Vol. XXX No. 6

The Nova Scotia Medical Bulletin

Official Organ of The Medical Society of Nova Scotia Canadian Medical Association Nova Scotia Division.

JUNE, 1951

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 should be in the hands of the editors on or before the 1st of the month. Subscription Price: $3.00 per year.

It is to be distinctly understood that the Editors of this Journal do not necessarily subscribe to the views of its contributors.

1. Manuscripts should be typewritten, on one side only of the paper and double spaced.
2. Should proof be sent to a contributor, corrections must be clearly marked and no additional matter added, and the proof returned promptly.
3. Orders for reprints should accompany the proofs.
4. Communications should be sent to the Secretary, Dr. H. G. Grant, Dalhousie Public Health Clinic, Morris Street, Halifax, N. S.
5. Please mention the Bulletin when replying to advertisements.

OFFICERS

The Medical Society of Nova Scotia

President - - - - - - - Dr. J. J. Carroll, Antigonish, N. S.
1st Vice-President - - - Dr. L. M. Morton, Yarmouth, N. S.
2nd Vice-President - - - Dr. J. W. Reid, Halifax, N. S.
Secretary - - - - - - - - Dr. H. G. Grant, Halifax, N. S.
Treasurer - - - - - - - - Dr. R. O. Jones, Halifax, N. S.

Antigonish-Guysborough Medical Society

President - - - - - - - - Dr. O. C. MacIntosh, Antigonish, N. S.

Cape Breton Medical Society

President - - - - - - - - Dr. C. P. Miller, New Waterford, N. S.

Colchester-East Hants Medical Society

President - - - - - - - - Dr. S. G. MacKenzie, Sr., 681 Prince St., Truro, N.S.

Cumberland Medical Society

President - - - - - - - - Dr. D. M. Cochrane, River Hebert, N. S.

Halifax Medical Society

President - - - - - - - - Dr. E. T. Granville, 554 Robie St., Halifax, N. S.

Lunenburg-Queens Medical Society

President - - - - - - - Dr. J. C. Wickwire, Liverpool, N. S.

Pictou County Medical Society

President - - - - - - - - Dr. C. B. Smith, Pictou, N. S.

Valley Medical Society

President - - - - - - - - Dr. H. E. Kelley. Middleton, N. S.

Western Nova Scotia Medical Society

President - - - - - - - - Dr. J. E. LeBlanc, West Pubnico, N. S.

Nova Scotia Association of Radiologists

President - - - - - - - Dr. H. R. Corbett, Sydney, N. S.

The Nova Scotia Society of Ophthalmology and Otolaryngology

President - - - - - - - - Dr. H. F. Sutherland, Sydney, N. S.

The Evolution of Cancer from Certain Nonmalignant Conditions

MALCOLM B. DOCKERTY, M.D.,
Division of Surgical Pathology,
Mayo Clinic, Rochester, Minnesota

INTRODUCTION

ALTHOUGH the cause (or causes) of cancer of human beings remains obscure, it is, however, well known that certain tissue changes when allowed to progress, frequently will terminate in malignant neoplasia. The high incidence of hepatoma after hepatic cirrhosis and of cancer complicating leukoplakia of the lip, tongue and vulva could be cited as typical examples of such changes. It is perhaps not so well known that similar transformations complicate inflammatory lesions and benign tumors. It is possibly not even realized that medication administered or the irradiation therapy given for perfectly innocent conditions may induce tissue changes that set the stage for the future development of malignancy.

The following cases have been selected because in each instance malignancy became superimposed on a tissue reaction not ordinarily considered to be precancerous.

Pernicious Anemia and Carcinoma of Stomach

Case 1.—A man 63 years old registered at the Mayo Clinic on December 20, 1949. At a previous admission in 1940 a diagnosis of pernicious anemia had been made and a regimen of liver therapy had been outlined for the patient. Roentgenograms of his stomach at that time had disclosed nothing significant. For six weeks prior to admission he had had indigestion with epigastric distress and a sensation of fulness on taking small amounts of food. There had been some loss of weight and moderate weakness.

Examination disclosed pernicious anemia, reasonably well controlled. No masses were felt in the abdomen. Roentgenograms of the stomach revealed two polypoid filling defects involving the body and pyloric end of the stomach.

At operation on December 23, 1949, the stomach was removed for multiple (3) adenocarcinomas.

From the standpoint of probability, pernicious anemia and gastric carcinoma occasionally should coexist in the same patient. The first report of this combination by Quincke in 1876 probably came as no surprise to his colleagues.

However, when men like Konjetzny began to study the gastric mucosa and to predict an increased incidence of cancer complicating pernicious anemia, investigators began to take sides on the issue. My former teacher, Dr. H. E. Robertson, was one of those who championed the notion that the flattened-out atrophic gastric mucosa seen at necropsy among persons who had had pernicious anemia was in reality a hyperplastic mucosa with intestinalization of the mucus-cell elements. He said that as soon as liver therapy succeeded

in maintaining large numbers of patients with pernicious anemia so that they entered the so-called cancer age, we would see an alarming increase in this complication.

In 1939 Cotti collected 107 cases of cancer complicating pernicious anemia; in 93 cases the lesions were gastric cancers. Moreover, 65 per cent of these cases were to be found in reports from the literature of the 1930's; in other words, about five years after the time liver therapy began to prolong the lives of patients who had pernicious anemia.

In an extensive study, Rigler and Kaplan found 45 instances of gastric carcinoma among 293 patients dying of pernicious anemia, or an incidence of 12 per cent. In a comparable study of 211 living patients with pernicious anemia the incidence of gastric carcinoma was 8 per cent and gastric polyps were found with about the same frequency. The transformation from clinically benign polyp into metastasizing carcinoma often occurred with surprising rapidity.

Our experience at the clinic has been interesting in that where over the years the number of patients seen with pernicious anemia has increased slowly and gradually, the number with complicating gastric malignant lesions has shown a very sharp increase. From 1918 to 1922, 628 cases of pernicious anemia yielded only 1 case of gastric carcinoma. By 1930 the figure was 4 cases among 628. Among 900 patients with pernicious anemia seen in the early 1930's, there were 16 whose anemia was complicated by gastric carcinoma. An additional 17 patients with this type of complication were observed between 1935 and 1939. Each year in the Division of Surgical Pathology we see perhaps half a dozen examples of this complication.

In his Mayo Foundation thesis, Olson reported on 94 instances of pernicious anemia seen at necropsy between the years 1911 and 1942. In the group there were 7 examples of gastric carcinoma and 11 of gastric polyps. When Olson's series were divided at the 1929 level, when liver therapy came into general use, illuminating results were noted. Neoplastic complications were half as common in the earlier years and twice as common in the latter years.

In summary, I feel that the association of pernicious anemia and gastric carcinoma is more than coincidental. It appears to be on the increase. Carcinoma of the stomach does not cause the pernicious anemia, since in the majority of cases the anemia precedes by years the development of the malignant lesion. The pernicious anemia by itself is not the cause of the gastric malignant process, inasmuch as cure of the former seems to expose the patients to increased hazards from the latter.

A common denominator, at present poorly understood, probably underlies both and it most likely embraces factors of heredity, age, chronic gastritis, avitaminosis and so forth.

Chronic Ulcerative Colitis and Carcinoma

Case 2.—A woman 41 years old registered at the clinic on March 24, 1948. She had had diarrhoea almost constantly for eighteen years, with three to twelve bowel movements per day, occasionally associated with blood and pus. One month prior to her admission severe abdominal cramps had developed, and the number of daily stools had increased to thirty. There was some degree of fever.

Examination disclosed borborygmi over the transverse colon. Rectal examination disclosed constriction at 3 cm. Stools did not contain ova, parasites or enteric bacillary pathogens. Medical treatment was prescribed.

The patient returned to the clinic on June 28, 1949, stating that her local physician had recently noted a mass in the rectum. The condition was diagnosed as a stricture. A year later she returned to the clinic. Her general condition was somewhat improved, but because of further narrowing of the rectal stricture and the intractability of the colitis, the patient was advised to undergo subtotal colectomy. From the clinical standpoint, as well as on the basis of roentgenograms, it was not felt that carcinoma was present.

The operation was accepted and performed. In the laboratory the surgical specimen disclosed the typical features of chronic ulcerative colitis with multiple formations of "pseudopolyps." In addition, there were 3 independent, flat, infiltrating adenocarcinomas, all of which exhibited mural involvement and one of which also involved the regional lymphatic nodes.

Prior to the time of Yeoman's report in 1927, it was not believed that chronic ulcerative colitis ever was complicated by the development of carcinoma. Late in the 1930's, Warren and Somers found no carcinomas in a large group of cases of colitis, but scarcely had the ink dried on their report when Catell observed the first instance of such a complication at the Lahey Clinic. In 1949 Warren and Somers observed a 5 per cent incidence of this complication. Others have had similar experiences. One might well wonder about "this changing incidence."

Twenty-five years ago the mortality rate associated with chronic ulcerative colitis was more than 50 per cent, and death often occurred early in the disease. The percentage of permissions for necropsy was low, since nobody suspected malignant complications. To-day, 90 per cent of patients who have chronic ulcerative colitis live beyond the minimal time required for the development of an associated carcinoma, the minimum being about five years and the average being somewhere between nine and twenty years. Moreover, currently, the surgical emphasis is more on colectomy than on ileostomy, and accordingly pathologists are having a greater opportunity to study the various complications. Not infrequently what was thought clinically to be a stricture proved on examination in the laboratory to be a very extensive carcinoma. Careful necropsy in chronic ulcerative colitis has shown that metastatic carcinoma and not cirrhosis was the cause of the clinically enlarged liver. This experience is being shown to be true with ever-increasing frequency to-day, yet the percentages of malignant complications cited in the literature are still perhaps only half as high as they are in actuality.

At the Mayo Clinic we have available for study material from no less than 100 cases of out-and-out cancers complicating chronic ulcerative colitis. The over-all incidence of the complication was 3 per cent. This figure was more than doubled in those cases in which the inflammatory process began in childhood. None of the malignant lesions developed within five years of the onset of intestinal trouble, an average time interval of about twelve years having to elapse. Progressive chronic disease with short periods of remission tended to produce the highest incidence of complicating malignant processes and more than two thirds of the colons exhibited "pseudopolyps" and true adenomatous polyps. Ileostomy exerted no protective influence against the development of

carcinoma: the rectal segment remaining after subtotal colectomy was a segment that had to be watched during the life span of the patient. A third of the carcinomas were multiple, some were diffuse, several masqueraded as benign strictures and the microscopic grade tended to be high. Results of surgical treatment were not encouraging, since only 2 patients survived five years. It would seem to me—and this is a personal opinion—that surgical treatment for the condition must be prophylactic and directed toward colectomy for chronic ulcerative colitis, especially when this condition is associated with inflammatory "pseudopolyps."

Paget's Disease and Cancer

Case 3.—A man 68 years old had experienced for four months an aching pain in the lower end of the right humerus. The pain, which was present most of the time, was made worse by movements of the elbow joint. He had consciously avoided using his right arm because of this.

Examination disclosed a fusiform enlargement of the region of the right elbow, with obliteration of the bony landmarks. There was some limitation of motion, especially in flexion and extension. Roentgenograms indicated the presence of diffuse Paget's disease of the right upper arm, with questionable pathologic fracture through a cystic area in the lower portion of the humerus.

Studies of blood calcium and phosphorus gave normal results. The value for phosphatase was moderately elevated.

A specimen was removed surgically from the cystic area on the right humerus. Exmination proved the condition to be grade 3 osteogenic sarcoma. Amputation was performed. Examination of the completely dissected humerus disclosed 2 independent osteogenic sarcomas, one at the upper end and the other at the lower end of the humerus. The remainder of the bone showed the typical picture of Paget's disease.

In spite of amputation, the patient succumbed within a four-month period, from the effects of metastasis to the lungs.

The patient in case 3 was suffering from Paget's disease of bone complicated by osteogenic sarcoma. The case is presented for several reasons; first, because the condition was localized. Most physicians, thinking about "Paget's disease", call to mind the old man with the big head and stooped shoulders. His arms seem unduly long because his spinal column is curved and collapsed. His femurs are bowed outward and his shin bones forward. Yet for every case in which this florid expression of the disease is presented there are 2 in which the lesions are localized. Contrary to what the textbooks teach, the localized lesions are *not* always found to involve weight-bearing bones. The foregoing case is an instance of such an exception to the rule.

Second, I would call your attention to the fact that in the seventy-five years that have elapsed since Sir James Paget described the condition, practically nothing has been learned about its cause—or indeed its nature. Its occurrence at about the time of the male and female menopause might suggest a cause based on sex hormones or the lack of them, but the patchy and often localized character of the lesions argues against such a notion. Moreover, whereas states of deficiency of sexual hormones might explain the osteoporosis, the late stages of Paget's disease exhibit the opposite type of picture; namely osteosclerosis.

Pathologically, all we can say is there exists in Paget's disease a marked acceleration of the two processes which result in maintenance of bone; namely, resorption of bone and formation of bone. What causes this alteration is much of a mystery.

In respect to the fatal complication in this case, much has been written since Paget's notation that sarcoma of bone developed in 3 of his 5 original patients. Bennett of Chicago has observed 4 such patients. The patient in case 3 was our sixth with such complications, and recently we encountered 2 more. The literature contains figures of incidence varying all the way from 5 to 40 per cent— representing hundredfold increases in the expected incidence of malignant tumors of bone.

The lesions are multiple in perhaps a third of the cases. They are more commonly found in florid examples of Paget's disease. The type of lesion seen is osteogenic sarcoma, a type of malignant process which one does not expect to encounter in old people. It is claimed that osteogenic sarcoma of the skull obtains on no other basis.

The pathogenesis, I feel, is simple, and I present again the thesis of repeated regenerative repair in damaged tissue with terminal spillover into the zone of malignant neoplasia. The prognosis is hopeless, all patients succumbing from the effects of blood-borne metastasis.

Arsenical Carcinogenesis

Case 4.—A man 47 years old registered complaining of swollen legs. Twenty-six years previously psoriatic lesions of the scalp, elbows, knees, chest, back and thighs had developed. A "German doctor" had prescribed Fowler's solution (10 drops four times daily), and the patient had taken the medication religiously for five years. Fifteen years previously warts had developed on the patient's palms and soles. "Light" roentgen-ray treatments and ointments had been prescribed and had caused some improvement. Ten years prior to registration horny plaques and warts had developed on the patient's face, chest and upper and lower extremities; four years later he had noted an indolent ulcer on his left heel. The ulcer finally required excision and grafting. Oedema of the lower extremities had developed recently.

Examination disclosed a generalized "psoriatic" rash with multiple fissured plaques about the face, neck, elbows, thighs, palms and soles. Pitting lymphedema was present over both lower extremities, distal to the knees. A fungus-like ulceration was present on the medial side of the left ankle. The surrounding skin was erythematous over a large area, and it was studded with millet-sized reddened elevations.

The ulcer was excised and skin was grafted. Multiple specimens were removed from the skin of both lower extremities Mocroscopically, all these specimens contained grade 2 basosquamous-cell carcinoma which appeared to arise from multiple foci. In all sections studied there was malignant invasion of the dermal lymphatic vessels, with secondary block and consequent oedema. Uninvolved areas of skin showed the changes of arsenical keratosis.

Arsenic is a cardinogenic substance. Kennoway and others have demonstrated that cancer can be induced by the topical application and by the ingestion of arsenic. The injection of arsphenemine has repeatedly induced arsenical keratoses, which in 20 per cent of cases proceed to malignant change.

Arsenical cancers, if use of this term can be permitted, are most frequently observed in the skin. Accordingly, in and about these cutaneous lesions it might be expected that there would be found excessive quantities of the carcinogenic agent. This is often but by no means always the case. Analysis or tumor tissue may give negative results for the presence of arsenic. Moreoves it appears that the carcinogenic influence spreads to include parenchymatouf organs like the liver, the adrenal bodies, the lungs and so forth. In these locations the incidence of carcinoma is higher among "arsenic eaters" than among persons who never come into contact with arsenic.

Individual susceptibility appears to be important in cause and incidence. Frequently the lesions are multiple.

Microscopically, the cancers on the skin most often develop on the basis of plaque-like lesions of arsenical keratosis. In their early phases they are often in situ or confined to the epidermis. Dyskeratosis, vacuolization of cells and the presence of giant forms make the lesions appear much more anaplastic than the clinical course would suggest. However, invasion of the cutis and metastasis sometimes occur. The prognosis must be guarded, even after the use of arsenic has been stopped and after the lesions have been locally excised. *New lesions may appear after long latent periods.*

Estrogen-producing Tumors and Cancer

Case 5.—A woman 64 years old was first seen in June, 1946, complaining of lower abdominal pain of eight months' duration and a loss of 16 pounds over a six-month period. In 1925, at the age of 43 years, the patient had received roentgen-ray therapy over the pelvis because of uterine fibroids. After this an ulcer on the lower abdominal wall had developed. This persisted, but the patient otherwise had been well until 1940, when, at the age of 58 years, vaginal bleeding had occurred. At this time radium had been applied within the uterus. Several subsequent episodes of vaginal bleeding had occurred which required hospitalization and the transfusion of blood.

Physical examination revealed a chronic ulcer 8 by 5 cm. on the midportion of the lower part of the abdominal wall, with raised pearly edges. Abdominopelvic examination showed a large, irregular fixed mass rising out to the pelvis and filling the lower part of the abdomen. The cervix and vagina were normal. Results of laboratory studies were not contributory.

Laparotomy, with excision of the ulcer, was carried out. Ascitic fluid was present. The omentum was a thick, solid mass adherent to the right abdominal wall. Total hysterectomy, bilateral salpingo-oophorectomy and excision of much of the omentum were performed.

Pathologic examination disclosed a malignant metastasizing granulosa-cell tumor arising from the right ovary. The uterus was the seat of a grade 3 adenocarcinoma, and one of several "fibroids" had undergone grade 3 sarcomatous change. The cutaneous lesion was a grade 2 basosquamous-cell epithelioma.

The foregoing case is presented because of the increasingly accepted concept that carcinoma of the uterine fundus frequently is an estrogen-producing disease. To test the validity of this hypothesis, a study of granulosa-cell tumors should prove to be illuminating, since these tumors manufacture estrogen in large amounts.

I have had the unusual opportunity of examining material from 87 patients with these estrogen-producing tumors. In no less than 17 endometrial or cervical cancer developed and 3 also had mammary malignant processes. (In one the mammary lesions were bilateral.) Our incidence of uterine carcinoma was more than 100 times the expected rate of occurrence.

Although many of the ovarian tumors were found in young women, uterine carcinoma was not observed as a complication in any patient less than the age of 46 years. It would appear, therefore, that the estrogen, although actually carcinogenic, required a prolonged period of action to effect the cellular changes leading to the development of carcinoma. Pathologically, the precancerous picture was that of prolonged and sustained endometrial hyperplasia.

Is there danger in treating the female menopause, with the use of large doses of estrogen? The studies just cited would tend to indicate that the answer is yes. According to Fremont Smith and associates, the dose has to be large and the treatment long sustained, but in the case they reported the end results was—as perhaps has been guessed—carcinoma of the corpus uteri.

Trophoblastic Tumors and Cancer

Case 6.—A parous woman 45 years old registered at the clinic complaining of vaginal bleeding. Three months previously (elsewhere) curettement had been carried out for her, and she had bled intermittently ever since. Estimations of the content of chorionic gonadotropin in the urine persistently showed values of more than 7,000 units.

Examination disclosed that the uterus was enlarged, soft and somewhat irregular. No other masses were felt.

Because of the patient's age, the persistence of bleeding and the presence of active-appearing hyperplastic tissue in the uterus, hysterectomy was advised and performed. The surgical specimen disclosed a solid haemorrhagic nodule 3 cm. in diameter which had penetrated to within 3 mm. of the peritoneum at one point. A tongue of tumor tissue had invaded, in tumor-like fashion, a large vein in the right borad ligament. Bilateral compound lutein cysts of the ovaries were present.

Microscopically, the uterine nodule exhibited marked anaplasia of trophoblastic cells but, in addition, contained a scattering of easily identifiable villi. Villi also were present in the extension of the neoplasm in the broad ligament. On the basis of newer knowledge, the lesion was labeled "chorion adenoma destruens" or "invasive mole."

This case is presented mainly for the benefit of the hard-working medical student who is utterly confused by the controversial literature regarding hydated mole and chorionepithelioma.

The common denominator in all these tumors is the trophoblast, which is composed of syncytial and Langhans cells. Their main function in life is the procurement of food for a rapidly growing foetus and to accomplish this end nature has provided them with digestive ferments which allow their penetration into the blood vessels of the maternal host. They are perfectly capable of penetrating the wall of the uterus and even of appearing in the capillaries of the lungs of the pregnant woman. In this regard, trophoblastic cells closely resemble cancer cells. One might well ask, and we could not well answer, why a fatal chorionepithelioma does not develop in every pregnant woman.

On searching the literature and analyzing our own cases, we concluded that there are 4 abnormal hyperplastic states of the trophoblast.

1. Hydatid mole. This is an exuberant overgrowth which distends the uterine cavity and which microscpically exhibits huge chorionic villi. The villi show extreme ranges of trophoblastic activity, but we no longer label moles as being malignant.

2. Syncytial endometritis (so-called). This is a condition in which isolated sheets of syncytial cells and Langhans cells, usually without villous formation, penetrate the myometrium diffusely. Perforation and intraperitoneal haemorrhage may result; infection commonly is seen in these lesions. They are benign, but hysterectomy may be necessary to effect a cure of the condition.

3. Penetrating mole or chorion adenoma destruens. Here the structure is that of a mole, but there is nodular infiltration of the uterine wall, including the large vascular sinusoids as described in case 6. Hysterectomy often is indicated because of haemorrhage, uterine perforation and infection. This condition, too, is benign, but many cases have been reported in which the condition is given as an example of cured chorionepithelioma.

4 True chorionepithelioma. This is the only malignant member of the group, and since it is fatal in about 100 per cent of cases, it becomes more advisable to conserve the reproductive organs of women found to have hydatid moles than to perform wholesale castration for moles in the false belief that to do so is to prevent the subsequent development of chorionepithelioma A simple piece of advice is in order: "If villi are found in the lesion, be conservative. Only 2 per cent of moles will terminate in chorionepithelioma."

Radiant Energy and Cancer

Case 7.—Seventeen years prior to his admission to the clinic in 1947, a man 39 years old had complained of pain and swelling of the left knee. Biopsy at that time had been interpreted as showing benign giant-cell tumor of bone. Treatment had consisted of roentgen irradiation. Currettement of the area of the tumor was carried out five years later because of recurrence of local distress; thd diagnosis was still "benign giant cell tumor". This was followed by irradiation with some relief of pain, but swelling persisted. For eight months prior to the final examination there had been a marked local "change for the worse" with pain, tenderness, swelling and limitation of movement of the knee joint. Examination at the clinic disclosed a fusiform swelling over the region of the upper part of the left tibia. Roentgenograms were interpreted as "giant-cell tumor showing irradiation changes. Some areas of calcification. Malignancy cannot be ruled out."

On October 17, 1947, biopsy followed by amputation through the midportion of the thigh was performed. A month later there was evidence of pulmonary metastasis, and two motnhs later the patient died.

My decision to present this particular case was an outgrowth of my attendance at the First National Cancer Conference held at Memphis, Tennessee, in February of 1949. At that meeting, the various delegates on the bone tumor panel discussed the carcinogenic action of radium and roentgen rays in the production of osteogenic sarcomas of bone.

Experiments with animals as early as 1910 established the fact that the newly discovered roentgen rays were quite capable of inducing changes in bone

leading to the development of sarcoma. It was next noted that in human beings receiving heavy doses of radium or roentgen rays over tuberculous joints, osteogenic sarcomas sometimes developed in the areas treated. With the occurrence of similar lesions in a group of radium dial-painters, investigators began to suspect that irradiation could be carcinogenic as well as cancerocidal. The Memorial Hospital group analyzed a large collected series to determine whether the incidence of such malignant change was indeed higher than that which would obtain on the basis of chance. They answered the question in the affirmative, finding a tenfold increase. The following were a few of the conditions, the too-vigorous treatment of which by means of radium and roentgen rays or both appeared to induce sarcomatous changes in underlying or surrounding bone; benign giant-cell tumor of bone, osteoid osteoma, xanthoma, sinus infection, retinoblastoma and axillary irradiation in cases of breast cancer, with development of osteogenic sarcoma of an underlying rib. Radium chloride used as a tonic was observed to produce more ill effects than Fowler's solution itself. In the matter of giant-cell tumor, the time interval studied precluded the possibility that the tumor is malignant from its inception.

Doses as low as 2,000 roentgens were effective. Doses of more than 9,000 roentgens produced actual necrosis of bone. Damage to bone followed by active regenerative hyperplasia appeared to set the stage for carcinogenesis.

The earliest instance of radium-induced sarcoma was noted fourteen years after exposure of the patient, so that in future more lesions of this nature probably will be seen than in the past.

With radioactive isotopes now in common use, a great stimulus has been given to researchers interested in the effect of these substances on bone. Radioactive strontium and plutonium have yielded the most consistently positive results in rats, rabbits, mice and dogs. Almost all the plutonium-induced sarcomas were seen in the axial skeleton. Multiple tumors appeared in animals with a high probability of tumor development.

Gastro-intestinal Haemorrhage and Cancer

Case 8.—A woman 47 years old had complained for three years of burning epigastric pain coming on in attacks of variable duration. No seasonal variation was noted, there was no relation of pain to meals, and little if any, relief was obtained by the taking of food and alkalies. Investigation two years before had revealed gallstones for which cholecystectomy had been performed. One year prior to admission, because of persistence of symptoms, a series of roentgenograms were made with barium contrast and no pathologic lesion was found. Two weeks prior to the patient's entry, the situation became complicated by the passage of tarry stools and marked weakness. On the day of her admission several episodes of severe haematemesis had occurred, for which blood had been transfused five times.

On examination abdominal distention was found, with a questionable mass in the midepigastrium. Emergency laparotomy was carried out and 8 additional pints of blood were transfused.

The duodenal tumor removed at laparotomy was a lobylated, encapsulated grade 1 degenerating leiomyosarcoma 15 by 7 by 7 cm. The tumor was densely adherent to the overlying duodenal mucosa, which was fissured in several areas.

I should like to discuss case 8 from two standpoints, namely: (1) the severe haematemesis clinically observed and (2) the pathologic process exhibited. In respect to the haematemesis, I should like to quote some figures from a study carried out in our laboratory some months ago in a series of 850 cases.

Haemorrhoids can be excluded. What will be included are 100 cases of gastro-intestinal bleeding without regard to duration, frequency or amount of blood lost per rectum or brought up by haematemesis. In 75 per cent of the cases the condition will be determine as to cause, and in 25 per cent no cause can be assigned without performance of exploratory laparotomy. In about a third of the cases in which the cause is known, the surgeon discovers the bleeding lesion, and peptic ulcers, bleeding myomas and bleeding Meckel's diverticula comprise most of the specimens removed. Gastrotomy increases the incidence of positive findings; Wangensteen claims to be able to reduce to 10 per cent the truly idiopathic group by performance of partial gastrectomy.

At the Mayo Clinic, surprisingly enough, more than half of the patients whose bleeding remains unexplained in spite of laparotomy suffer no further episodes of bleeding.

Myomas and myosarcomas account for perhaps 4 per cent of the cases in which severe gastro-intestinal haemorrhage occurs. Whereas only half of these tumors bleed, haemorrhage, when it occurs, often is alarming, as it was in the case just presented. It occurs on the basis of large ulcer craters which frequently are present over these tumors. Erosion of venous channels results. I personally feel that the ulcers are the results of intussusception and infarction of the tumor tissue, rather than of peptic digestion, since myomas and myosarcomas of the colon often show a similar picture.

Pathologically, the principal fact to bear in mind is that half of the myomatous tumors of the small and large intestine and of the rectum are malignant. Metastasis occurs by way of the blood stream, and never by way of lymphatic vessels. Consequently, in resecting the areas containing these tumors the surgeon may safely spare the mesentery and with it the all-important blood supply to adjacent segments of bowel. Peritoneal sedimentation occasionally may occur. Since nobody has ever observed a microscopic-sized gastro-intestinal leiomyosarcoma, it would appear logical to assume that such a neoplasm arises through malignant transformation of a common, everyday leiomyoma. Such an actual mode of origin often can be demonstrated in neoplasms of this type which exhibit benign and malignant portions.

COMMITTEE ON FRACTURES AND OTHER TRAUMAS
AMERICAN COLLEGE OF SURGEONS

The Care of Hand Injuries

II

Requirements of Early Definitive Treatment

I. The first-aid treatment of hand injuries is directed fundamentally at protection. It should provide protection from infection, from added injury, and from future disability and deformity. This protection is afforded by noninterference with the wound, cleanliness of surrounding areas, the application of sterile protective dressings and immobilization in the position of function.

II. The general requirements for proper early definitive care are:

A. Thorough evaluation of the injury.

1. Determination of the time, place, causative agent and mechanism of the injury.

2. Determination of the nature and extent of the first treatment given.

3. Determination of infection status: whether the wound is relatively clean, grossly contaminated or with infection established.

4. General nature of the wound, i.e., contusion, abrasion, burn, incised wound, lacerated wound, crushing wound, puncture wound, tooth wound, imbedded foreign body, fracture, compound fracture, amputation or combined injuries.

5. Evaulation of structural damage.

(a) Degree and extent of surface injury.

(b) Source of major bleeding.

(c) Evidence of tendon or muscle damage by testing function *against resistance.*

(d) Evidence of nerve injury elicited by testing for motor and *sensory* functions.

(e) Bone and joint injury determined by X-ray.

(f) Discovery and exact localization by X-ray of suspected opaque foreign bodies.

B. Adequate facilities and equipment.

1. Each hospital or clinic should have at least one surgeon who is thoroughly familiar with the anatomy and physiology of the hand and who is prepared to undertake the early treatment of its major injuries.

2. Such treatment should be rendered under strictly aseptic conditions, preferably in an operating room, with careful adherence to aseptic technic in the matter of scrubbing, draping, masking and the use of gloves.
3. An adequate supply of appropriate instruments.
4. Sufficient assistance to assure good exposure.
5. Good lighting.
6. Provision of a bloodless field by means of pneumatic tounriquet or blood pressure cuff.
7. Complete anaesthesia for the patient, preferably by general anesthesia.

C. Application of appropriate treatment.

1. Thorough cleansing of a wide area around the wound with the wound protected. (Entire hand and forearm). Shaving, soap and water scrub.
2. Through cleansing of the immediate wound area, preferably with soap and water or a bland detergent. Antiseptics should not be used in or on the wound.
3. Careful inspection of the wound and assurance of adequate exposure, by additional incision if necessary, *closely paralleling natural creases.*
4. Thorough toilet of the wound, removing, under inspection, all foreign matter. Excision, by sharp and careful dissection, of all completely devitalized or grossly soiled tissue in the wound surfaces. It is essential that the greatest care by exercised to spare all tissues that may be viable, particularly skin, tendon, nerve and bone fragments.
5. Assurance of hemostatis by ligation of major injured vessels.
6. Repair of injured nerves by end-to-end union with fine interrupted perineal sutures. The uniting of divided digital nerves is important to future function.
7. Repair of other soft tissue injuries, where appropriate, i.e., in clean wounds of short duration, in well-cleaned contaminated wounds of not over eight hours' duration, never in wounds with established infection.
8. Reduction of fractures and dislocations, and retention in corrected position by traction or splinting in the position of function (position of grasp with wrist in dorsiflexion.)
9. Application of protective dressing, fingers separated by gauze and hand immobilized to such extent as may be necessary to permit healing, in the position of function (never in the flat position.)

10. Administration of antibiotics and protective antitoxins as indicated.

D. After-treatment.

1. Elevation and rest of the hand.
2. Noninterference with initial dressing for a sufficient time to permit healing, unless evidences of suppuration develop.
3. Restoration of skin coverage of denuded areas at earliest possible time. Partial thickness skin grafting is a simple and valuable means of promoting early healing.
4. Early restoration of function for nonaffected parts of the hand by directed *active* motion to the fullest extent that will not jeopardize healing of repaired structures.
5. Restoration of function in affected parts of the hand by directed *active* motion as early as is consistent with full healing and preservation of the repair of damaged structures.

Subsequent articles will deal with the particular treatment of special types of injuries.

Prepared by the American Society for Surgery of the Hand October 1948.

MEDICAL POST-GRADUATE TRAINING

As most of the Profession are probably aware, Dalhousie University has received a three year grant from the W. K. Kellogg Foundation to provide facilities for Post-Graduate training for practitioners of the four Maritime Provinces.

This grant becomes available in July of this year. A Committee has been appointed by the University and already has done considerable organization work and has met with representatives of the Provincial Medical Societies in an effort to determine the best ways in which this important work can be begun.

In general these methods divide themselves into:

(1) Formal courses of one week or more in duration given in Halifax.

(2) Local speakers visiting Medical Societies throughout the Maritime Provinces.

(3) Speakers from Canada, the British Empire and the United States, coming to Halifax at intervals throughout the year and to which the profession would be invited.

A Medical Post-Graduate Office has now been established at the Victoria General Hospital with Miss Joan Hudson as executive secretary, who will be able to provide any information about Post-Graduate work. Would those who desire to see any operative work of a particular nature or to spend some time in one department kindly communicate with this office.

E. F. ROSS, M.D., Chairman
Medical Post-Graduate Committee

Robert Arthur Haliburton McKeen

by George H. Murphy, M.D.,F.R.C.S.,F.A.C.S.

IT was my good fortune, when green from the Schools, to come under the inspiring influence of Dr. R. A. H. McKeen during my first practice (twelve years) at the collieries in Cape Breton. He was then a veteran colliery physician and surgeon; easily the Chief, and within and without the limits of his extensive practice at Glace Bay, was held in highest professional and personal esteem.

Throughout his career the general practitioner, he comes in my mind, as I write, in the more strongly focused light of the Surgeon. He learned Surgery in what the highly specialized teaching of our times call the hard way. But for McKeen it was not hard. A benign and discerning nature gave him the gift; and a big industrial community craving the relief that the surgical art alone could supply gave him the field to fit his talents and his great enthusiasm to improve the way of his calling. For some years he stood practically alone in anything approaching major surgery. No hospital near, and improvised operation rooms, often in poorly equipped homes, were the vogue for most emergencies. His success and zeal in his surgical work not only widened and tempered his experiences and skill but aroused the consciousness of the public to the necessity for a well organized hospital, which in due course was erected and furnished with the best equipment of the time. The hopes and visions of years now realized, McKeen came into his own.

His most fruitful years followed. With two assistants to shoulder the weight of his large general practice, and the heartiest co-operation of the doctors in adjoining collieries and districts, he developed a surgical clinic of rare excellence. Good organization enabled him now to visit betimes clinics on the Continent and Great Britain to keep his techniques and methods up to standards of the best schools. Some of his assistants became outstanding surgeons. McKeen was able and kindly by nature, a friend worthwhile, and with a bump of Scotch humor almost as big as his heart.

His death in 1912 at the age of fifty-nine was deeply mourned by profession and public alike, and his name will continue to live in the best annals of surgery in Nova Scotia.

Society Meetings

PICTOU COUNTY MEDICAL SOCIETY

A MEETING of the Pictou County Medical Society was held in the Nurses' Residence, Aberdeen Hospital, New Glasgow at 2.30 p.m., May 9th, 1951. Dr. H. B. Whitman presided and introduced the guest speakers—Doctors C. L. Gosse and Martin Hoffmann.

Dr. Gosse spoke on "Prostatic Enlargement" and reviewed the recent trends in surgical correction of this condition. Following his talk he displayed drawings by Dr. Saunders of the Anatomy Department, on the retropubic operation, and then showed a motion picture of the operation as performed by himself at Camp Hill Hospital. The excellent photography and skill of the operator were of equally high merit.

Dr. Hoffmann spoke on "Diseases of the Liver". By his oratorical skill and vast knowledge of his subject it would almost be an understatement to say that he held his listeners spellbound. With special emphasis on the condition "Infectitious Hepatitis" and the differentiation between medical and surgical conditions affecting the liver, the whole review was much appreciated by his audience.

Between the two addresses the doctors were entertained in the Nurses' sitting-room by the Superindentant of the Hospital, Miss Ross, and were served sandwiches and coffee, a much appreciated gesture.

In the evening the meeting adjourned to the Banquet Hall of the Norfolk Hotel. Regular members of the local society present were: Doctors L. Sproull, R. Douglas, C. B. Smith, D. F. Fitzgerald, C. E. Stuart, H. Townsend, M. F. Day, F. J. Granville, C. Miller, S. D. Dunn, V. H. T. Parker, D. F. MacLellan, I. MacKay, F. Young, J. MacDonald, W. A. MacQuarrie, J. Ballem, C. Harries, H. MacKay, A. E. Blackett, H. B. Whitman, H. A. Locke; from the Antigonish-Guysborough Medical Society were Doctors MacCormick, MacIntosh, Hogg, Robbins and Dr. J. J. Carroll, president of The Medical Society of Nova Scotia. Also present were Doctors Hoffmann and C. L. Gosse, guest speakers at the afternoon meeting and Dr. N. H. Gosse, of the Canadian Medical Association and guest speaker for the evening.

The election of officers for the coming year was as follows:

President—C. B. Smith.

Vice-President—Dr. J. B. MacDonald.

Secy-Treas.—Dr. S. D. Dunn.

Representatives to The Medical Society of Nova Scotia: Dr. A. E. Blackett and Dr. Hugh F. MacKay.

Dr. Hugh MacKay briefly reviewed the "Registered Nurses Association Act of 1950" and pointed out that the proposed curriculum for nurses, involved advanced laboratory training and other skills not necessarily associated with a nurse's duties. On behalf of the Pictou County Medical Society he introduced the attached Resolution and moved its adoption. This was seconded and passed unanimously.

Dr. N. H. Gosse was introduced to the meeting by Dr. Blackett. He gave an interesting and compelling address covering the changing medical world of our times, stressing the upheavals of the past generation or so. Without

mincing words, he scored destructive criticism from various of the branch societies and said that strong leadership was more than ever necessary in the coming years. He also emphasized the need of a full-time secretary.

Dr Hugh MacKay extended the thanks of the Society to Dr. Gosse.

Meeting adjourned.

Stuart D. Dunn,
Secretary-Treasurer

RESOLUTION RE THE REGISTERED NURSES ASSOCIATION ACT 1950

WHEREAS The Medical Men of this County give hundreds of hours annually to the Nurses Training School, and throughout the Province, Medical Men give thousands of hours annually to Training Schools. It is obvious that we have a vital interest in the standards of these Schools.

AND WHEREAS The cost of the operation of the Training School is a direct charge against the total revenue of the Hospital, which Hospital can only meet increased costs in the School by increasing its rates to the Public.

AND WHEREAS Legislation enacted in 1950 as "The Registered Nurses Association Act 1950", will, in our opinion increase such costs without providing additional revenues, and sets up standards which the Aberdeen and presumably other Hospitals cannot, at this time, comply with, as personnel are not available.

AND WHEREAS It would appear that the Registered Nurses Association of Nova Scotia is endeavouring to set itself up as a governing board for all Nurses Training Schools in the Province, *without* reference to the Boards of Trusts of the individual Hospitals, OR the Medical and Teaching Staffs of same, OR The Medical Society of Nova Scotia, OR The Provincial Medical Board.

BE IT THEREFORE RESOLVED That this Medical Society views with concern actions taken by The Registered Nurses Association of Nova Scotia, which directly involve Nurses Training Schools in which Medical Men do practically all the advanced teaching.

AND FURTHER RESOLVED That this Society considers it discourteous and ill-advised, that Legislation in the nature of "The Registered Nurses Association Act 1950", was enacted without consultation with the Hospitals involved, The Medical Society of Nova Scotia, and The Provincial Medical Board.

AND FURTHER RESOLVED That this Resolution be passsed to The Medical Society of Nova Scotia, and to the other branch Societies, with the request that the matter be considered at the next meeting of the Executive Committee of The Medical Society of Nova Scotia.

CAPE BRETON MEDICAL SOCIETY

The Annual Meeting of the Cape Breton County Medical Society was held at the Royal Cape Breton Yacht Club on May 31st.

Dr. M. M. Hoffman, B.A., M.Sc., Ph.D., M.D., Research Professor of Medicine, Dalhousie University Medical School, and Director, Department of Metabolism, Victoria General Hospital, was guest speaker and presented an excellent informal talk on the pathology of liver diseases.

The following slate of officers were elected.

President—Dr. C. P. Miller, New Waterford.

Vice-President—Dr. S. A. Green, Glace Bay.

Secretary-Treasurer—Dr. H. R. Corbett, Sydney.

Associate Secretary-Treasurer—Dr. C. A. D'Intino, Sydney.

Executive Cape Breton Medical Society—Dr. Eric W. Macdonald, Reserve, Dr. W. M. Nicholson, Reserve, Dr. H. J. Martin, Sydney Mines.

Executive, The Medical Society of Nova Scotia—Dr. J. R. Macneil, Glace Bay, Dr. H. F. Sutherland, Sydney, Dr. G. C. Macdonald, Sydney, Dr. M. J. Chisholm, New Waterford.

H. R. CORBETT, M.D.

NOTICE

Arthritis Awards Announced

Awards totalling $81,000 have recently been made by The Canadian Arthritis and Rheumatism Society for Clinical Fellowships and Research Fellowships and Grants. Dr. John Woodbury of Nova Scotia is one of the recipients, and will take further clinical training under Dr. Wallace Graham, Sunnybrook Hospital, Toronto.

The provision of these fellowships is part of the Soiety's national effort to further research into the cause of treatment of rheumatic diseases and to aid general professional knowledge.

Obituary

BOWMAN C. CROWELL—1879-1951

Dr. Bowman C. Crowell, Associate Director Emeritus of the American College of Surgeons died in Clermont, Florida, on Thursday morning, April 26, at the age of 72. Dr. Crowell retired from active service with the College on November 15, 1949, after having served since 1926 as associate director and director of the department of clinical research. He is survived by Mrs. Crowell, address, Clermont, Florida.

Dr. Crowell was born in Yarmouth, Nova Scotia, January 10, 1879. He received an A.B. degree from McGill University in 1900, and M.D. and C.M. degrees in 1904. He was Resident Pathologist and Intern at New York City Hospital from 1904 to 1907; Instructor in Pathology, New York University and Bellevue Medical College, 1907 to 1911: Pathologist, Bureau of Science, Manila, Phillippine Islands, 1911 to 1915: Associate Professor of Pathology and Bacteriology, and Chief of the Department, University of the Philippines, 1912 to 1914: Professor and Chief of Department, 1914 to 1918, and Director, Graduate School of Tropical Medicine and Public Health, 1916 to 1918; Chief of Service, Department of Pathology, Oswaldo Cruz Institute, Rio de Janeiro, Brazil, 1918 to 1922; Professor of Pathology, Medical College, State of South Carolina, 1922 to 1923, and of Jefferson Medical College, Philadeplhia, 1923 to 1926. He was a Lecturer in Pathology at Northwestern Medical School from 1927 to 1949, and was a member of the Board of Directors of the American Cancer Society. On October 28, 1949, he was awarded the American Cancer Society's first annual medal "in recognition of his outstanding contributions to the control of cancer."

The Bulletin extends sympathy to Doctor W. A. MacKay of Thorburn on the death of his wife, the former Annie Stewart, which occurred early in May, following an illness of several weeks.

The general manager of Abbott Laboratories Ltd., Montreal, Harry D. Cook, was elected president of the Canadian Pharmaceutical Manufacturers Association at the annual meeting held at Ste. Adele, P.Q., May 30.

Mr. Cook had been vice-president of the Association since May, 1949, and an executive council member since 1947. He had also been chairman of the health insurance committee since 1945.

Personal Interest Notes

Four widely respected members of the Halifax Medical profession were honored at the annual meeting of the Halifax Medical Society at the Lord Nelson Hotel on April 25th. The four, Doctors C. S. Morton, R. Evatt Mathers, Arthur E. Doull and Lewis Thomas, were presented with honorary life memberships. All have completed fifty years service as practitioners. The presentations were made to the four guests by individual members of the society. Doctor Doull received his award from Doctor W. L. Muir; Doctor Mathers from Doctor H. W. Schwartz; Doctor Morton from Doctor H. D. O'Brien and Doctor Thomas from Dr. J. W. Reid.

Doctor and Mrs. W. M. Roy and family, who have been living in Sacramento, California, for the last six years, returned to Halifax in April, and will take up permanent residence here. Doctor Roy will open a private practice of radiology.

Doctor and Mrs. G. L. Covert of Halifax returned from a trip to Bermuda the end of April.

Doctor and Mrs. R. O. Jones of Halifax left by plane early in May for Cincinnati, Ohio, where Doctor Jones attended the American Psychiatric Convention. Doctor F. A. Dunsworth of Halifax also attended the American Psychiatric Convention. He was accompanied by Mrs. Dunsworth and they spent a few days in New York on their return home.

Doctor and Mrs. W. I. Morse of Halifax left by car the end of April for Atlantic City, N. J. where the former attended a medical convention. On their return trip they visited relatives in New Haven, Connecticut, Cambridge, Massachusetts and Saint John, New Brunswick.

Doctor H. I. Goldberg of Halifax returned early in May from New York where he attended clincial sessions of the New York Skin and Cancer Hospital.

Sir Lionel E. H. Whitby of Cambridge, England, was elected an honorary member of the Association of American Physicians at the meeting held at Atlantic City, N. J., on May 2nd. He is author of "Disorders of the Blood", which the Association labelled the standard work in this field.

Doctor J. E. Hiltz, medical superintendent of the Nova Scotia Sanatorium, Kentville, presented a paper "Pulmonary decortication in tuberculosis", at the annual meeting of the Canadian Tuberculosis Association held in Toronto in May. The paper was compiled in association with Doctor J. J. Quinlan, assistant superintendent, and Doctor V. D. Schaffner, surgeon. Following the meeting in Toronto, Doctor Hiltz attended the annual meeting of the National Tuberculosis Association in Cincinnati, Ohio.

Doctor J. N. D. O'Rafferty, who has been practicising at Oxford for the past two years, has accepted a position with Camp Hill Hospital, Halifax.

Doctor D. R. Davies of Penygraig, Wales, will take over the practice vacated by Doctor O'Rafferty.

Doctors L. C. Steeves, C. A. Gordon, D. L. Sutherland, and J. H. Lesser, all of Halifax, attended the annual meeting of the American College of Physicians, held in Saint Louis, Missouri, in April.

The Bulletin extends congratulations to Doctor and Mrs. J. F. L. Woodbury, formerly of Halifax, and at present in Toronto, on the birth of a son, Francis Russell, in Toronto, on April 6th; to Doctor and Mrs. D. M. Muir of Shelburne, on the birth of a son, David MacGill, on April 11th; to Doctor and Mrs. S. E. Bishop of Kentville, on the birth of a daughter, Carolyn Jane, on May 6th; and to Doctor and Mrs. Duncan MacMillan of Sheet Harbour, on the birth of a daughter on May 3rd.

Doctor C. Donald Vair, who graduated from Dalhousie Medical School in May of this year, announces the opening of an office for general practice in association with the Dartmouth Medical Centre.

Doctor Donald I. Rice, who also graduated from Dalhousie Medical School in May of this year, announces the opening of an office for general practice in association with Doctor J. H. Slayter, of Halifax.

The marriage took place at Windsor May 22nd of Miss Dorothy Jean, only daughter of Mr. and Mrs. S. G. Muir, Windsor, and Doctor William Golding Cameron, son of Mr. and Mrs. H. J. Cameron, Winnipeg, now of Toronto. Doctor Cameron graduated from Dalhousie Medical School in May of this year, and will practise at Dryden, Ontario.

Doctor N. B. Trask, who graduated from Dalhousie Medical School in May of this year, announces the opening of an office for general practice in association with Doctor D. S. MacKeigan of Dartmouth.

Doctor Ian S. Robb, Dal. 1942, medical missionary of the United Church of Canada, and who was unreported in the interior of Communist China for some months, has been reported safe and well at Hong Kong. He was expected to board a plane for Amsterdam on May 11th. His wife and two children are living at Bridgetown.

Doctor Kenneth A. MacKenzie of Halifax who underwent an operation early in April is now improving, and expects to resume his practise in a short time.