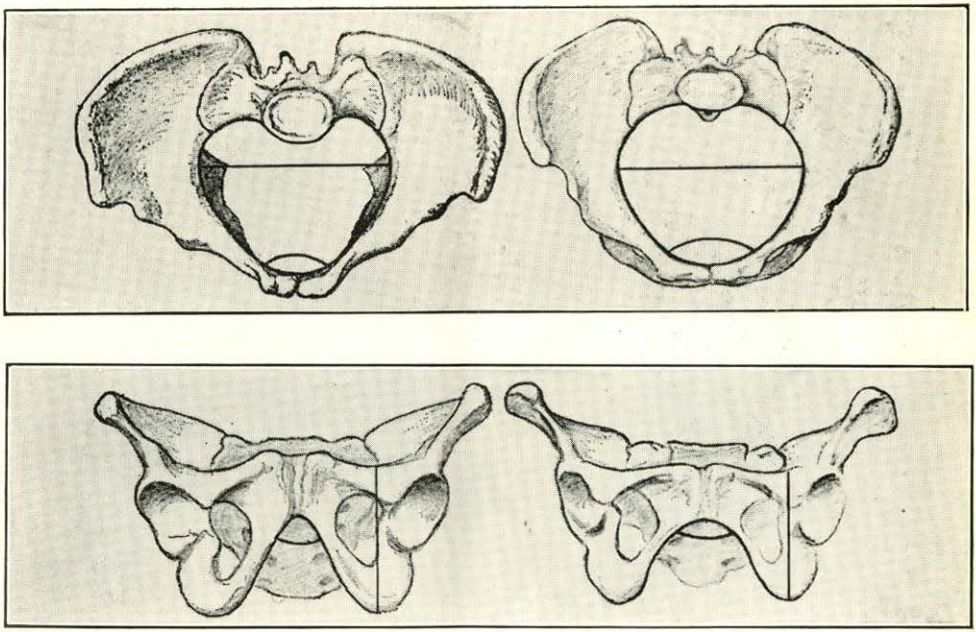


FIGURE IV

CHARACTERISTICS OF THE MALE AND FEMALE PELVIS

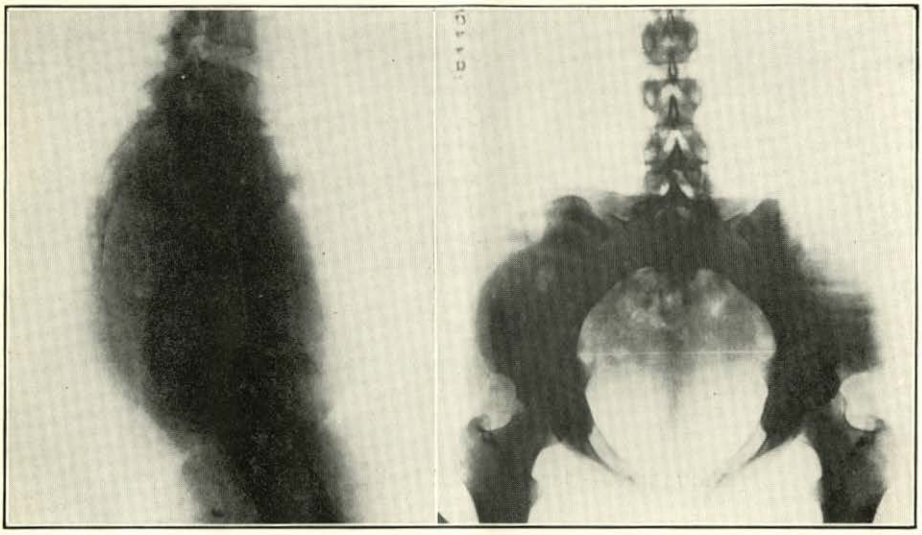


FIGURE V

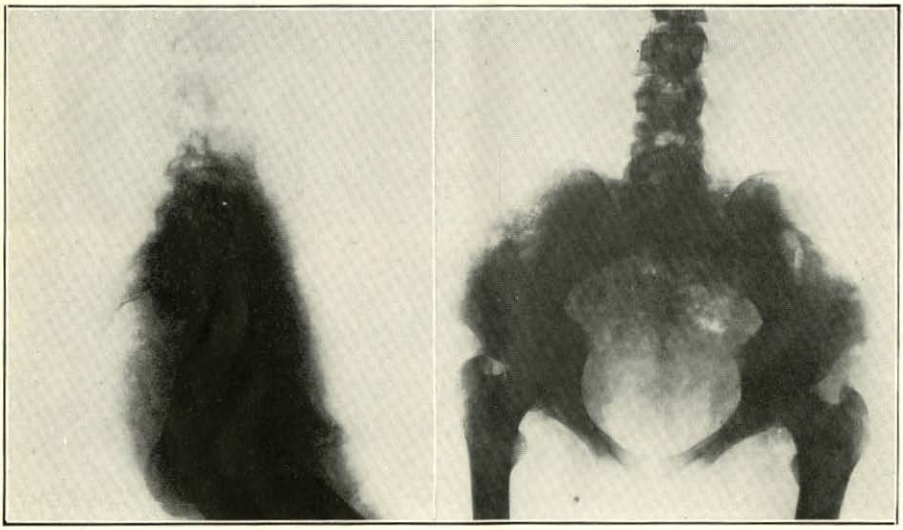


FIGURE VI

In the Android Type:

The head enters usually in the transverse and so proceeds until it meets the pelvic floor. If labor occurs normally it does so exactly by the same mechanism as in the gynecoid type.

When there is arrest it will be for the following reasons (1) the wedge-shape of the forepelvis pushes the head back against the promontory and so makes engagement difficult. (2) Because this lack of room in the forepelvis continues down the canal, the head is pushed backward so that it tends to make a three-point landing in the transverse with brow and occiput caught on the two ischial spines and the posterior parietal bone on the tip of the sacrum. (3) Another factor making the same thing likely is the funnel-shape so characteristic of this pelvis—the splaying inward of the ischial spines, the splaying forward of the tip of the sacrum. (4) In the absence of inward splaying of the spines if there is a poor sacral hollow, or the lower end of the sacrum lies too far forward it tends to splint the head in the transverse or, which is the same thing, it fails to provide a hollow in which the forehead can rotate *posteriorly* as the vertex rotates *anteriorly*. (5) Exaggeration of factor (3) may so contract the outlet as to make delivery through it impossible without destruction of the baby.

In practise it is found that spontaneous delivery is, as would be expected from the above, more common in the gynecoid than in the other archetypes, and least common in the android, and conversely that Caesarian section was most common in the android. In fact, in cases where there is doubt as to the possibility of a natural labor occurring, the presence of an android type of pelvis would sway one towards a Caesarian section where one might persist longer in a trial of labor in the gynecoid or anthropoid types.

The following table shows what happens:

	Spontaneous	Low Forceps	Mid Forceps	Caes. Section
Gynecoid	34%	41%	14%	11%
Anthropoid	16	47	19	18
Android	8	30	28	34

Note the rise in mid forceps and Caesarian section and the drop in spontaneous delivery as between gynecoid and android.

Effect of Type of Pelvis on Choice of Obstetrical Manoevre:

A fore-knowledge through X-ray study of the sort of pelvis with which one is dealing will influence the choice of obstetrical manoevre when difficulty has occurred. For instance, when dealing with an anthropoid pelvis one would be justified in attempting a face-to-pubis delivery for arrest in the persistent posterior, where this could be done only at great risk to the baby in the android type. Moreover, the anthropoid type is the ideal for such manoevres as manual rotation or the Melhado forceps manoevre. With the android, where the arrest is more often in the transverse, the key-in-lock manoevre may prove simpler and easier.

For some time I have been X-raying all pelves in my service at the Grace Hospital in which there has been difficulty with delivery, in an attempt to find the cause. I have picked the following two cases out because the X-ray pictures illustrate so clearly what occurs.

Fig. V shows the pelvis of a patient in which the fetal head entered in the L.O.P. position, and was held up on the pelvic floor as a persistent posterior. Here one was dealing with the snug fit of a posterior-positioned head in an anthropoid pelvis. The head had persisted as a posterior because it had entered as a posterior, because it was easier for it to rotate posteriorly than anteriorly in a pelvis of such shape. If the pelvis had been a little bigger (or the fetal head a little smaller) it would have been possible to deliver with forceps as a face to pubis. If the pelvis had been still bigger, the patient would have delivered the baby spontaneously as a face to pubis. Things being as they were, it was necessary for delivery to be accomplished by the Melhado forceps manoevre.

Fig. VI shows the pelvis of a patient in which the head entered in the transverse (R. O. T.) and got caught up in that position when it reached the pelvic floor, refusing to rotate either anteriorly or posteriorly. This patient has a mixed type of pelvis—the posterior part of it is android (the obstetrically important part) and the anterior part anthropoid—it is therefore an android-anthropoid type. Since it is the posterior pelvis which usually determines the mechanism of labor this proceeded as in an android pelvis. The fetal head advanced and was finally caught up in the transverse by the abnormally prominent ischial spines. But while the spines splay inward, the sacrum does not do so abnormally to complete the picture of a funnel pelvis. What happened here was that the head got caught by these protruding spines before it could rotate anteriorly. This patient could have been delivered by the key-in-lock forceps manoevre, but if manual rotation had been tried, there would have been a distinct tendency for the head to slip back into the transverse again. She also was delivered easily by the Melhado manoevre.

As a result of my experience with X-ray I am rapidly reaching the conclusion that its great future in obstetrics will be as much to show us what type of pelvis we are dealing with as whether or not this particular baby will go through it. Indeed, there are so many factors involved in the passage of the head through the pelvis that a mere comparison of X-ray diameters—or any other diameters—is not enough. There will always be cases of such doubt that only a trial of labor will determine the outcome.

But what a routine study of primiparous pelves will tell is the sort of labors we can expect in the individual case, the type of trouble we are likely to run into, and the wisest obstetrical procedure to follow.

To any readers of the BULLETIN who are further interested in this work I can do no better than recommend the articles of Caldwell and Molloy in the March, April and May 1939 numbers of the *American Journal of Roentgenology*, and the article of Thoms in the November 1939 issue of the *American Journal of Obstetrics and Gynecology*. These can be obtained from the Dalhousie Medical Library.

Disulon in the Treatment of Gonorrhea

G. A. Winfield, M.D., Halifax, N. S.

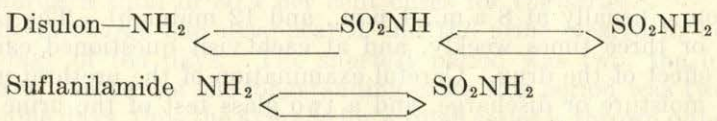
THE therapy of gonorrhea has undergone a marked advance during the past two years. In May, 1937, Dees and Colston published a paper on the use of sulfanilamide in gonorrhea. Almost immediately the drug received widespread publicity, not only in the medical literature but also in the lay press. Since the appearance of the above paper much has been written on sulfanilamide, on its use, its abuse, and its toxicity. It soon became evident that the drug was not without danger. Numerous reactions occurred, some of them ending disastrously. In the light of our present knowledge there is little doubt but that much of the unpleasantness could have been avoided, had better control been exercised in the use of sulfanilamide. But as is so often the case with new preparations, the compound was exploited to the limit. Here was a substance that would cure gonorrhea in a few days. Small wonder that it became available to the masses with absolutely no control.

During the past two years sufficient knowledge has been acquired to place sulfanilamide on a firm basis and to allow it to take its place as one of the greatest therapeutic agents discovered in recent years. With the increase in knowledge regarding sulfanilamide new compounds are constantly being synthesized in an effort to develop chemotherapeutic agents which have a more selective action, are less toxic, and possess a greater margin of safety.

In June, 1938, a paper was read before the American Urological Association at Quebec by Dr. W. L. James, reporting the results obtained by his group at the Newark, N. J. City Dispensary with sulfanilyl-sulfanilamide, or Disulon in a series of cases of male gonorrhea. The authors[2] claimed 94 per cent clinical cures in an average of ten days. Reactions were few, comprising some 7 per cent all of which were mild. They concluded that the new preparation was 50 per cent more effective and 50 per cent less toxic than sulfanilamide, their series with the latter drug yielding only 58 per cent clinical cures in three weeks.

In January, 1939, Shelley[3] reported his results in one hundred cases of male gonorrhea. In only three cases did he report failures. He concluded that Disulon was more effective than sulfanilamide, could be used in lower doses, and further that it appeared to be effective in cases of sulfanilamide-resistant gonorrhea. Orr[4] states that he has obtained cures in about 60 per cent of sulfanilamide-resistant cases in a series of about one hundred cases.

The structural formulae of the two drugs are as follows:



Disulon is a crystalline compound, difficulty soluble in cold water (0.01%), but much more soluble in hot water. From animal experiments carried out by Gray et al.[5] and Rosenthal[6] confirmed by Barlow[7] Disulon has a thera-

peutic index at least five times as favorable as that of sulfanilamide. The mode of action of sulfanilamide and related compounds is still in doubt. James and Sutton[8] quote Barlow as stating that unlike sulfanilamide which is excreted in the urine in both free and conjugated (inactive) form, Disulon is apparently excreted in the free form entirely, which may account for its superiority. Long[9] states that both he and Marshall at the Johns Hopkins Hospital have noted conjugation with Disulon, but do not mention to what extent conjugation takes place.

Following the report of O'Crowley, James and Sutton[2] the author became interested in this preparation called Disulon. Through the kindness of the manufacturers, the Alba Pharmaceutical Company, of New York, sufficient of the drug was obtained for clinical trial in July, 1938. There follows a clinical study of the results in a small series of acute and chronic cases of gonorrhea treated with Disulon.

In this series no attempt was made to select cases. The dosage varied as knowledge of the drug increased. Early in the series a daily dose of 45 grains for ten days was used. This was later reduced to 22.5 grains daily. Latterly thirty grains daily, in three divided doses, over a period of six days has constituted a course. In no case did the total dose exceed 450 grains, and in the majority of cases it was below 300 grains. Where one course was considered inadequate, a second course was given after a suitable rest period. In two cases a third course was considered necessary, both cases being chronic gonorrhea of long standing. In the present routine, if no chemotherapeutic response to the drug is noted in six days, treatment is stopped and the case classed as a failure.

The work-up of the patient was much the same as is found elsewhere. On the first admission smears were taken and a two glass test of the urine done. The diagnosis was based on the finding of the gonococcus by means of the gram stain in the smear. The patient was given the usual instructions regarding alcohol and sexual excitement. Fluids were not restricted, nor were they forced, the patient being allowed sufficient for his comfort. No dietary restrictions were imposed. All were cautioned against the use of other medications especially laxatives (sulphates) and against direct exposure to sunlight. Each patient was given sufficient Disulon to last only until the next visit. This was done purposely in an effort to secure the necessary co-operation. One of the difficulties, and a very real one, is to keep the patient attending until sufficient investigation has been carried out to reasonably insure a cure. There is a marked tendency to discontinue treatment when symptoms have disappeared. This is one of the difficulties encountered with any of the new chemotherapeutic agents in the treatment of gonorrhea, and presents a serious problem, especially in the creation of carriers.

At first patients were instructed to take Disulon three times daily before meals. Later it was thought that better results might be obtained if the blood level were kept constant and instructions were given to take the drug every eight hours, usually at 8 a.m., 4 p.m., and 12 midnight. The patient was seen two or three times weekly, and at each visit questioned carefully regarding the effect of the drug. Careful examination of the urethral meatus was made for moisture or discharge, and a two glass test of the urine done. If at the end of the first course (6 days) the patient had not recovered completely, a second course was begun after a rest period of one week. During the rest period the patient was instructed to force fluids.

In the majority of cases the discharge had disappeared and both glasses of urine were clear at the end of the second week or before. If so, the patient was seen at weekly intervals for the next two weeks. Four weeks after treatment was begun prostatic massage and passage of sounds were started. If no recurrence took place, the prostatic secretion contained less than eight pus cells per high power hield, three successive prostatic smears were negative for the gonococcus, and the entire urethra had been well dilated with and massaged over sounds, the patient was instructed to take a quantity of alcohol. If no recurrence took place, he was discharged with instructions to report if symptoms recurred, and in any case to return in three months for complete check-up. He was warned against intercourse without protection for at least six months. Urethral instillations of silver nitrate were not used as an index of cure in this series.

No local treatment whatsoever was used during the first week. From the second week on urethral instillations of 4% Argyrol were given in certain cases at each visit to the office, two or three times weekly. This was done not so much with any idea of treatment, but rather to further insure the patient's attendance until such time as cure could be pronounced with reasonable safety.

In all some seventy cases have been treated with Disulon. Of these there exist adequate data on fifty-one; twenty-four of these were treated in hospitals, the majority at the Military Hospital, Halifax; the remainder are from the authors private practice.

Of the fifty-one cases comprising this series, all were acute or chronic gonorrhea. The majority were in the acute stage of their first infection. One female is included. Of these fifty-one cases fourteen had received previous treatment with sulfanilamide, some over a long period of time. These will later be examined separately. All these cases have been under observation for a period of months. The longest period of observation was twelve months, the shortest two months, and the average seven months.

Forty cases received one course of Disulon only. Eight cases received two courses, and three, all longstanding chronic infections, received three courses. The total dosage varied from a maximum of 450 grains to minimum of 125 grains and averaged about 200 grains. Regular local treatment was combined in fourteen cases.

Of the fifty-one cases treated three were unable to tolerate the drug sufficiently long to allow of a result, and all three are classed as failures. In addition three other cases have had a recurrence; one after three, one after four, and one after five months. While these may be well have been reinfections, and while all have responded well to a second course of Disulon, sufficient time has not yet elapsed to be sure of the result. These three cases are accordingly classed as failures. In addition, four of the previously treated cases are failures. In the series then, forty-one cases are classed as cures with ten failures, a total of 80.4 per cent cures for the series.

The discharge had disappeared and the urine cleared in both glasses in an average of ten days. The shortest period was two, the longest thirty-nine days. In two of the longstanding cases this period was twenty-four and thirty-nine days, thus the average for a small series is thrown out of proportion.

Fourteen cases had received previous treatment with sulfanilamide, and all were in a chronic condition. Some had been under treatment constantly for a period of months; in addition, all had received local treatment. This

was continued during Disulon therapy. Of these fourteen cases four were failures, they were eventually cured after weeks of local treatment. The remaining ten are classed as cures. Six received two courses, about 300 grains, three received three courses, about 400 grains, and one received one course only. It was apparent in all these previously treated cases that Disulon was tolerated much better than sulfanilamide had been.

In thirty-five cases no untoward reactions were observed. In sixteen or 31 per cent some side effects were noted. In three cases these were sufficiently alarming to discontinue the drug; two because of measley rash, one because of nausea and persistent vomiting. The reactions occurred in all three cases after about 150 grains had been taken.

Fatigue was a symptom in only five cases, occurring about the third day of treatment, and usually disappearing in two or three days. In no case was it marked. Cyanosis occurred in five cases, easily visible in the lips and nails, and usually accompanied by some dysponea on exertion. This also occurred early, usually on the second day, and disappeared mostly in three to five days. These symptoms were not considered sufficient cause for withdrawal of the drug.

Pains in the calves of the legs occurred in three cases and in one case interfered with walking to some extent. Because of occasional reports of peripheral neruitis these cases were closely watched. No evidence of peripheral neruitis was found. In all cases the complication occurred from three to ten days after the drug has been stopped, at the end of the course. It appeared to be transient only and all three cases are completely well. These symptoms have also been noted as occurring with sulfanilamide by Breakey and Harrold[10] and Wishard et al.[11] and with sulfapyridine by Long[12] and Durelll.

High fever occurred in two cases after 75 and 160 grains respectively. The temperature reached 102° in one case and 104° in another. There was an accompanying chill and generalized aching, much similar to influenza. In fact, both patients attributed their temperature to this cause and continued the therapy. In spite of continued therapy the temperature had dropped to normal in 36 hours and remained there in both cases.

Headache was complained of in only one case and was not severe. One patient stated that he felt greatly benefited generally while taking the tablets.

No complications of the gonorrhea, such as epididymitis, occurred in any case while under treatment with Disulon.

The one female in the series presented herself with an acute gonorrhea; smears from both servix and urethra were positive. She was given a total of 300 grains of Disulon in two five day courses of 30 grains per day, with a rest period between courses. Urethral smears were negative in six days, cervical smears in twelve days. Repeated smears before and after the menses were reported negative. There has been no recurrence in four months.

Comment

From the brief experience gained in this small series certain information has been obtained:

(1) Disulon appears to be an effective agent in the treatment of acute and chronic gonorrhea. In the dosage advocated, thirty grains daily, it appears to be a safe agent, better tolerated than sulfanilamide.

(2) If no chemotherapeutic response is noted at the end of six days, when 30 grains per day are given, the drug should be discontinued.

However, should there be a chemotherapeutic response as evidenced by a marked lessening of the discharge, but perhaps with organisms still present, the patient should be entitled to a second course after waiting a reasonable length of time between courses, usually six to seven days. If the patient does not respond to a total of 350 grains, the drug should be discontinued entirely and the patient be classified as a failure. Should the patient have a complete remission of signs and symptoms after 180 grains, further treatment by means of the drug should be held in abeyance, as in the majority of cases cure has been accomplished with this dosage.

(3) Better results are obtained when the drug is taken every eight hours instead of with meals as this ensures a more even distribution of the medication. Cases in the hospital appear to respond better than ambulant cases, more likely because their activities and medication are better controlled.

(4) Disulon appears to be effective in a large percentage of sulfanilamide-resistant cases.

(5) With Disulon, as with any chemotherapeutic agent, great care must be exercised to obtain co-operation on the part of the patient, and cases must be investigated fully before pronouncing cure. There is a marked tendency on the part of the patient to cease treatment when symptoms have disappeared. This factor is not relieved by notices in the lay press of rapid cures. The problem of chronic gonorrhea carriers appears to have become more difficult with the advent of newer therapy in treatment.

Summary

(1) A small series of gonorrheal cases, acute and chronic, treated with Disulon is reported.

(2) In this series there were 80.4 per cent cures.

(3) Of 14 cases previously treated with sulfanilamide, ten or 71 per cent were cured. Local treatment was used both during sulfanilamide and Disulon therapy and hence is a common factor.

(4) Side effects occurred in 16 cases of 31 per cent. In three cases, or about 6 per cent these were serious enough to warrant stopping of treatment.

(5) Experiences gained in this small series are briefly tabulated.

Note:

My thanks are due to Col. R. M. Luton, District Medical Officer, M D., No. 6, for permission to include in my report a series of 19 cases treated at the Military Hospital, Halifax, and also to the Alba Pharmaceutical Company, through whose generosity sufficient Disulon was made available for this study.

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Compensated and Uncompensated Deafness

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IT is well established that, among the children who have normal hearing, there are some who, as a result of former chronic suppuration, have considerable damage to the ear, while, among those who are hard of hearing, there are some with what appears to be a similar or even smaller degree of damage to the ear.

When a child or adult has a degree of damage to the ear which is sufficient to cause deafness, in spite of which speech is heard normally or nearly normally, the case is classified as one of compensated deafness, while when a child or adult can clearly hear the voice of someone speaking to them from a distance but cannot hear the words until the person who is speaking goes much closer, the deafness is said to be uncompensated. We are thus introduced to the two main classes into which some think that deafness ought to be divided, the compensated and the uncompensated.

In regard to deafness which is fully compensated it is necessary only to note that when the child or adult is not deaf in spite of damage to the ear, there is no need for treatment excepting when it aims at the prevention of any increase in the damage to the ear. In compensated cases who can hear the words as soon as they can hear the person speaking, though they hear at a distance which is materially less than normal, treatment should be given. It is in compensated cases that treatment gives its best results.

In regard to uncompensated deafness, it is necessary to recognise that treatment will very frequently give poor results until compensation of the deafness has been attained. The problem that these cases raise is of considerable importance and it is easy to dictate the lines on which it should be tackled and far more difficult to tackle it upon these lines except by individual tuition. The cases with a minor lack of compensation are frequently not recognised during their years of education but those with much lack of compensation generally say that they are very deaf and those in contact with them think them very hard of hearing, yet if they are tested by modern methods, it is found that they hear musical notes with comparatively little diminution and if they are questioned it is found that they can hear the music of a military band or of church bells or striking clocks nearly as far away as can a normal person and yet they cannot understand the words a person speaks unless he comes quite close to them. If we collect a number of such persons of all ages and test their hearing, we find that they fall into certain well defined groups.

Group 1. In this may be placed children and adults who are below the normal level of intelligence. They are or were in low grades at their school and they have difficulty in appreciating the meaning of quite simple sentences if they have to read them quickly or if similar sentences are spoken to them quickly. If this inherent difficulty has been enhanced by a slight derangement of the hearing, it is too much for their mentality and they become hard of hearing. They cannot understand when they are spoken to and they say that they are deaf. Often they appear unwilling to give correct answers when

their ears are tested for unconciously they use their deafness to escape from the stigma of stupidity. So, when they are children they do not fit into the plan of education, they are not feeble minded enough to go to schools for mental defectives, they are not deaf enough to be admitted to schools for the deaf who do not generally cater for them, and they do not hear well enough to get much benefit from education in an ordinary school. Fortunately they are few in number.

Group 2. In this group may be placed children and adults who are up to or above the normal standards of intelligence. They can extract from any printed work sufficient to advance them in the necessary time to higher grades at school where they sit in the front rows because they cannot hear as well as others. Some of them are brilliant and win scholarships to universities where they are high in the pass list when they graduate and then they start in business or in a profession. There they find that, while in the university, they could rely on books for all the information necessary for examinations, now, in an office instructions pass by word of mouth and that the letters that they read or write are often only the prelude to an interview at which they often fail. And so perhaps they have to start again and after weeks of disappointment find a nitch in which they stay, but have no opportunity to use their intellectual powers. Time passes and they get more deaf, their slender livelihood is threatened and they go to an otologist who tests their power of hearing simple notes and makes a record of it on a graph. Then on the same graph, he records their power of hearing conversation. Their is a great difference between the intensity of sound required to make them hear the simple notes and that which is needed to make them hear the words of conversation which is much greater. So it is clear that the deafness is uncompensated. The otologist knows from experience that it will not be of much assistance to them to treat their ears until they have had a course of training to establish compensation, though treatment of the condition of the nose which caused the deafness may be necessary, so he instructs the patients how to train themselves with the assistance of their family or friends. And generally they demur, they are not keen on any wash in Jordon business but further explanation makes them keen, and in a month or so these men, who could only hear when their client was a foot or so away, can now converse at sixteen feet or so away. And being interested they enquire why they were deaf when they had ears to hear.

Group 3. The persons in this class do not seem to be actually hard of hearing to their fellows, but they find spoken words a little difficult to understand especially when the words are spoken quickly, and so like the more clever of the people in class 2. they do not rise as rapidly as they should in business or in professions. If we test them carefully we can frequently detect a minor deficiency in their hearing and in the way in which they use it. Without such testing they are difficult to detect for they hear words normally when they listen, and by the term listening it is here intended to convey, that they concentrate most or all of their attention on discovering what is being said, rather than on the significance of what they hear.

In dealing with large numbers of people who are slightly deaf, several interesting observations may be made. In the first place it would seem that some men have a natural ability to hear and that others have to learn to hear. It would also seem that minor degrees of damage to the ear such as will cause a slight degree of deafness have very little influence in determining whether or no a person will hear speech intelligently. In some, such slight disease acts as a

stimulant and they hear with more intelligence than their fellows. In others the effect of slight disease and of the slight resultant deafness, will be to drive them to their books and they become visually more intelligent and auditorily less intelligent. This only stresses what we have been considering namely that deafness may be compensated or uncompensated.

There is some evidence that there is an essential difference between the auditorily intelligent and the auditorily unintelligent, namely that while the first focusses his attention on the groups of words which form the phrases that he hears, the second listens to the individual words. Those of high auditory intelligence, when they hear a phrase consider it as if it were a single world. "Science leads us down a path of which we cannot see the end" is auditorily to them a single word and raises an idea within their mind. In some, words rise in the mind directly the idea is formed so that, while yet the person speaks, they are prepared with instant criticism or agreement. Some successful barristers say that they conciously use this method in cross-examining a witness. Conversely, people, who have not trained their auditory intelligence, are apt to listen to the individual words rather than to the phrase and, missing a word here and there, as everybody does sometimes, they concentrate on trying to discover what it was and miss the words which follow. This sometimes makes them seem a little deaf and if they have a little deafness in addition to this habit, the deafness is enhanced, though in reality they could have overcome deafness if they had understood a little of the principles of hearing. In this connection it is perhaps necessary to remind ourselves that the ability to hear certain notes alters materially with age. There are in every sound of speech a number of different sound patterns and it is clear that when the hearing alters as we grow older that we utilise those sound patterns which are still available to our ears and therefore hear quite normally, although by reason of our age we are deaf to certain notes and hear others indistinctly. In a similar way we find that certain deaf persons have lost the ability to hear certain notes and yet they have learnt to hear quite normally with the notes that they still can hear. Their auditory intelligence, and the way in which their auditory intelligence was trained when they were young, has saved their hearing.

It is perhaps desirable to consider very briefly the treatment and prevention of these cases of uncompensated deafness that have been described above. In the first place it is necessary to recognise them. The presence of uncompensated deafness may be suspected in any person who hears words better than they understand them, particularly if they understand with ease the things they read. We can be certain that a case of deafness is uncompensated if, on carrying out the tests of hearing by any method which permits the measurement of the intensity of the sound which is required to make a person hear, we find a certain degree of deafness, and a much greater degree of deafness for the sounds of speech. The final proof that a case of deafness was due to lack of compensation is afforded by a marked improvement in the power of hearing after a few weeks of training. The methods which were first employed for training were too complex and too scientific. Now training is carried out at home by the patients' family or friends and the methods are extremely simple.

One cannot but feel that a higher degree of co-operation between otologists and educationists might enable such training to be carried out as part of the ordinary school curriculum. It is felt that the intelligent children who were a little hard of hearing would benefit as would also those who were inclined to

get their knowledge too much from the things they read and too little from the things they hear.

In this connection it is necessary to remember that it has been estimated by modern scientific methods that about ten per cent of the population in any civilised community are hard of hearing. This figure does not include cases of temporary deafness but for the most part is based on a survey of school children who were hard of hearing and whose deafness was not improved by treatment during the period that they attended school. It is further assumed that if their deafness was thus maintained at school in spite of treatment, it would continue for the remainder of their life. The isolated cases that we see prove that this last assumption is not always strictly true. The deafness generally is permanent but their auditory intelligence can in certain cases be materially improved so that the handicap of their deafness is much reduced.

The Nova Scotia Medical Bulletin

Official Organ of The Medical Society of Nova Scotia.

Published on the 20th of each month and mailed to all physicians and hospitals in Nova Scotia. Advertising forms close on the last day of the preceding month. Manuscripts, preferably typed and double-spaced, should be in the hands of the editors on or before the 1st of the month. Subscription Price:—$3.00 per year.

Vol. XIX. January, 1940 No. 1

Questing

Turning with backward glance we view
The old, spent year—from this the new,
Counting by us no great things done
No noble deeds, no honor won.
Dare we then lift our spirits up
In fancies flight to taste a cup
Of greatness—toiled for but in dreams,
The sweet, to bitter turns, it seems.
For oft when favors toward us lean
And fortunes field is ours to glean
Our wanton footsteps turn aside
In haste to serve some hollow pride,
Till God, disgruntled, from us rend
The talents we so poorly spend.
Humbling our pride, He gives instead
A stone to break for daily bread.

Who would be happy let him seek
A lowly place among the meek.
Let him, be quick to lift and share
Another's burden—finding there
Forgetfulness of self begun
In kindnesses to mortals done.
Let him be brave to take defeat
Or face disaster. Let him meet
Each crisis with a steadfast heart,
True nobleman—a man apart.
Thus he can reach through trials that sear
To happiness in each New Year.

J. W. R.

(The Editors are not cruel—they wish you all a Happy New Year anyhow!)

CASE REPORTS

Maternal Mortality

THE following cases illustrate two of the deaths which occurred in the Grace Maternity Hospital during 1939.

Case I. Mrs. B. R. aged 36. Patient was admitted to hospital in her seventh pregnancy on February 18th, 1939, and was delivered of a living male child shortly after admission. She had had no prenatal care but the general physical examination did not reveal any abnormality except some rather badly infected teeth. The evening of the same day her temperature was 100, pulse 112, and the following day at 4 p.m. her temperature was 102.2, pulse 96.

February 21st the temperature was 104.2 and ranged from 102 to 104 despite sulphanilamide therapy. Nothing could be found during this time to account for the fever and increased pulse; urine was negative. The sulphanilamide, which had been discontinued for a few days prior to March 1st, was recommenced in large doses up to 120 grains a day, and the patient was given 1,000 c.c. of citrated blood.

The patient became irrational the evening of March 2nd and it was thought there might be some trouble in the chest, but on consultation with the medical service this was ruled out. March 4th 500 c.c. of citrated blood. A report of a throat swab came in on March 2nd and showed it to be positive for haemolytic streptococci. Treatment was continued throughout that week with some decrease in the temperature, but the pulse remained rapid, and the patient was irrational.

March 12th patient was definitely worse, the abdomen very distended and evidence of free fluid in it. The abdomen was tapped and 20 c.c. of clear fluid was obtained by needle, the pathological report on which showed by direct smear abundant pus cells and streptococci, the latter being later identified as haemolytic in type. It was decided, on finding fluid, to open the abdomen, which was done by incision in the left lower quadran and a large amount of serous turbid fluid escaped from the abdomen. There was no evidence of peritoneal or bowel reaction to this fluid.

The patient's condition being as it was, a continuous intravenous was set up and a Levine tube with a waggenstein suction apparatus was introduced into the stomach. Protonsil was given intramuscularly, sulphanilamide was continued by mouth when possible and 20 c.c. of protonsil was injected intraperitoneally. Despite all treatment the patient continued to go down hill, the abdomen becoming very distended and cyanosis marked. She died on March 21st.

Diagnosis puerperal sepsis, haemolytic streptococcal in origin, focus of infection the throat.

Case II Mrs. A. M. Age 33. Gravida nine.

Admitted to hospital July 7 because of bleeding p.v. She had had eight previous deliveries which were normal with apparently no toxemia. She had been attended by a doctor at her first delivery. Subsequent ones had no

medical attention. She had no prenatal care with any of her pregnancies including her present one.

Shortly after admission she was examined and packing was removed from the vagina. No evidence of placenta praevia. Blood pressure was normal as was also a catheter specimen of urine. Hb. was 85%. The patient was about 29 weeks pregnant.

She continued along with slight bleeding each day. On July 9th her Hb. had dropped to 70%. She was receiving iron daily in 60 gr. doses, but despite this, her Hb. continued to drop and got as low as 60% on July 22nd. The bleeding had not ceased and on the 22nd. became so severe it was decided to induce labor. This was done by the giving of pitocin in small doses, beginning with m.i. and increasing m.i. q. 15 minutes up to and including m. viii.

The membranes were ruptured at 11 p.m. on July 22nd. and at 11.54 p.m. patient was delivered of a living female child. The placenta was expelled intact.

Because of her anemia, a blood transfusion was considered advisable, and of six possible donors who came in from the country only one was compatible. Following delivery she was given 550 c.c. of citrated blood, which was followed by a slight chill.

On leaving the patient about 1 a.m. the uterus was firmly contracted and there was the usual lochial discharge. About one-half hour later the uterus was relaxed and she was bleeding. She was given ergot and pituitrin, but despite this and continual massage of the fundus the bleeding continued. She was seen shortly after by one of the attending staff, and despite all attempts to get the uterus contracted and the bleeding stopped, it could not be.

The uterus and vagina were tightly packed with gauze but the patient still continued to ooze. This packing was removed and she was repacked. Again pituitrin and ergot were used, but the bleeding continued. No donor was available and the patient expired at 4.30 a.m. despite all attempts to stop the bleeding and to improve the general condition.

A similar case to this, some two weeks previously is alive and well to-day because one of the interns happened to be a compatible donor and immediately available.

W. G. COLWELL.

Correspondence

184 College Street,
Toronto 2, Nov. 17,
1939.

Doctor H. G. Grant,
Secretary, Nova Scotia Division,
Halifax, N. S.

Dear Doctor Grant:

Re Radio Broadcasting

At the last annual meeting, General Council of the C.M.A. accepted an invitation from the Canadian Broadcasting Corporation to provide a series of thirty-two broadcasts, each of fifteen minutes' duration, over a Trans-Canada hook-up.

The preparation of the talks is in the hands of a capable committee under the Chairmanship of Dr. T. H. Leggett of Ottawa.

It has been arranged that the talks will be given by the General Secretary or the Assistant Secretary.

The series will begin at 7.45 o'clock, Eastern Standard Time, on the evening of Wednesday, November 22nd, and will continue once a week, on the same day and at the same hour.

We would be glad if you would bring this notice to the attention of your members from whom we would appreciate receiving comments relative to the broadcasts.

Yours sincerely,

T. C. ROUTLEY,

Department of the Public Health

PROVINCE OF NOVA SCOTIA

Office—Hollis Street, Halifax, N. S.

MINISTER OF HEALTH - - - - HON. F. R. DAVIS, M.D.,F.A.C.S., Halifax

Chief Health Officer - - - - - - - DR. P. S. CAMPBELL, Halifax.
Divisional Medical Health Officer - - - DR. C. J. W. BECKWITH, D.P.H., Sydney.
Divisional Medical Health Officer - - - DR. J. J. MACRITCHIE, Halifax.
Divisional Medical Health Officer - - - Dr. J. S. Robertson, D P. H., Yarmouth.
Statistician and Epidemiologist - - - Dr. Harold Robertson, C. P. H., Halifax.
Director of Public Health Laboratory - - DR. D. J. MACKENZIE, Halifax.
Pathologist - - - - - - - - - - DR. R. P. SMITH, Halifax.
Psychiatrist - - - - - - - - - - DR. ELIZA P. BRISON, Halifax.
Sanitary Engineer - - - - - - - - R. DONALD MCKAY, B.Sc., A.M.E.I.C.
Superintendent Nursing Service - - - MISS M. E. MACKENZIE, Reg. N., Halifax.

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MEDICAL HEALTH OFFICERS FOR CITIES, TOWNS AND COUNTIES

ANNAPOLIS COUNTY

Hall, E. B., Bridgetown.
Braine, L. B. W., Annapolis Royal.
Kelley, H. E., Middleton (Mcpy. & Town).

ANTIGONISH COUNTY

Cameron, J. J., Antigonish (Mcpy).
MacKinnon, W. F., Antigonish.

CAPE BRETON COUNTY

Densmore, F. T., Dominion.
Fraser, R. H., New Waterford.
Francis, Bernard, Sydney Mines.
Sutherland, Harvey, Glace Bay.
McLeod, J. K., Sydney.
O'Neil, F., Sydney (County, South Side).
Murray, R. L., North Sydney.
Townsend, H. J., Louisbourg.
Gouthro, A. C., Little Bras d'Or Bridge, (Co. North Side).

COLCHESTER COUNTY

Eaton, F. F., Truro.
Havey, H. B., Stewiacke.
Johnston, T. R., Great Village (Mcpy).

CUMBERLAND COUNTY

Bliss, G. C. W., Amherst.
Gilroy, J. R., Oxford.
Hill, F. L., Parrsboro, (Mcpy).
Cochrane, D. M., River Hebert (Joggins)
Withrow, R. R., Springhill.
Stuart, C. E., Parrsboro.

DIGBY COUNTY

Belliveau, P. E., Meteghan, (Clare Mcpy).
DuVernet, Edward, Digby.
Rice, F. E., Sandy Cove, (Mcpy).

GUYSBORO COUNTY

Chisholm, D. N., Port Hawkesbury (Mulgrave).
Sodero, T. C. C., Guysboro (Mcpy).
Moore, E. F., Canso.
Monaghan, T. T., Sherbrooke (St. Mary's Mcpy).

HALIFAX COUNTY

Morton, A. R., Halifax.
Forrest, W. D., Halifax (Mcpy).
Payzant, H. A., Dartmouth.

HANTS COUNTY

Bissett, E. E., Windsor.
MacLellan, R. A., Rawdon Gold Mines (East Hants Mcpy).
Reid, A. R., Windsor, (West Hants Mcpy).
Shankel, F. R., Windsor, (Hantsport).

INVERNESS COUNTY

Chisholm, D. N., Port Hawkesbury.
Grant, T. E., Port Hood.
Proudfoot, J. A., Inverness.
McNeil, A. J., Mabou, (Mcpy).

KINGS COUNTY

Bishop, B. S., Kentville.
Bethune, R. O., Berwick, (Mcpy).
de Witt, C. E. A., Wolfville.
Moreash, R. A., Berwick.

LUNENBURG COUNTY

Marcus, S., Bridgewater (Mcpy).
Donkin, C. A., Bridgewater.
Donaldson, G. D., Mahone Bay.
Zinck, R. C., Lunenburg.
Zwicker, D. W. N., Chester, (Chester Mcpy).

PICTOU COUNTY

Blackett, A. E., New Glasgow.
Chisholm, H. D., Springville, (Mcpy).
Bagnall, P. O., Westville.
Crummey, C. B., Trenton.
Dunn, G. A., Pictou.
Parker, V. H. T., Stellarton.

QUEENS COUNTY

Ford, T. R., Liverpool.
Smith, J. W., Liverpool, (Mcpy).

RICHMOND COUNTY

Deveau, G. R., Arichat, (Mcpy).

SHELBURNE COUNTY

Corbett, J. R., Clark's Harbour.
Fuller, L. O., Shelburne, (Mcpy).
Dinsmore, J. D., Port Clyde, (Barrington Mcpy).
Lockwood, T. C., Lockeport.
Churchill, L. P., Shelburne, (Mcpy).

VICTORIA COUNTY

MacMillan, C. L., Baddeck, (Mcpy).

YARMOUTH COUNTY

Hawkins, Z., South Ohio, (Yarmouth Mcpy).
Caldwell, R. M., Yarmouth.
Lebbetter, T. A., Yarmouth, (Wedgeport).
LeBlanc, J. E., West Pubnico, (Argyle Mcpy).

Those physicians wishing to make use of the free diagnostic services offered by the Public Health Laboratory, will please address material to Dr. D. J. MacKenzie, Public Health Laboratory, Pathological Institute, Morris Street, Halifax. This free service has reference to the examination of such specimens as will assist in the diagnosis and control of communicable diseases: including Kahn test, Widal test, blood culture, cerebro spinal fluid, gonococci and sputa smears, bacteriological examination of pleural fluid, urine and aeces for tubercle or typhoid, water and milk analysis.

In connection with Cancer Control, tumor tissues are examined free. These should be addressed to Dr. R. P. Smith, Pathological Institute, Morris Street, Halifax.

All orders for Vaccines and sera are to be sent to the Department of the Public Health Metropole Building, Halifax.

Report on Tissues sectioned and examined at the Provincial Pathological Laboratory, from December 1st., 1939 to January 1st., 1940.

During the month, 198 tissues were sectioned and examined, which with 11 tissues from 4 autopsies, makes a total of 209 tissues for the month.

Tumours, simple	25
Tumours, malignant	28
Tumours, suspicious of malignancy	0
Other conditions	145
Tissues from 4 autopsies	11
	—— 209

Province of Nova Scotia Division of Vital Statistics

Provisional Monthly Report—November 1939

	November 1939				Oct., 1939
	Total	Male	Female	Rate	Rate
No. of live births	817	413	404	18.1	21.1
No. of stillbirths	32	18	14	37.7**	32.5**
No. of deaths	450	232	218	10.0	9.4
No. of deaths under 1 year of age	43	19	24	52.6*	47.8*
No. of deaths from puerperal causes	3	...	3	3.7*	3.1*

Causes of Death	Int. List No.	November, 1939				Oct., 1939
		Total	Male	Female	Rate	Rate
Measles	....	..	..	..	.....	.....
Scarlet Fever	....	..	..	..	.....	.....
Whooping Cough	9	3	2	1	6.7	10.7
Diphtheria	10	1	..	1	2.2	.....
Influenza	11	6	5	1	13.3	12.9
Dysentery (bacillary)	....	..	..	..	.....	.....
Pulmonary Tuberculosis	23	22	9	13	48.8	51.6
Other forms of Tuberculosis	24-32	4	1	3	8.9	2.1
Cancer and other Malignant tumors	45-53	62	32	30	137.7	105.3
Cerebral hemorrhage, thrombosis and embolism	82a, 82b	15	7	8	33.3	32.2
Diseases of the Heart	90-95	83	43	40	184.3	176.2
Diseases of the Arteries	96, 97, 99, 102	46	24	22	102.1	128.9
Pneumonia (all forms)	107-109	34	21	13	75.5	27.9
Diarrhea and Enteritis under 2 yrs. of age	119	2	1	1	2.4*	2.0*
Nephritis	130-132	22	14	8	48.8	43.0
Diseases of Early Infancy	158-161	15	3	12	18.4*	23.4*
Accident	176-195	26	17	9	57.7	51.6

* Rate expressed as number of deaths per 1000 live births.
**Rate expressed as number of stillbirths per 1000 total births.

Provisional Monthly Report of Births and Deaths November, 1939.

	BIRTHS									DEATHS															
	Total Births	Live Births					Still Births			Total	All Causes		Maternal	Under 1 year of Age	Whooping Cough	Influenza	Pulmonary Tbc.	Other forms of Tbc.	Cancer	Cere. hem. Embolism Thrombosis	Heart Disease	Disease of the Arteries	Pneumonia All Forms	Diarrhea under 2 years	Nephritis	Diseases of Infancy	Accident
		Total	Legitimate		Illegitimate		Total																			
			M.	F.	M.	F.		M.	F.		M.	F.														
Nova Scotia	849	817	394	383	19	21	32	18	14	450	232	218	3	43	3	6	22	4	62	15	83	46	34	..	22	15	26
Annapolis	15	14	7	6	..	1	1	..	1	13	9	4	..	1	..	..	..	..	3	1	2	2	1	..	2	..	..
Antigonish	13	13	8	4	..	1	..	..	..	22	9	13	..	1	..	1	1	..	4	1	1	1	1	..	1	..	2
Cape Breton	190	181	87	85	2	7	9	4	5	67	34	33	1	11	1	1	3	1	6	2	11	9	7	..	3	3	3
Colchester	47	45	21	22	1	1	2	1	1	19	9	10	..	..	..	..	..	..	2	..	3	3	1	..	..	..	1
Cumberland	76	73	37	35	1	..	3	3	..	21	10	11	..	5	..	..	2	..	2	..	4	3	3	..	2	2	..
Digby	28	27	14	11	..	2	1	..	1	13	9	4	..	4	..	1	..	..	3	..	2	..	2	..	..	3	..
Guysboro	20	20	5	14	1	..	..	..	..	9	5	4	..	2	1	..	..	..	2	1	..	2	..	..	1	1	..
Halifax	198	192	87	95	5	5	6	4	2	113	61	52	..	9	..	1	7	..	16	1	21	12	5	..	4	1	7
Hants	23	22	10	10	1	1	1	..	1	15	8	7	..	..	..	1	..	..	1	1	4	4	2	..	..	..	..
Inverness	28	28	14	13	1	..	..	..	..	21	14	7	..	..	..	..	2	1	1	..	5	2	1	..	1	..	1
Kings	46	46	26	18	2	..	..	..	..	19	6	13	..	2	..	..	1	..	3	6	4	1	1	..	..	..	3
Lunenburg	39	36	20	13	1	1	3	2	1	32	14	18	1	3	..	1	1	..	7	..	5	2	3	..	..	2	1
Pictou	55	53	24	25	3	2	2	1	1	36	19	17	..	1	..	..	..	..	5	2	8	3	3	..	2	1	3
Queens	9	9	4	5	..	..	..	..	..	11	6	5	..	..	..	..	3	..	..	..	2	1	2	..	2	..	1
Richmond	13	13	5	8	..	..	..	..	..	6	2	4	..	2	..	..	1	..	..	..	2	..	1	..	..	2	..
Shelburne	14	13	7	6	..	..	1	1	..	7	4	3	..	..	..	..	..	..	1	..	3	1	..	..	1	..	1
Victoria	11	10	6	4	..	..	1	..	..	3	2	1	..	..	..	..	..	..	..	..	1	..	1	..	1	..	..
Yarmouth	24	22	12	9	1	..	2	1	1	23	11	12	1	2	1	..	1	2	6	..	5	..	..	..	2	..	3

Note: These figures are based on the Birth and Death certificates received by the Division of Vital Statistics, Halifax, N. S., up to and including December 10, 1939 and represent the number *registered* with the Division Registrars during the month of November, 1939.

Personal Interest Notes

THE BULLETIN extends congratulations to Dr. J. W. MacIntosh of Halifax who has recently been elected a Fellow of the American College of Physicians.

Dr. Allan R. Morton, City Medical Officer, returned to the City accompanied by Mrs. Morton for the Christmas holiday season. Dr. Morton is taking postgraduate work at Johns Hopkins University, Baltimore.

Dr. G. Edward Maddison, Dal. '37, has been appointed to the staff of the quarantine and immigration medical services at Halifax. Shortly after graduation Dr. Maddison went to the State of Alabama where he served as county health officer. Following that he attended the University of Toronto and obtained his degree of Doctor of Public Health.

Dr. J. H. L. Simpson has been re-elected President of the Board of Directors of All Saints Hospital, Springhill.

The wedding took place on December 20th at Halifax of Miss Evelyn Jane Sinclair, daughter of Mrs. Sinclair and the late Dr. E. E. Sinclair of Summerside, to Doctor Donald Campbell, Charlottetown, son of the late Mr. and Mrs. A. A. Campbell of Cape Breton. Dr. Campbell graduated from the Dalhousie Medical School in 1931, and is at present attached to the Royal Canadian Army Medical Corps at Sydney.

Dr. W. J. Dyer, Dal. '36, has established himself in practice in Halifax. Immediately after graduation Dr. Dyer went to Kentville where he stopped for a year and a half on the staff of the Nova Scotia Sanatorium. After that he received an appointment at the Royal Victoria Hospital, Montreal, and also served on the staff of the Neurological Institute under Dr. Pennfield.

The BULLETIN extends congratulations to Dr. and Mrs. G. R. Burns of Halifax on the birth of a daughter on December 20th, and to Dr. and Mrs. H. D. O'Brien of Halifax on the birth of a son on December 26th.

Toxoid Clinic at Truro. Dr. F. F. Eaton, the Medical Health Officer of Truro, assisted by the school health nurse and also nurses from the Victorian Order held a most successful clinic during the latter part of December. At this clinic there were 67 small children immunized with toxoid, and during the year there have been 699 treatments. Dr. Eaton is to be congratulated on the effort he is making to prevent diphtheria.

Annual Meeting of the Dalhousie Unit

On January 8th. T. H. Robinson was elected President of the No. 7 Dalhousie Stationary Hospital Benevolent Association at its annual meeting. Other officers elected were as follows: Vice-president, G. H. Morrison: execu-

tive, Nursing Sister Margaret MacDonald, Nursing Sister Lillian Fitzgerald, S. R. Balcom, D. H. Sutherland, Wesley Nicholson, secretary, E. Nosewothy.

Members of the entertainment committee were appointed as follows: Dr. M. A. Macaulay, Mrs. Glen Donovan, G. R. MacLeod, G. C. MacLeod, G. C. Beazley, and G. H. Morrison. The nominating committee which drew up the slate of new officers was composed of G. C. Beazley, H. Cousins, G. R. MacLeod, and Nursing Sister Cameron.

The business meeting followed the annual dinner. In addition to the election of officers, chiefly routine matters were dealt with.

Out of town members attending included Dr. F. F. Chute, Canning and Dr. S. G. MacKenzie, Truro. Dr. Kenneth A. MacKenzie, retiring president, was chairman.

Dr. T. E. Grant, Dal. '36, who formerly practised at Port Hood, has taken over the practice of his father at Montague, P. E. I.

Dr. W. D. Piercey, Dal. '34, has been appointed assistant superintendent of the Ottawa Civic Hospital at Ottawa. Dr. Piercey has recently been with the Bristol Eye Hospital in Bristol, England.

The Board of Commissioners of the Victoria General Hospital recently announced the following appointments to the medical staff of that institution. Associate attending surgeon at large, Hon. F. R. Davis; temporary assistant attending surgeons, Dr. H. D. O'Brien, Dr. J. W. Merritt, Dr. A. M. Marshall; temporary assistant attending physician, Dr. J. W. Reid, all of Halifax.

ASSISTANT WANTED

Assistant desired, who has had some practical experience in general practice, for a well established medical and surgical practice. Salary $2,500.00 to $3,000.00 the first year: object, if satisfactory, to enter a partnership later. Apply to the Secretary or Dr. Donald G. Colp, 3805W. Broadway, Robbinsdale, Minnesota.
