

The American Journal of Roentgenology

Edited by P.M.Hickey, M.D.
Associate Editor, F.C.Zapffe, M.D.

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No. 10

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The American Roentgen Ray Society

Another Demonstration

PROBABLY in the history of Roentgenology no exhibit of X-ray plates has equalled that shown at the recent convention of the American Roentgen Ray Society at Cleveland. It was comprehensive, and well catalogued, which added much to its interest and its educational value.

At the convention of the American Hospital Association at St. Paul, in August, was shown another excellent demonstration of Roentgen pathology, which fell only a little short of the one at Cleveland.

One item worthy of note at both of these conventions was the very large majority of exhibits that were on

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THE AMERICAN JOURNAL OF ROENTGENOLOGY

Editor, P. M. Hickey, M. D., Detroit

Associate Editor, F. C. Zapffe, M. D., Chicago

VOL. I

NEW SERIES, AUGUST, 1914

No. 10

THE ROENTGEN FINDINGS IN OBSCURE HEAD LESIONS

By WILLIS F. MANGES, M. D.,

Roentgenologist to Jefferson Hospital; Director Roentgen Ray Laboratory
Philadelphia General Hospital, Philadelphia, Pa.

There are certain departures in the Roentgen study of the head so well established and so nearly standardized that they need only be mentioned to establish the value of reference in their relations to the study of the more obscure lesions.

In 1906 Caldwell taught us the proper technique in the examination of the accessory sinuses of the nose. It is the standard of the day. In 1909 Lange reviewed the literature on the subject of X-ray study of the mastoid and the following year established a definite classification of mastoid disease from the view point of the Roentgenologist, as well as its value to the Aurist, by corroboration evidence.

Last year Pfahler described a definite technique for X-ray study of the sphenoid sinuses. And more recently Percy Brown has shown us the advantages of careful study of the skull in lateral projection with especial reference to the base and its adnexa.

Our technique may be found in these papers, except that frequently we make our stereoscopic displacement of the tube in the direction of the long axis of the body.

The foregoing are classics to be referred to with confidence, and all of them aid in the study of the more obscure lesions.

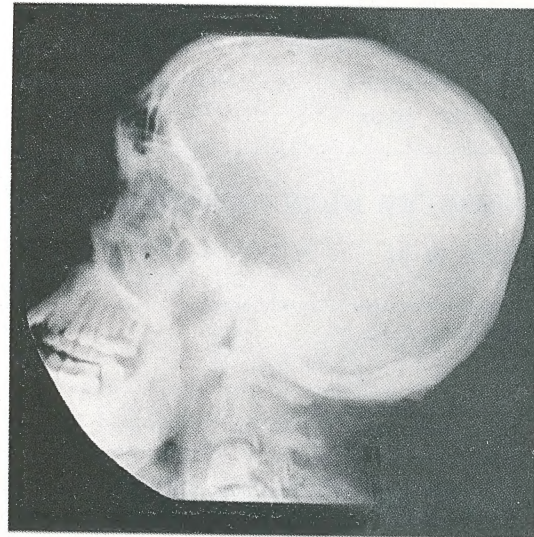
We will discuss the subject under two heads:

1. The findings in the skull bones.
2. The findings in the brain and its processes.

Under the first heading we will consider external influences and internal influences. In the former, injury is a common cause, the effects are immediate or remote. Our immediate findings lie in determining the nature and extent of fractures which are often hidden to all other methods of diagnosis. We need but caution you that a head examination after injury should be complete. The writer has recently found a fracture of the left parietal bone extending well toward the base, six months after the injury. It is worthy of note that this fracture had not been found by another Roentgenist shortly after the injury. The patient has come to the hospital for the relief of convulsions. Stewart has recently given us a valuable contribution on fractures of the skull. We should be especially careful in our efforts to determine the presence of depression of the fragments, and the extent of basilar involvement.

The remote effects of injury offer a somewhat speculative but very interesting field of study. Bone subjected to violence becomes more susceptible to infection or malignancy. We have found what we believe to be a gumma of the frontal bone in a patient whose son recalled upon inquiry,

that the patient had bumped his head against the edge of an open door. The skin had not been broken, but the injury undoubtedly influenced the onset and site of the lesion.



Acromegaly.

Disease of the skull bones due to infection is frequently the cause of obscure consequences.

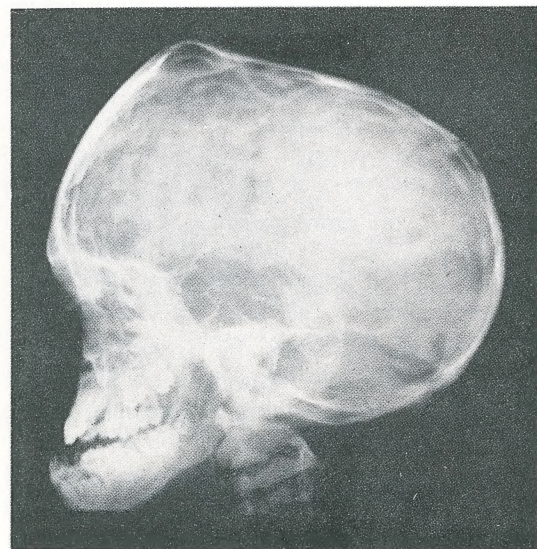
"Abscess of the brain is due to suppurative otitis media (in half of the cases), to fracture of the skull, osteomyelitis of the cranial bones, abscess of the lung, gangrene of the lung, empyema, and concussion or wound of the brain, and general diseases."

Our personal experience in the X-ray study of suspected brain abscess is somewhat limited. In one case where brain abscess was suspected, the writer made a probable diagnosis of tumor causing an internal hydrocephalus. The convolution depressions on the inner-table of the skull were exaggerated; the skull sutures were somewhat separated, and there was no evidence of disease in either mastoid, although there was a history of ear discharge.

Autopsy revealed a cerebellar tumor which completely blocked the aqueduct of Sylvius

and produced marked dilatation of the ventricles.

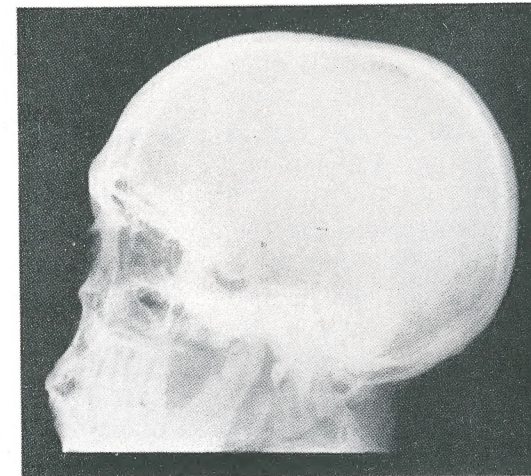
A more recent case (at present a patient in the hospital) had a radical mastoid operation on the left side seven years ago. This was followed shortly by a cerebellar abscess on the same side which was drained, and the patient made a good recovery. He has recently come to the hospital with violent head symptoms. Clinically, there were no localizing signs. X-ray examination revealed healthy bone in regions of former operations, and normal mastoid on the right side. Slight evidence of bone defect was noticed on the right side in front of the coronal suture near the top of the head. At operation the surgeon opened the former mastoid wound but found no evidence of disease. He then trephined the skull according to our direction and enlarged the opening. The bone cut easily on one side but with difficulty on the opposite side of the trephine opening. The dura was of a dusky color, tense and free from pulsation either to the sense of sight or touch. On opening the dura the brain tissue was dark and also free from pulsation. An instrument was inserted into the brain tissue but



Congenital Syphilis. Early ossification of sutures, marked convolution depressions.

pus did not escape, and the wound was closed. Some improvement followed, but the patient has since progressed unfavorably.

A symposium of three papers on the subject of brain abscess, by Drs. McKernon,



Hypertrophy of posterior clinoid processes. Calcareous deposit pineal region.

Dercum and Goldstein, and free discussion by many others, fails to contain even the suggestion of possible aid from the Roentgenologist.

In this obscure and not infrequent disease we can at least determine the condition of both mastoids without operation, as well as determine the probable source of infection when due to other causes than concussion or general diseases.

An infectious process, if near bone, will very soon demand lime salts, with a consequent lessening in density, which may be shown on the skiagraph. Thus the more superficial brain infections should permit Roentgen localization.

Syphilitic lesions of the skull bones may be productive (periostitis) or destructive (gumma), but either may be clinically obscure, yet very apparent on X-ray study. Malignant disease of the cranial bones may involve the brain by metastasis or by continuity. Osteitis deformans (Paget's dis-

ease) may involve only the skull bones, but a general thickening and more or less spongy appearance of the skull bones should lead one to look for involvement in other bones. In this disease the important prognostic feature is the extent of involvement of the inner table and the basilar processes.

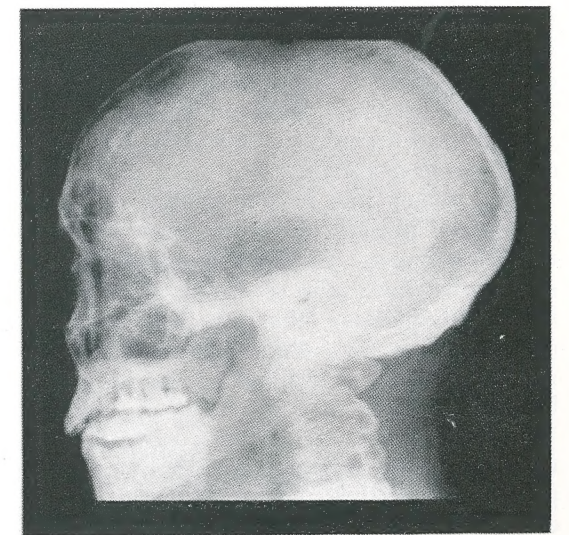
Any bone will atrophy under constant pressure. This fact has an extensive application in the Roentgen investigation of head lesions.

The atrophy may be localized as in the case of superficial cyst or tumor of the brain; limited to the anterior half of the skull if there is dilatation of the lateral ventricles only; or general, if there is extensive internal hydrocephalus.

These facts have long been noted in isolated cases, but we have not paid sufficient attention to them.

In 1909, Schuller believed that brain tumor might be seen on the plate if it contained salts of lime, but this was comparatively infrequent. More assistance could be obtained in this respect from certain secondary changes.

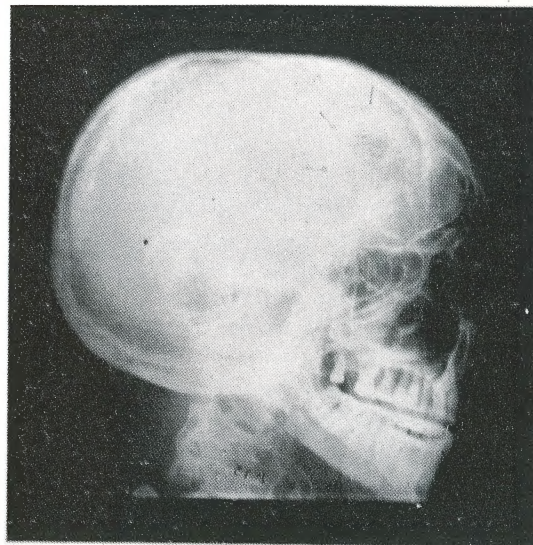
1. Destruction of osseous wall of skull either local or general.



Fibrosarcoma frontal region. Note irregular thinning of bone due to pressure.

2. Dilation of venous channels of the diploe which become so marked that they possess diagnostic value.

3. The increased distinctness of sutures.



Gumma of frontal bone involving frontal sinus.

4. The very characteristic increase of thickness of the skull. This thickness was due either to concentric hyperostosis of the walls or long excrescences on the inside of the skull. Sometimes the shape of the skull was changed by a new growth. Out of 240 cases he succeeded in making for diagnosis in 150, 54 of which involved the hypophysis.

Localized atrophy is distinctly diagnostic of localized disease.

The writer has in the exhibit a Roentgenogram illustrating this point with unusual clearness. It is of a patient whose symptoms were almost typically those of idiopathic epilepsy, the only localizing evidence from a neurologic point of view being a sensation of warmth in the hand just before the onset of convulsion.

Operation revealed a very soft but protruding tumor which was determined by the pathologist to be glioma. Symptoms had existed less than one year.

Harder tumors will produce a more irregular atrophy.

Another example of localized atrophy due to cyst may be seen in the American Quarterly of Roentgenology, Sept., 1913, exhibited by Dr. Lange.

The skull atrophy of internal hydrocephalus is a finding, the full importance of which we do not yet appreciate.

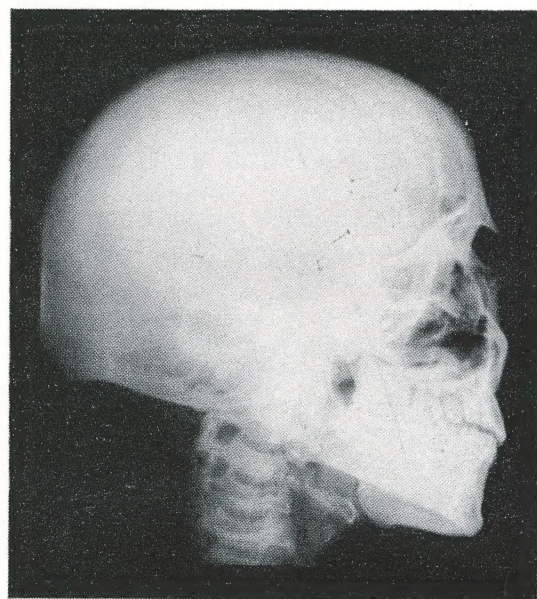
It is impossible to determine how prevalent the condition is or in what number of instances it is the cause of death.

The X-ray findings in external hydrocephalus are no less conspicuous. (An example being in our exhibition.)

Hydrocephalus may be acute or chronic, congenital or acquired.

The acute type is usually internal, but may be external. It results from meningitis—usually tuberculous.

In this type our findings would be wide separation of the sutures in children, absence of convolution markings if external, presence of convolution markings soon after the onset if patient should survive, if internal.



Recurrent sarcoma of frontal bone. Hypertrophy of posterior clinoid processes and calcareous deposit in pineal.

Congenital internal hydrocephalus is the most frequent form of the chronic type. It comes on at birth, or shortly after, and is usually easy of clinical diagnosis, hence is



Localized thinning of skull, regular in outline, due to glioma. Proven by operation.

not properly included here. The findings, however, would be thin skull, large head with or without depressions, and separation of sutures.

The acquired type may come on at any age and is difficult of clinical diagnosis. We do not know how long the condition must exist before producing convolution depressions, but believe that the Roentgenogram would reveal them soon after or possibly before the onset of marked symptoms; and the symptoms we know often exist for a year or more. In an excellent article on "Tumors of the Pineal Body" by Bailey and Jelliffe, reporting a case and giving abstracts of all the cases reported, we find some interesting facts.

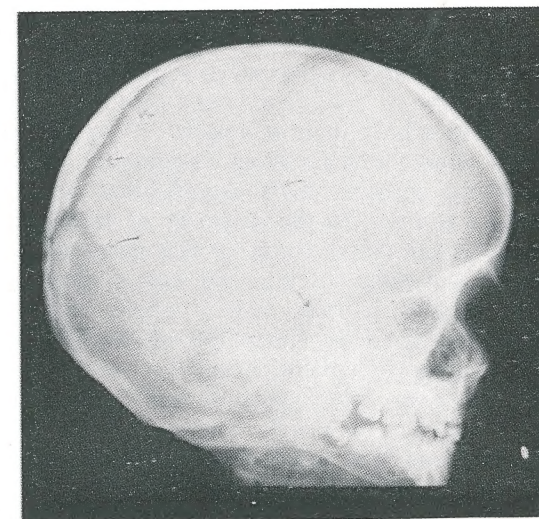
In the vast majority of these cases there was internal hydrocephalus, and since nearly all had existed for a year or more there is no doubt but all would have presented this sign on the skiagraph, had it been possible

to make them. Reported cases of tumors of the pineal are rare, but consider that in all but two or perhaps three there is no mention in the abstracts of clinical diagnosis, and we cannot estimate the number that have escaped the pathologist.

It is of especial interest that in the three cases examined by X-ray, all gave positive findings, though incorrectly interpreted. In one of the three, mention was made of the thinness of the skull due to pressure atrophy.

Any growth in a position to obstruct the interventricular passages or exert pressure on the veins of Galen will produce dilatation of one or more ventricles, hence local or general evidence of skull atrophy may be found. We have then in this finding, an important localizing sign.

The writer has, on several occasions, found the skull sutures completely obliterated, one in a known luetic, another in a boy having epilepsy—the head being otherwise normal—and the third in a girl of seven with an enormously large head. In this last case the head was well proportioned, the sinuses were well developed and healthy, the basilar processes quite distinct and regular, and the bones of the vault were of nor-



Acute external hydrocephalus. Confirmed by operation.

mal thickness for a child of her years, though thin for the size of the head, and there was no evidence of diploe—a conflicting set of findings to say the least. We do not know the cause of the ossification of these sutures.

THE FINDINGS OF THE BRAIN AND ITS PROCESSES.

The question of foreign bodies entering from without is excluded.

In 1902, Pfahler reported positive findings in two cases of brain tumor in the absence of bone defect. These were confirmed by operation. Lime salts were absent from the tumor in each instance.

In 1903, Pancoast reported a Roentgenologic study of eight cases of suspected brain tumor, in two of which his findings were confirmed by operations—not by autopsy in any of them.

Bailey and Jelliffe's case of pineal tumor and two others mentioned by them were, in part at least, capable of casting distinguishable shadows, and I have no doubt that other cases are on record though not within notice of the writer. However, we can say with certainty that a certain proportion of brain tumors will cast noticeable shadows.

During the past few years I have found shadows of what seem to be small calcareous deposits in the region of the pineal gland. They vary in size from very minute to as much as a half inch in length. They occur with almost exasperating frequency; exasperating because their significance is not known to me. In the majority of instances there is associated more or less irregularity about the sella turcica. In one, a distinct acromegalic; in many others where there is hypertrophy of the clinoid processes; several were apparent epileptics and two had mental disorders. Two patients had exophthalmic goitre. In nearly every instance the patient was sent for X-ray examination because of obscure head symptoms.

The writer feels that it is of clinical significance and related to the disorders of the ductless gland series.

Cushing makes no mention of any such finding in his larger number of pituitary cases.

Kidd has recently reviewed the subject of the pineal gland and he quotes Faiure in 1857 having found small grains of calcium phosphate and concretion, but makes no mention of their significance or even of their size, whether microscopic or macroscopic.

Flesch, in 1888, studied the pineal of horse, sheep, pig, dog, bat and man, but found brain sand only in man.

Furthermore, we are not accustomed to finding these hard bodies except occasionally, in patients sent for mastoid or accessory sinus study. In one instance there was an infected antrum of Highmore, but the patient, a man, had a female-like voice, as well as other feminine characteristics. The sella turcica was normal. In another there were unusual head symptoms complicating a chronic mastoiditis, and also marked hypertrophy of the posterior clinoid processes. Constant headache is a most common associate.

It is impossible to deduce the importance of these foreign bodies from the known physiologic functions of the pineal body, but since there is apparently a well established belief that its functions are inter-related with those of the pituitary, thyroid, adrenals, ovaries, and testes, we believe that these findings should point to a new field of investigation. That the presence of macroscopic concretions is not of common post mortem notice, may be inferred from a statement in Cushing's work on the pituitary, to the effect that he regretted not having made systematic investigation of the pineal body; and he does not make mention of such findings in the text ascribed to the X-ray findings.

Sella turcica irregularities are to be considered by another author. The reflex influences of defects and disease of the teeth and face bones are highly estimated by the speaker, but could not be considered here for want of time.

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THE TREATMENT OF CANCER BY PHYSICAL METHODS, WITH AND WITHOUT SURGERY

From the Physical Laboratory of the Huntington Cancer Commission, General Memorial Hospital,
New York City

By ARTHUR F. HOLDING, M. D., New York

The electrical methods employed in the following series of cases were deep Roentgen therapy, fulguration (De Keating Hartt), desiccation (Clark), and diathermy (Nagelschmidt). These therapeutic agencies were combined with surgery, radium, toxins, and vaccines when such adjuvants were indicated. The results obtained were due to the correlation of excellent methods, which have already been described, but are little understood and seldom used by the

profession at large. Inasmuch as we have been treating these cases only during the past eighteen months, sufficient time has not elapsed to warrant any final statement concerning the successful cases, other than that they are now symptomatically well.

For our purposes malignant lesions may be divided into three classes, i. e., those in the first, second, and third degrees of malignancy.



Before Treatment

After Treatment

FIG. 1. FIRST DEGREE OF MALIGNANCY

Superficial epithelioma of the nose. Complete recovery under massive Roentgenotherapy.



Before Treatment

After Treatment

FIG. 2. FIRST DEGREE OF MALIGNANCY

Case of mycosis fungoides in which the lesion on the right temporal region was treated by surgical removal and skin grafting. The lesion on the left temporal region was treated by massive Roentgenotherapy. The lesions on the cheeks and neck were treated by desiccation. The best cosmetic results were obtained by radium, desiccation and massive Roentgenotherapy.

1. THE FIRST DEGREE OF MALIGNANCY.

(a) Cases having superficial skin lesions tending to extend out from the skin rather than into the underlying structures. (b) Those which do not extend more than one cm. beneath the skin. These are characterized by slow growth, long duration, and a tendency not to metastasize early.

Histological characteristics. Growths of this class of malignancy in our series showed the histological formation of papillary epithelioma, basal celled epithelioma, mycosis fungoides, and pre-epithelial keratoses.

Prognosis. The prognosis of such cases treated by the above methods is 100 per cent. good. They can be cured by physical methods, without surgery, pain, hemor-

rhage, opening up the lymph channels, danger of infection, implantation of malignant cells, or hospital confinement, and with the best cosmetic results.

Therapeutic methods. These cases should not be treated by cutting operations. The physical methods indicated in the order of their preference are: (a) Massive doses of Roentgen rays; (b) desiccation; (c) radium; (d) destructive caustics, provided the more expensive equipments are not available.

If improperly treated or neglected, these cases may develop into cases of the second or third degree of malignancy.

2. THE SECOND DEGREE OF MALIGNANCY.

(a) Those operable tumors which tend to extend rapidly into the deeper structures,

characterized by rapid growth and tend to metastasize early. Carcinomata of the breast and operable sarcomata are very good examples of this class.

Histological characteristics. Growths of this class of malignancy in our series of cases showed the histological formation of basal celled epithelioma, and alveolar and medullary carcinomata of the breast.

Therapeutic methods. This class of cases should be treated by the following program: (a) Preoperative massive doses of Roentgen rays; (b) thorough radical operation; (c) fulguration at the time of operation; (d) postoperative deep roentgenotherapy or radiotherapy. By the use of these adjuvants to surgical treatment, the

percentage of recovery in this class of patients has been materially improved.

3. THE THIRD DEGREE OF MALIGNANCY.

Inoperable superficial and deep malignant conditions.

Prognosis. These patients as a rule cannot be cured by any method of treatment and are undesirable subjects, as the ultimate prognosis is 100 per cent. bad. Despite this fact in our series of 116 cases of the third degree of malignancy, 6 (5.8%) cases to date remain symptomatically well; 24 (20%) showed marked primary improvement after massive Roentgen ray was instituted. This in itself is sufficient to demonstrate to the most conservative that Roentgenotherapy has an action on malignancy.



Before Treatment

After Treatment

FIG. 3. SECOND DEGREE OF MALIGNANCY

Case of epithelioma of the nose in a patient suffering from extensive lupus (non-ulcerative). The tumor developed on the nose after a local treatment of the lupus with carbon dioxide snow. The epithelioma was removed surgically, the base effulgerated (de Keating-Hart), and this procedure followed by massive Roentgenotherapy. The lupus was treated by massive Roentgenotherapy, the resistant edges being controlled by desiccation (Clark). An artificial nose has since been fitted and the patient makes a very presentable appearance.



Before Treatment

After Treatment

FIG. 4. THIRD DEGREE OF MALIGNANCY

Case of primary lymphosarcoma of the tonsil, involving the cervical glands. Treated at first by toxins with slight, if any, improvement. Within forty-eight hours after the first massive dose of deep Roentgenotherapy the size of the tumor had diminished 50% in size. Under the combined treatment of toxins and X-Rays patient steadily improved to the condition shown in the "after treatment" illustration. He subsequently relapsed and failed to respond to any treatment. This is commonly the history in cases of lymphosarcomata, Hodgkin's disease, the leukaemias and allied conditions, i. e., marked primary improvement progressing often to apparent recoveries, but as a rule these patients die sooner or later of the condition despite all changes in the technique, including raying of the long bones. In this class of cases every effort should be put forward to try and make permanent the initial good results.

nancy which might well be called inhibitory. This inhibitory action shown in these hopelessly advanced cases is the action which becomes annihilatory in less advanced cases.

Therapeutic methods. The symptoms can usually be improved by electrical methods and radium. The results obtained since the installation of the Coolidge tube in all three classes of cases have been noticeably better than those obtained previously with the former patterns of tubes. We have operated the Coolidge tube with a parallel spark gap of 10 inches, with milliamperage of 5 getting 15 X through 3 m. m. of aluminum and sensitized paper in 1½ minutes.

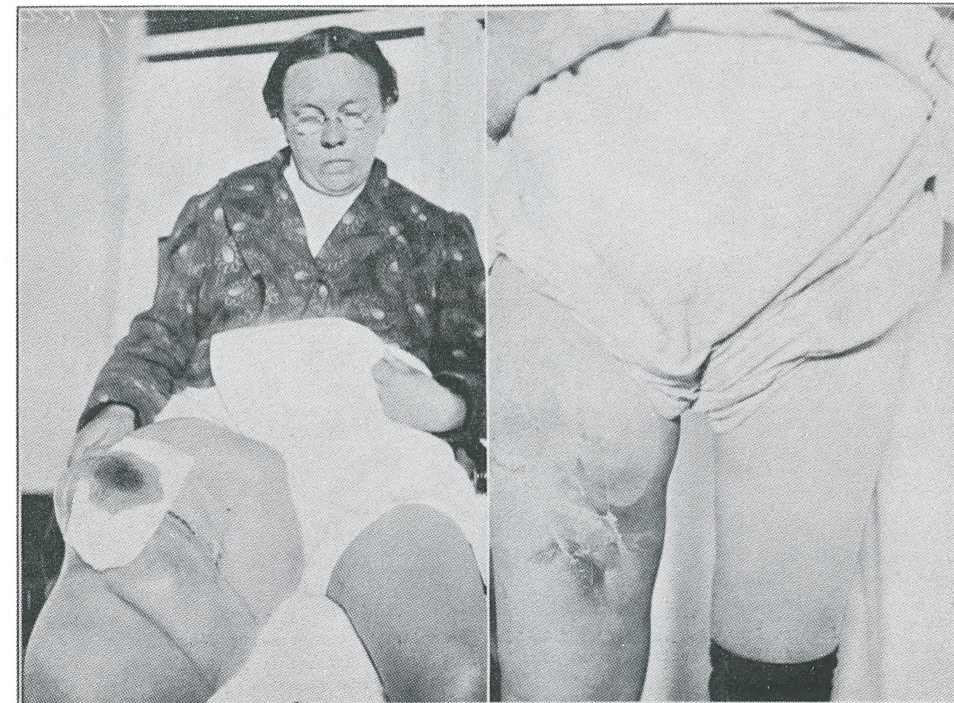
The foregoing division of all cancers into three classes of malignancy, is valuable for determining both the prognosis and the treatment. Cases of the first degree of malignancy can be cured; cases of the sec-

ond degree of malignancy may be cured; cases of the third degree of malignancy cannot be cured. Much time may be lost in cases of the second and third degree of malignancy and the patient's life endangered if one is deceived by the well known superficial healing properties of radium as well as of the X-rays. The fact that lesions of the second degree of malignancy appear at first to improve, under treatment indicated only for cases of the first degree, gives a false sense of security and results only in therapeutic procrastination, resulting in the second degree case developing into a malignancy of the third degree while under treatment only suited for cases of first degree malignancy.

Of the first degree of malignancy we have thirteen cases, nine of which have been symp-

tomatically cured under massive doses of X-ray, four of which are symptomatically cured with radium, and one of which has been symptomatically cured under the combined treatment of both massive doses of X-ray and radium.

Of the second degree of malignancy, we have a total of ten cases, four of epithelioma of the skin and six of carcinomata of the breast, all treated by a combination of massive doses of X-ray, radical operation, and fulguration, followed by massive doses of X-ray or radium. Three of these patients are still under treatment, five have been discharged symptomatically cured, and two have discontinued treatment. All of those patients who have continued the treatment are symptomatically well, although sufficient time has not elapsed to warrant the



Before Treatment After Treatment

FIG. 5. THIRD DEGREE OF MALIGNANCY

Case of myxo-lympho sarcoma. Extensive tumor of the right thigh and large mass filling half of the abdomen on the left side. It was impossible to remove all the tumor tissue from the thigh at operation and no surgical removal of the abdominal mass was attempted. Postoperative Roentgen deep therapy has caused the complete disappearance of all evidence of both the tumor masses so that the patient is today symptomatically well.

statement that they have been completely cured.

In the third degree of malignancy we had 116 cases, divided into groups according to the accompanying table:

Diagnosis	No. of cases	Sympt. well	Im-proved	Unim-proved	Dead
Epithelioma	21	0	4	10	8
Carcinoma of breast	22	1	3	9	6
Lymphosarcoma	11	1	4	3	3
Round celled sarcoma.....	2	0	0	2	0
Spindle celled sarcoma	9	1	3	3	1
Chondrosarcoma	1	1	1	0	0
Melanosarcoma	2	0	0	1	0
Miscellaneous sarcomata ...	7	0	3	3	0
Hodgkin's disease	5	2	3	0	2
Chronic lymphatic leucemia	1	0	1	0	0
Carcinoma of uterus	10	0	2	2	2
Miscellaneous tumors	25	0	0	5	15
	116	6	24	38	37
Percentage.....	—	5.8	20.	32.22	32.

On account of the extravagant exploitations of radium by the profession as well as by laymen, a statement as to its relative value as a therapeutic agent as compared with other physical methods may be useful.

Radium has been fortunate in many respects in its exploitation. In the first place, it is so rare and expensive that it has been placed only in the hands of well known physicians, surgeons or scientists who have felt in duty bound to test it extensively and report upon its properties. Think of what it means to have a newly discovered element corraled in the hands of men of such world wide reputation as Van Noorden, the internist; Bumm, Krönig, Doderlein, Wertheim, Schauta and Kelly, the gynaecologists; Von Eisselberg, Hogeneck, Abbe, the surgeons; think of the large clientele these men control and the large number of cases they could treat with this agent and report upon. Think of professors of physical department in our universities devoting their entire time and in some instances, the time of most of their force of scientifically trained assistants to the study of this new element. Their results are not nullified by a great multitude of mediocre or unreliable results promulgated by inexperienced observers who happened to have a few hun-

dred dollars that they were willing to invest in the new agent as was the case when X-ray machines were put on the market. The result is that radium results have been taken much more seriously than its predecessor in the radio-active field, the X-rays. For some reason electricity of any kind in medicine is not taken very seriously by the profession at large. And I can't help but remark the singular fact that although the radium workers may be very scientific, as a whole they do not seem to be familiar with the therapeutic effects that have been obtained by means of X-rays in efficient workers' hands. Several of the best known radium workers have pointed with pride to their results in treating the various leukaemias; Hodgkin's disease, exophthalmic goitres and epitheliomata for instance, and acted surprised when informed that X-ray workers have reported the same results years ago and that these things are routine occurrences in the practice of good Roentgenotherapists. They look skeptical when assured that X-rays properly administered will control all the symptoms complained of in exophthalmic goitre except exophthalmos, and that the blood counts and lymphatic enlargements in leukaemias and pseudo-leukaemias can all be controlled at least temporarily. Whether these results obtained by radium will be more permanent than those obtained by X-rays cannot be stated at the present time as the radium cases are too recent to warrant any conclusion. There really should be little or no rivalry between these two agents at the present time. The point to get to the medical profession is that there is a field in which this agent should be preferred to surgery. In comparing the relative value of these various methods six points should be considered.

1. Cost.

Radium is far more expensive than any of the other methods. Massive X-rays, electric desiccation and ultra-violet rays come next in expense. Surgery and caustics are the cheapest.

2. EASE OF APPLICATION.

As to ease of application, much depends upon the training of the individual who administers the treatment. Each therapeutic will naturally do the best work with the greatest ease by employing that agent with which he is most familiar. Other things being equal, radium and caustics are easier to apply than the other agents in question.

3. TIME CONSUMED IN TREATMENT.

Radium applications are much longer in duration than any of the other methods. They require hours while the other treatments require minutes.

4. PAIN.

Radium, X-ray and ultra-violet light treatments cause no pain. Electric desiccation and carbon dioxide snow cause slight pain. Surgery and cauterization are very painful and require a local anesthetic. Chemical caustics are the most painful.

5. COSMETIC EFFECTS.

Cosmetic effects are best after radium, X-rays, ultra-violet light, desiccation, and carbon dioxide snow, and poorest after surgery or cautery.

6. DANGERS.

With a proper technique there are no dangers in any of these methods. Poor technique is a de facto contra-indication for the use of any agent, for it will need the combined energies of the advocates of both forms of radioactivity to force the surgeons of today to admit that there is any efficacy in either method.

The electric cautery of Percy seems to have made some impression on the surgical mind but the virtues of desiccation, diathermy and fulguration are hardly known and seldom practiced by surgeons. It is to be hoped that the propaganda of radium as-

sociated with the timely invention of the Coolidge tube will call to the attention of the medical profession, the value of electrical methods. This can hardly result in a large vogue for these methods unless championed by prominent surgeons.

The only hope for the relief of internal growths is to diagnose them in their incipency. By the proper use of the Roentgen rays, a positive or negative diagnosis of carcinoma or ulcer of the gastro-intestinal tract can be made in the earliest stages of the involvement.

Furthermore, its size, shape and position can be determined, painlessly and without shock or danger. This accurate information affords an opportunity for the early and successful removal by surgical operation of the cancer or ulcer bearing area, moreover reducing the time required for surgical examination and operation and consequently the amount of shock entailed, so that the percentage of recoveries after surgical removal is increased.

The problem of handling malignancy today resolves itself, therefore, into:

1. The proper treatment of external cases of the first degree of malignancy, lest they develop into cases of the second and third degree of malignancy. 2. Increasing the palliative effects possible for external tumors of the second and third degrees of malignancy, so that they may be regarded as actually remedial. 3. The diagnosis and early surgical removal of ulcer bearing areas and malignant conditions of the gastro-intestinal tract in their incipency.

CONCLUSIONS.

1. Incipient surface cancers can be cured (a) if SUPERFICIAL, by physical methods; (b) if DEEP, by physical methods and surgery.

2. The physical methods employed include massive X-ray doses, desiccation (Clark), fulguration (De Keating Hartt), diathermy (Nagelschmidt), and radium.

3. Beginning cancer of the gastro-intestinal tract can be diagnosed with accuracy by recently improved X-ray methods.

4. Advanced cancer either internal or external cannot be cured.

5. The successes herein reported are due not to the discovery of any one new factor, but rather to the combined application of the best and most efficient electrophysical technic, both in early diagnosis and prompt treatment, the results of which, if permanent, are invaluable.

6. The methods herein advocated are very costly.

7. If this work is to be continued, sufficient money must be raised to carry it on. This means, for institutions, proper endowment; for individuals, the establishment of adequate fees.

I am grateful to the members of the Commission and the staff of the General Memorial Hospital for their co-operation, and particularly to my assistants in the electrophysical department for their faithful and painstaking work.

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FURTHER X-RAY STUDIES ON THE ILEOCECAL VALVE AND THE APPENDIX*

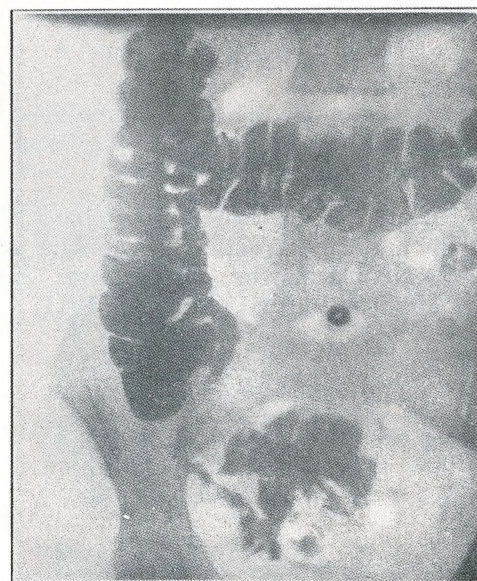
By JAMES T. CASE, M. D., of Battle Creek, Michigan

Roentgenologist and Assistant Surgeon to the Battle Creek Sanitarium; Attending Roentgenologist to St. Luke's and Cook County Hospitals, Chicago; Professor of Roentgenology, Northwestern University Medical School, Chicago

At the Boston meeting of the American Roentgen Ray Society (1912), I presented some X-ray studies on the ileocecal region with special reference to the appendix and to the ileocecal valve, dwelling particularly on the question of ileocolic valve incompetency. Since then, considerable interest has been manifested in the special topics treated in my paper, as evidenced by the papers of Groedel on ileocolic valve incompetency and on the appendix; by the further work of Jordan, and by the work of Max Cohn on the appendix. The results of some of my more extended studies were incorporated in a paper presented before the International Congress of Medicine at London in August of this year.

Lately, the interest of surgeons has been enlisted in the clinical study of ileocolic valve incompetency and J. H. Kellogg has devised a simple but very effective operation for a surgical cure of ileocolic valve incompetency. Dr. Kellogg, keenly appreciating the importance of maintaining the barrier against reflux from the colon into the small intestine, has gone a step further and devised an operation for making an artificial ileocolic valve in connection with the operation of ileosigmoidostomy.

After another year of research and further testing of the views previously presented, it seems proper, and I trust profitable, to offer a summary of my later studies and conclusions with reference to the X-ray examination of the appendix and of the ileocolic valve.

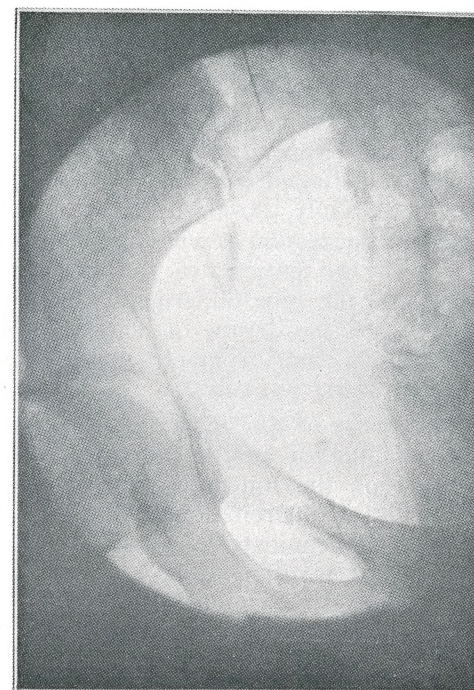


1. Roentgenogram ten hours after a bismuth meal showing extensive filling of the terminal ileum (ileal stasis) due to appendical adhesions.

THE APPENDIX.

In acute appendicitis, little need or opportunity for X-ray examination will be likely. Perhaps in doubtful cases, as, for instance, suspected left-sided appendicitis, a careful injection of the colon with the bismuth clysma under the guidance of the fluorescent screen, followed by careful and intelligent palpation of the abdomen under the screen, may be of some service.

In studying chronic appendicitis and its complications and sequelae, I believe the X-ray examination capable of rendering valuable service in a large number of cases. Of course, when the lumen of the appendix is



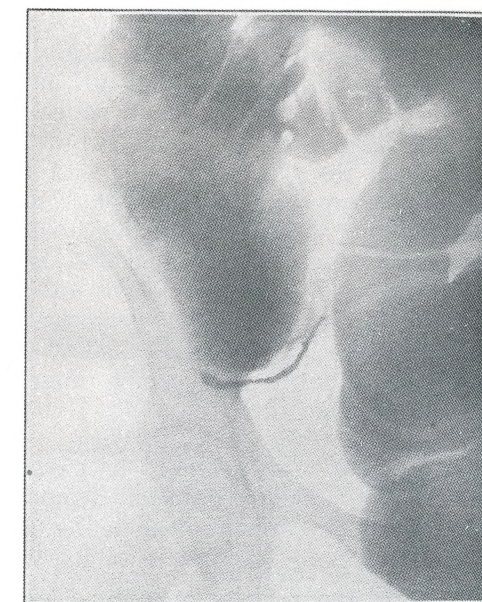
2. Residue in the appendix seen on the twelfth day following a barium meal, certainly a very poorly drained appendix. The barium-filled appendix has been seen on the forty-third day following a barium meal.

closed as the result of an obliterative process, bismuth will fail to enter and the appendix shadow will fail to appear, but in the large percentage of cases in which the appendix shadow can be studied under the fluorescent screen, there are a number of facts capable of demonstration. One may study the size and length of the lumen, the presence or absence of constrictions or kinks, adhesions, drainage (emptying time), the relation of the visible appendix shadow to a point of pain on pressure, the position of the appendix, whether retrocecal, procecal, etc.

Often the lumen is seen to be constricted. Important conclusions may be drawn from a broad appendix shadow persisting for a long time, perhaps even for several days after the rest of the bowel is empty. The writer has seen the tender appendix shadow still filled with bismuth on the twentieth day and A. Howard Pirie has related a case in

which the bismuth shadow persisted for forty-three days. The exact disposition of the appendix is often suggestive of a pericolic membrane of the variety described by Eastman. Kinks of the appendix are frequently made out under fluorescent examination. The relation of the bismuth-filled appendix to the sigmoid, transverse colon, terminal ileum and the cecum itself may be accurately studied by intelligent palpation.

The technic of examination of the appendix was fully described in my previous paper. I need not here repeat the details, except to emphasize two points; first, the necessity of examining the patient in the horizontal position, the screen over the abdomen and tube underneath the table, and second, the necessity of palpating the abdomen under the screen with the gloved hand or preferably with the wooden spoon of the type described by Holzkecht, or, in certain cases, with my modification of Holzkecht's spoon.



3. A very poorly drained appendix, the very dense shadow of the appendix being due to filling following a barium meal, although the present roentgenogram was made at the time of the colon injection five days later.

*Read at the annual meeting of the American Roentgen Ray Society, Boston, October 1-4, 1913.



4. Adherent appendix in a case of spastic constipation with ileal stasis. Terminal ileum not yet empty at the tenth hour.

The time of the examination is of some importance. Shortly after the cecum begins to fill, the appendix, if patent, also fills. This usually occurs at about the sixth hour, although there are many cases in which the cecum is filled earlier or later. From this time on until the bowel is empty and frequently for many days afterward, as I have suggested, the appendix remains visible. Fluoroscopic study of the appendix, however, should be done at a sufficient interval after the bismuth meal that the ileum will be empty; otherwise, a very thin shadow still remaining in the terminal ileum may be taken for the appendix.

The making of a roentgenographic record of the shadow of the bismuth-filled appendix is a matter of considerable difficulty. The ordinary technic of roentgenography with the patient standing or lying is not likely to show the appendix shadow. Except in occasional fortunate instances, one must first find the appendix fluoroscopically and then make the roentgenogram. The cecum or other bismuth-filled bowel is held out of the

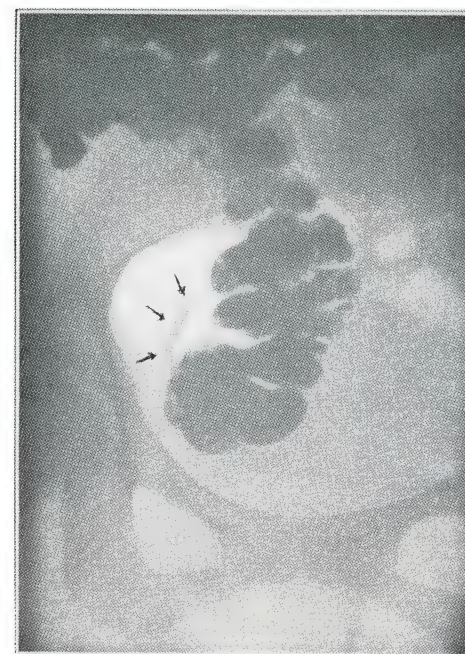
way by the wooden "palpatorium," (Holzknecht's spoon.)

Out of more than three hundred cases in which I have secured roentgenograms of bismuth in the appendix, the appendix was first seen and studied with the fluoroscope in all but one. Only those who have had experience in fluorescent screen studies of the bowel with the patient in the horizontal position and the tube underneath the table, can appreciate the degree of accuracy with which shadows can be identified in all except the heaviest patients.

In one series of 827 bismuth meal examinations, tabulation of the facts shows that in sixty-four the appendix had been removed. Out of the remaining 763 cases, the appendix was demonstrated in 273 cases, or just one-third, a rather high percentage until it is recalled that all of the patients of the series referred to, were submitted to X-ray study because they exhibited various gastro-intestinal symptoms. In a large majority of cases, constipation was a prominent symptom. Hence one might expect to find in this particular series of cases a larger



5. Retrocecal, adherent appendix at the fiftieth hour following a barium meal.



6. Retrocecal appendix in a case of marked prolapsus of the mobile cecum.

percentage than usual in which the appendix would be visible. Further, I believe, that in only a very small percentage of cases does the filled appendix escape observation under the careful fluoroscopic technic possible with the Haenisch or some similar trochoscope. I can not believe that the ratio of patent appendices can be very much greater than one in three of patients with gastro-intestinal symptoms.

Groedel has recently taken the stand that every appendix which permits the entry of bismuth is a pathological appendix. I believe that, technically speaking, it is pathological for the contents of the colon to enter the appendix. However, I do not wish to be understood as claiming that every appendix which permits the entry of bismuth is in need of surgical attention. I am quite ready to believe that there are many cases in which the appendical shadow is visible where surgery is distinctly not indicated; for instance, such cases as are frequently encountered where the contents of the ap-

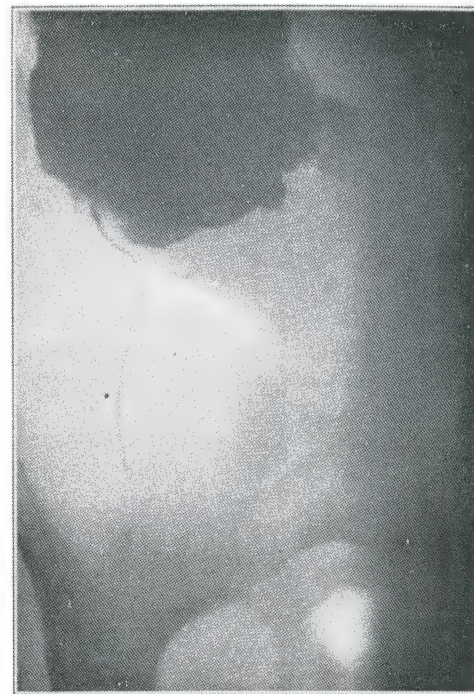
pendix have disappeared by the time the colon is empty.

It is to be presumed that when the appendix rids itself promptly of the bismuth-mixed cecal contents, the fact of the entry in the appendix is of little consequence, but when the cecal contents are retained for several days and perhaps even weeks, one may certainly conclude that under favorable circumstances, when the fecal mass is especially rich in pathological bacteria, its retention within the appendix will be a matter of greatest importance. Hence, when the appendix remains visible for more than a day or two following the bismuth examination, it is, in proportion to its poor drainage, a dangerous appendix.

There are a large number of cases in which the bismuth shadow persists for many hours or days and sometimes several weeks after the rest of the bowel has been emptied of the bismuth content. In the case of Pirie's referred to above, on the forty-third day the patient developed an acute appendicitis. In one case of mine, on the eighth day, the patient developed acute appendicitis. Reference to the records showed, however, that in my case, the patient's leukocyte count



7. Appendix retrocecal and adherent, pointing upward.

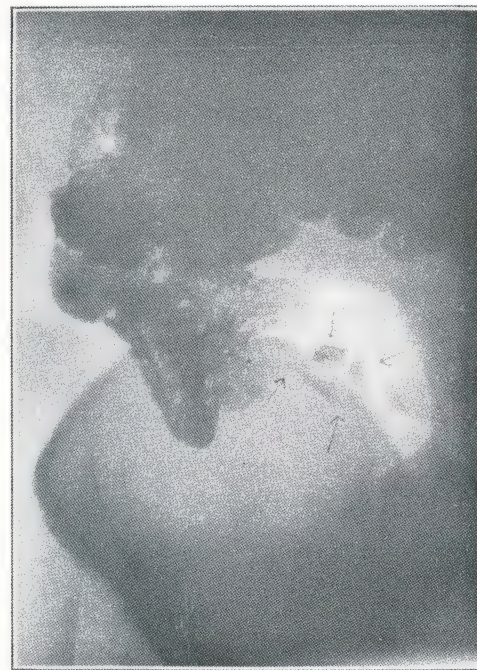


8. Appendix retrocecal and adherent. Cecum held up out of the way by the wooden spoon.

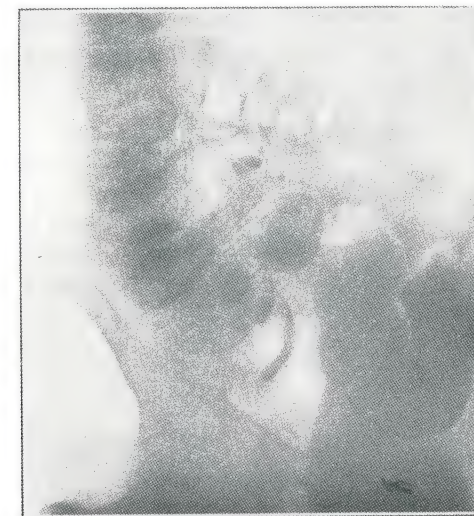
on the date of entry into the hospital four days before my examination was higher than it was on the day of her operation and clinically the case was one of recurrent appendicitis. It was suggested that perhaps in these cases the presence of the bismuth in the appendix was the exciting cause of the acute attack and that bismuth in the appendix was a menace to health. In connection with the discussion of this question, I made an inquiry into the fate of bismuth administered in medicinal doses for therapeutical purposes. I therefore had occasion to examine five patients who were being given bismuth in fifteen grain doses in the usual manner in the course of treatment of acute gastric disease. In all five, bismuth was found in the appendix. In one of them it was found on the nineteenth day after the last dose of bismuth. Although this is a limited number of cases from which to draw an inference, the conclusion seems warranted that there is no more likelihood of

bismuth entering the appendix and by remaining there cause acute appendicitis when the bismuth is taken in the course of an X-ray examination than when bismuth is being administered therapeutically.

In the series of 273 cases above referred to, where the appendix was filled with bismuth, there was very definite tenderness corresponding to the appendix in 236, or 86%. In only 37, or 14%, was there lack of definite tenderness on pressure over the appendix shadow. I believe that in these 37 cases, the appendix was practically normal. They were characterized by the short time during which the appendix lumen was visible, by the lack of tenderness, by free mobility of the cecum and appendix, and by the absence of kinks or constrictions of the appendix. On the other hand, of the 236 cases in which there was definite tenderness on pressure over the appendical shadow, 88



9. Roentgenogram of the appendix illustrating the value of pressure by the wooden spoon during the making of a roentgenogram. The light area surrounding the appendix shows the effect of pressure with the spoon.



10. Doubly-kinked appendix, involved in adhesions with a pericecal membrane.

have had the appendix removed, many during operation for other causes, and in all but a few instances, the pathological report showed disease of the appendix.

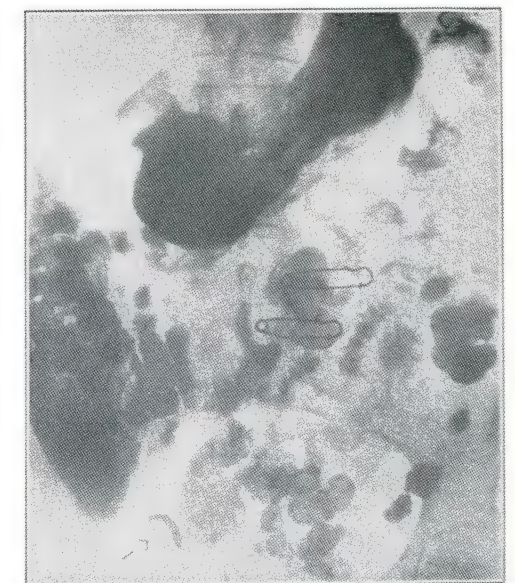
I now have more than 325 cases in which, following the bismuth, the appendix has been visible fluoroscopically and hence capable of being studied and recorded roentgenographically. Out of this larger experience, I wish to repeat what I stated in my previous communication, that in practically every instance in which the appendix has been visible on the first examination, repeated examinations, often for the third time, have shown the appendix again filled with bismuth. On the other hand, when the appendix could not be demonstrated on the first examination, in practically all the cases, repeated examinations have also failed to demonstrate it. In the few cases where the results have not been the same on repeated examinations, the inconstancy may, I think, be attributed to technical faults.

When the appendix is not visible, there may be several reasons. Its lumen may be closed by a chronic obliterative process, by kinking near the cecal end or by the infiltration and swelling associated with an acute appendicitis or the appendix may be

filled and the fact fail to be noted by reason of such dilatation or adhesions of the cecum that the retrocecal appendix can not be made out.

Even in cases where the appendix lumen has been obliterated, the X-ray gives definite information as to whether or not a tender point coincides with the shadow of the lower inner border of the cecum at a point where the appendix should be. If on palpation under the greatly improved conditions afforded by fluoroscopy, there is no appendical region tenderness, even granted that the lumen is obliterated, it is not likely that an essential pathological point is being overlooked.

There are numerous cases, it must be admitted, in which the adherent, dilated cecum may prevent a retrocecal filled appendix from being discovered. This source of error is likely to occur very frequently, perhaps even in the great majority of cases when the examination is made roentgenographically alone, or when the patient is studied in the standing position. This source of error can not be a very large one with the patient ex-



11. Portion of a forcep left in the abdomen following abdominal hysterectomy, simulating the appendix.



12. Residue in the cecum at the site of the appendix, the appendix having been removed. In appendectomized patients, a residue of this sort is often seen in the cecum several days after the barium meal has been evacuated.

amed fluoroscopically in the horizontal position, using the wooden spoon or the gloved hands for palpation. Out of my large series of cases in which the appendix has been visible, I have very rarely been able to fill the appendix by the clysm.

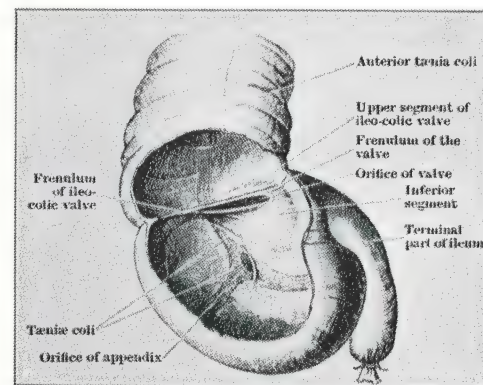
Demonstration of enteroliths and other foreign bodies in the appendix has been done by Fittig and Weisflog. I have successfully demonstrated appendical calculi in two cases. In a third case, a very large calculus removed from the appendix at operation, had not been recognized during the previous roentgen examination as being other than a bismuth shadow. Adhesions, resulting from appendix disease, are sometimes suggested by an abnormal, fixed position of the sigmoid, as in several cases which I shall demonstrate after this paper. The adhesions may sometimes involve the terminal ileum and produce ileal stasis, or, on the other hand, they may be productive of ileocolic valve incompetency. On several occasions,

the removal of the appendix has resulted in relief of the ileocolic valve incompetency.

ILEOCECAL VALVE INCOMPETENCY.

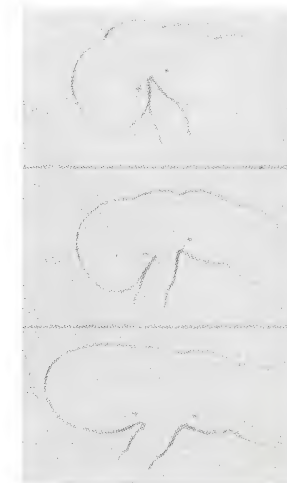
Last year I called attention to the frequency with which I had observed the passage of the clysm from the large into the small intestine. I reported that in two hundred consecutive examinations of the colon following the injection of the bismuth suspension, I had demonstrated bismuth in the small intestine in thirty-three cases, or one in six. When the clysm has thus passed the valve, I have considered the fact indicative of incompetency of the ileocolic valve. Singer and Holzknecht called attention to the relative frequency of ileocolic valve incompetency, reporting three incompetencies out of fifteen cases examined by clysm. Groedel has reported studies on the ileocecal region with special reference to ileocolic valve insufficiency and concludes that the ileocolic valve incompetency is often due to perityphlitis. L. G. Cole tells me he has seen this condition in about sixty cases.

Before the International Congress of Medicine in London this year, I reported a much more extensive series of cases (fifteen hundred consecutive bismuth clysm examinations) in each of which the competency of the ileocolic valve was especially noted by the technic which I shall describe, and incompetency of the valve discovered in nearly two hundred and fifty cases, or one in six.



13. The cecum showing the structure of the ileocecal valve (Cunningham.)

I have now found more than three hundred cases of ileocolic valve incompetency. I should state that this comparatively large



14. Three diagrams (Kellogg) illustrating the normal and the incompetent ileocecal valve. On the left, the normal ileocecal valve. The middle, disinvagination of the upper lip at A. The lower lip, B, normal. Right hand, marked incompetency showing disinvagination of both lips.

number of cases occurred during gastro-intestinal examination after a bismuth meal for suspected gastric carcinoma and ulcer, duodenal and gall bladder lesions, chronic appendical disease, with or without involvement of the cecum and terminal ileum, kinks, torsions, spasms and tumors of the colon. Indeed, for some time since the apparent importance of ileocolic valve incompetency has been more definitely studied, a number of cases have been clinically diagnosed by my colleagues before the X-ray examination.

Our chief-of-staff, Dr. Kellogg, on account of the frequency with which I am finding incompetency of the ileocolic valve, has become convinced that this morbid condition is "one of considerable importance, not only in relation to pathological disturbances of the alimentary canal, but also of numerous varied and serious functional disturbances and degenerations elsewhere in the body." Observations of Dr. Kellogg and other surgeons during numerous abdominal

operations gives confirmation of the belief that the normal ileocolic valve is thoroughly competent. I will refer you to Dr. Kellogg's paper for a very interesting discussion of the physiology of the ileocolic valve and of the morbid conditions which arise from incompetency of the valve.

Dr. Kellogg has also described the palliative and operative treatment of ileocolic valve incompetency. It seems possible that in certain rare cases there may exist a temporary incompetency of the ileocolic valve associated with acute dilatation of the colon which may be recovered from when the cause is removed. I am convinced that in the majority of cases, however, the ileocolic valve can only be cured by some surgical procedure, as, for instance, the operation devised by Dr. Kellogg for repair of the valve.*

For years diarrhea has been considered the classical symptom of ileocolic valve incompetency, but in reviewing the notes of my large series of cases, it is a most striking

*This operation, as well as an operation for making an artificial ileocolic valve when performing ileosigmoidostomy, was described in an article by Dr. Kellogg in *Surgery, Gynecology and Obstetrics*, November, 1913.



15. Roentgenogram following the barium enema showing slight incompetency of the ileocecal valve.



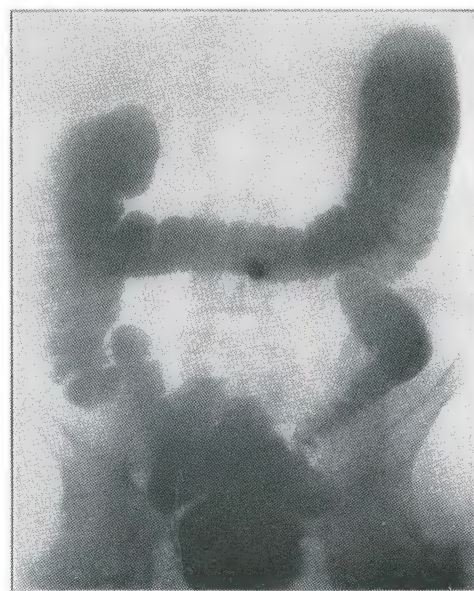
16. Roentgenogram showing marked incompetency of the ileocecal valve, permitting two or three feet of terminal ileum to fill at the time of the barium enema.

fact that in the majority of instances ileocolic valve insufficiency is associated, not with diarrhea, but with intestinal stasis. Our present knowledge of the antiperistaltic phenomena in the colon makes it easy to understand why we find ileal stasis and constipation rather than hypermotility when reflux from the colon into the ileum is no longer prevented by a competent ileocolic valve. Jordan, whose attention has been largely devoted to the study of Lane's kinks, and others have considered that one of the cardinal symptoms of ileal kinking was ileal stasis; yet I and my colleagues are now thoroughly convinced that ileal stasis is, in the large majority of cases, due, not to a Lane's kink, but to ileocolic valve incompetency. On the other hand, we feel that in the majority of instances where Lane's kink is present, it is a matter of coincidence and of secondary importance in the production of ileal stasis.

Certainly there are cases in which there is a definite causative relation between adhesions and kinks of the terminal ileum and

stasis in the ileum, but in all my cases (proven by operation), where I considered the Lane's kink a cause of stasis in the ileum, there has been dilatation and stasis proximal to the kink, the dilated portion of the ileum being separated from the cecum by constricted or kinked ileum.

I have enjoyed an unusual opportunity for the study of this region. Some two years ago, in the surgical clinic of Dr. Kellogg, a tentative rule was made requiring a bismuth meal examination of every patient undergoing a laparotomy, no matter for what cause, except emergencies. The surgeons have long since decided to continue this rule and insist on its observance more rigidly because of the material aid rendered them. Thanks to this rich opportunity I have, on repeated occasions, observed the surgeons disclose a typical Lane's kink of the ileum, whereas during the preoperative bismuth examination, there had certainly been no ileal stasis. On the other hand, in the majority of cases where ileal stasis had been reported from the



17. Enema-filled colon, illustrating the great frequency with which ileocecal valve incompetency and spasticity of the iliac and pelvic colon are associated.



18. Very marked incompetency of the ileocecal valve, with extreme dilation of the terminal ileum.

bismuth examination, there had also been discovered by the X-ray examination an ileocolic valve insufficiency and this was confirmed by the surgeons at operation. In still another class of cases, where ileal stasis without ileocolic valve incompetency had previously been reported from roentgen observations, no Lane's kinks were discovered.

Keith, in 1903, rediscovered the sphincter function of the ileocolic junction which had long before been mentioned by Dr. John Mason Good. Last year in my discussion of this subject I suggested that there were cases of spasmodic closure of the ileocolic valve, due to irritation, the etiologic factors being similar to those which operate to produce spasm of the pyloric sphincter. I based this suggestion partly upon the observation that there were a certain number of cases where although the ileocolic valve was thoroughly competent and I was unable to demonstrate the presence of ileal adhesions, yet ileal stasis occurred. Arthur F. Hertz believes that a certain degree of ileal delay is "a normal physiologic condition of the utmost importance for adequate digestion." Hertz

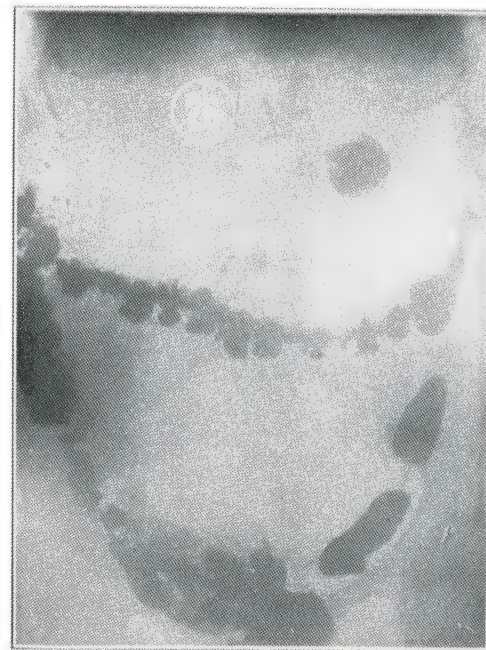
was probably the first to suggest that the normal delay in the ileum is increased in all conditions leading to spasm or to inhibition of the normal ileocolic sphincter, more especially in acute appendicitis, but to a less marked degree in chronic appendicitis.

Leaving out of consideration neoplastic obstruction, we may conclude, therefore, that ileal stasis, meaning thereby a pathological increase of the normal emptying time of the ileum, may result from one or more of at least three different causes, viz., incompetency of the ileocolic valve, spasm of the ileocolic sphincter, and ileal adhesions of various kinds, including the true Lane's kink.

The bismuth clyisma has been suggested as a means of diagnosing Lane's kink, provided the clyisma passes the ileocolic valve. It is supposed that in such a case, the clyisma will fill the ileum only as far as the kink. Figure shows the appearance of the ileum in one of my cases, the ileum



19. Colon in a case of spastic constipation and ileocecal valve incompetency at the twenty-sixth hour following the barium meal. Note the gas distension of the small intestine indicative of chronic small intestasis. Some of the gas is in the left half of the colon, but the greater part is in the small intestine. Note the long appendix, bulbous at the tip.



20. Roentgenogram twenty-six hours following the barium meal. Note that the stomach is not yet empty and therefore the extensive filling of the terminal ileum, which would normally be significant, is probably unimportant in this case, being due to the slow emptying of the stomach.

being filled for perhaps seven inches. There was a peculiar configuration of the ileum, which suggested very strongly a Lane's kink, although accurate palpation was impossible in this case. The patient then evacuated the clyisma and returned to the trochoscope, after which another roentgenogram was made. The shadow of the terminal ileum was exactly identical with the first plate. Notwithstanding the fact that the bismuth had gone no further in spite of the exertion of climbing from the table, walking sixty feet, expelling the enema and getting back upon the table, yet at operation the surgeon could find no sign of any adhesions, although he explored the last five or six feet of ileum. On the other hand, I have often seen the clyisma flow through the ileocolic valve onward past a typical Lane's kink and fill the ileum for several feet or more. Aside from certain comparatively rare cases in which, the ileocolic valve being competent, ileal

stasis occurs in a dilated portion of the ileum proximal to a constriction, it seems that the so-called Lane's kink is a very unimportant factor in the production of ileal stasis. On the contrary, ileal stasis, as above stated, is, in the majority of cases, associated with incompetency of the ileocolic valve, or with a symptom complex of clinical and X-ray findings which seem to indicate a spasm of the ileocolic sphincter. I do not wish to be understood as minimizing in the least the serious importance of ileal and colonic stasis in the production and exaggeration of certain pathologic states.

It is well known that previously unsuspected ileal adhesions are often accidentally found at operation. In view of our present conclusions regarding the comparative unimportance of these "kinks" in the production of ileal stasis, it seems proper to urge that every case for laparotomy should be subjected to X-ray examination before the operation in order that the surgeon, should he encounter ileal adhesions, may know whether they are associated with ileal stasis,



21. Illustration of the appearance considered by the writer as characteristic of ileocecal valve spasm. (Roentgenogram eight hours following the barium meal.)

and therefore whether they require surgical intervention.

That the clinical diagnosis of ileocolic valve incompetency is possible by other than X-ray means is demonstrated by the frequency with which my colleagues are referring patients to me for confirmation of a diagnosis of this condition. In addition to the clinical symptoms of intestinal stasis, there are certain special symptoms, especially flatulence in the small intestine. That it is in the small intestine may be inferred from the fact that the patient can not expel the gas either by mouth or by rectum. The roentgen examination frequently shows at a glance that this gas is in the small intestine, as in Figure 19.

The X-ray diagnosis of ileocolic valve incompetency has, in my work, been based upon the passage of an injection of bismuth suspension beyond the ileocolic valve into the terminal ileum. A uniform technic has been followed in all of our colon injections. We insist upon seeing, by means of the fluoroscope that the cecum is filled. Massage of the abdomen over the shadow of the cecum is practiced, by means of a wooden spoon, in the antiperistaltic direction. To insure thorough filling of the cecum, the patient is sometimes asked to lie upon the right side for ten or fifteen minutes after injection of the clyisma. Occasionally one finds that the enema has not passed the valve immediately following the injection, but when the patient returns to the table, after evacuating the colon, bismuth is found in the terminal ileum. It seems possible that in these cases the added strain of contracting the abdominal muscles has sufficed to force material into the ileum.

There should be an interval of at least two hours between the preliminary cleansing enemas and the colon injection. When this precaution is neglected, there may be an accumulation of water left behind in the cecum and ascending colon which may be forced on in to the ileum through the incompetent ileocolic valve and so dilute the portion of

the bismuth suspension which enters the ileum that its shadow is imperceptible.

After the injection, the patient should be asked to stand or at least to sit erect for a few moments in order to permit the gas and air which may be present in the cecum, to pass into other portions of the colon.

In doubtful cases, it is important that the roentgenogram should be made with the patient lying prone, plate anterior, rather than lying supine, plate anterior. In the latter position, "saddling" of the ileum over the iliopectineal line may lead to confusion. In marked cases of ileocolic valve insufficiency, however, there is never any question of the recognition of the terminal ileum.

There are certainly grades of ileocolic valve incompetency. Sometimes the clyisma flows on into the ileum almost as soon as it reaches the cecum before there has been time for distension of the cecum. In other cases, the filling of the ileum has not occurred until after the special straining incident to evacuation of the colon. In some instances, the ileum shows as a dim shadow, filled for only three or four inches. On the other hand, the ileum may be filled for many feet and its calibre may be considered widened, as in Figure 16 and Figure 18. It seems likely that in these extreme cases, especially when the bismuth meal examination shows marked ileal stasis, the surgical procedure of Kellogg might be distinctly indicated. It should be stated, however, that, as yet, Dr. Kellogg has not felt justified in operating definitely for relief of this incompetency, the operation thus far having been done when the abdomen was opened for other cause, but it seems likely that in certain cases such as the last mentioned, it may be perfectly justifiable to operate definitely to restore competency of the insufficient ileocolic valve.

In a number of instances, I have observed a reflux of ingested bismuth from the cecum back into the ileum. In still other instances, I have been able, by manipulations, to pass some of the contents of the cecum back into the terminal ileum.

In studying ileocolic valve incompetency by means of the clysmas, over-distension should be avoided. It has been shown experimentally by Senn and numerous others that it is possible to force fluid and air beyond the ileocolic valve and that the air enters at a considerably lower pressure than the fluid. Following a series of animal experiments, Senn warned that "the forcible injection of water beyond the ileocolic valve should therefore be recognized as a dangerous expedient and should never be resorted to," longitudinal lacerations of the muscular coat of the bowel having resulted when sufficient pressure was used to overcome the valve.

In certain instances, ileocolic valve incompetency seems to be definitely associated with the results of appendix disease. In a number of cases in the surgical clinic of Dr. Kellogg and his associates, it has been observed that the removal of the appendix and breaking up of adhesions surrounding it has cured the incompetency of the ileocolic valve.

Ileocolic valve incompetency is very frequently associated with colitis. This obser-

vation has been made in a very large number of cases. There is probably a definite relation between the increased antiperistalsis associated with spastic constipation and incompetency of the ileocolic valve. It may be noted that in the studies of Singer and Holzkecht upon spastic constipation, ileocolic valve incompetency was discovered in twenty per cent. of the cases (three out of fifteen cases).

Another source of error in the diagnosis of ileal stasis should be noted. Unless one has a definite routine for conducting his bismuth work so that sufficient time elapses between the administration of the bismuth meal and the taking of another meal by the patient, it will be found that if an ordinary meal is taken so soon after the bismuth meal that some of the bismuth still remains in the stomach until the tenth or eleventh hour, there may be bismuth still in the ileum after the nine hours considered the limit of normal. Hence it is important to take cognizance of this possibility in the diagnosis of ileal stasis.

NEW YORK SCHOOL OF ROENTGENOLOGY

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This school has been formed to meet the demand for adequate post graduate instruction in Roentgenology.

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Daily instruction will be given except on Saturdays and Sundays.

CLASSES: The classes will be limited to ten members.

ENTRANCE REQUIREMENTS: Matriculates must be graduates in medicine and of good ethical standing in their respective communities. A rudimentary knowledge of the X-rays is required for admission. Preparatory tutoring can be arranged for.

FEES: Matriculation and Laboratory Fees\$ 25.00
Tuition Fee, per month... 150.00

LEWIS GREGORY COLE, M.D., 103 Park Avenue, New York City. Professor of Roentgenology, Cornell University Medical College. Investigations of the Alimentary Canal.

LEOPOLD JACHES, M.D., L.L.B., 27 East 95th Street, New York City. Attending Roentgenologist, Mt. Sinai Hospital, Montefiore Home. Consulting Roentgenologist, Har Moriah Hospital.

Fluoroscopy. Roentgen examination of the Thorax, including Lungs, Heart and Mediastinum.

FRED M. LAW, M.D., 576 Fifth Avenue, New York City. Attending Roentgenologist, Manhattan Eye, Ear and Throat Hospital; Women's Hospital; New York Nose, Throat and Lung Hospital.

Technique and Roentgenology of the Head, including examination of the Accessory Sinuses.

WILLIAM H. STEWART, M.D., 222 West 79th Street, New York City. Attending Roentgenologist, German Hospital; Harlem Hospital; Fordham Hospital; Lebanon Hospital.

Technique, Bone Pathology, Fractures, Foreign Bodies, Roentgen Examination of the Kidneys and Urinary Tract.

ARTHUR FENWICK HOLDING, M.D., 103 Park Avenue, New York City. Attending Roentgenologist, Huntington Cancer Commission, General Memorial Hospital. Chief of Roentgen Clinic, Cornell University Medical College.

Technique and Roentgenotherapy.

THE AMERICAN ROENTGEN RAY SOCIETY CONSTITUTION

As Revised and Adopted by the Society October, 1910, and with Amendments Added as Adopted, Sept. 20th to 23rd, 1911, September, 1912, October, 1913, and September, 1914.

ARTICLE I.

NAME. The society shall be known as the American Roentgen Ray Society.

ARTICLE II.

OBJECT. The object of the Society shall be the study and practical application of the Roentgen Rays.

ARTICLE III.

SECTION 1. The members shall be Active, Corresponding, Honorary and Associate, and shall be persons interested in the object of the Society, recommended by at least two members in writing, and approved by the Executive Committee, who must have proof of their good ethical standing. They shall be elected by ballot.

(See Resolution passed by three-fourths vote of the Society, September 23, 1911, prescribing new requirements for the eligibility of all applicants for active membership in the Society. See page 392.)

SECTION 2. Active members shall be graduates in medicine and residents of America, shall sign the constitution and pay annual dues of ten dollars (\$10.00) which sum shall include the subscription to the "American Journal of Roentgenology."

SECTION 3. No member who is in arrears for annual dues shall vote, hold office, or be entitled to receive the transactions. It shall be the duty of the Treasurer to erase from the roll of membership the name of every member who is in arrears for one year, thirty (30) days after the receipt of a registered letter by said member, such action to be reported at the next annual meeting for confirmation.

SECTION 4. Corresponding members shall be residents of foreign countries and

may be admitted on application, providing it is approved by the Executive Committee. They shall be physicians who have specialized in Roentgenology, and who are in good ethical standing in their community. Their dues shall be five dollars (\$5.00) a year, which shall include one subscription to the "American Journal of Roentgenology," or a copy of the proceedings of the Society.

SECTION 5. Honorary members shall be persons who have distinguished themselves in Roentgen Ray research or practical work.

SECTION 6. Associate members shall be persons of scientific attainment who are interested in the advancement of Roentgenology, and whose membership is not otherwise provided for. They shall be admitted on application, providing said application has been approved by the Executive Committee. They shall be in good standing professionally, and have their applications endorsed by two members of this Society. Their annual dues shall be \$5.00, which shall include one subscription to the "American Journal of Roentgenology."

SECTION 7. Corresponding, Honorary and Associate members shall have all privileges of Active members, except to vote and hold office.

ARTICLE IV.

OFFICERS

SECTION 1. The officers shall be President, First and Second Vice-President, Secretary, Treasurer, Librarian, an Executive Committee of three, and a Board of Censors which shall consist of the last three living ex-Presidents. The officers shall be elected by ballot.

(See Section 5, Article V.)

ARTICLE V.

DUTIES OF OFFICERS

SECTION 1. The President shall perform all the duties pertaining to that office, and shall deliver an address during the annual meeting.

SECTION 2. In the absence of the President, one of the Vice-Presidents shall preside.

SECTION 3. The Secretary shall keep or cause to be kept, a correct record of all the transactions of the Society in a permanent form. He shall send due notice of all meetings to each member, shall notify all members of committees of their appointment and of the duties assigned to them. He shall conduct the correspondence and perform all duties usually pertaining to his office. The Secretary shall have printed an alphabetically arranged list of the members of the Society, with their addresses, for free distribution to members applying for same, which list shall be revised from time to time, and shall specify charter members.

SECTION 4. The Treasurer shall receive and be accountable for all money that shall come into his hands by virtue of his office. He shall give good and sufficient bond to the Executive Committee for the safe keeping and disposal of his trust, and shall make a full report to the Society annually. He shall pay out money only by the written approval of the President and Chairman of the Executive Committee.

SECTION 5. An Executive Committee of three members shall be elected as follows: one for three years, one for two years, and one for one year; and thereafter, one annually to serve for three years, the new member of the Executive Committee to be elected by ballot, the polls to be open at the Registration Bureau for twenty-four hours, and the one receiving the highest vote to be declared elected. They shall hold the bond of the Treasurer, audit his accounts annually, arrange for annual meetings, have general supervision of the affairs of the Society not otherwise provided for, consider and report to the Society all new business

and shall transact the business of the Society.

SECTION 6. A Board of Censors, consisting of the three last living ex-Presidents, the senior of whom shall be chairman, shall consider all matters pertaining to the conduct of members of the Society, and after consideration and investigation of complaints, if it appears to be misconduct, they shall communicate with the member in question. Upon a continuation of the misconduct they shall refer the matter to the Society at the next annual meeting for further action.

ARTICLE VI.

MEETINGS

The annual meeting shall be held on the Wednesday following the second Tuesday of December of each year, unless otherwise arranged by the Executive Committee.

ARTICLE VII.

PUBLICATIONS

SECTION 1. A Standing Committee of three to be known as the Committee of Publication, shall have full charge of the publication of the proceedings of the Society. One member shall be elected to serve for one year, one two years and one three years, and thereafter one member shall be elected annually to serve for three years. The members of this committee shall be nominated at the annual meeting by the Nominating Committee and elected by the vote of the majority of the members present at such annual meeting. The President, Secretary and Chairman of the Executive Committee shall be members ex-officio of this Committee. This Committee shall appoint the editor of the "American Journal of Roentgenology."

ARTICLE VIII.

AMENDMENTS

This constitution may be amended by a three-fourths vote of all the members present at the annual meeting, provided the proposed amendment has been read before the Society at least one day previously, and the hour for action has been set by the Society and announced in open meeting at least one day previously.

Resolutions Adopted by the Society for the Purpose of Prescribing the Manner in Which Certain of its Affairs Shall be Conducted When Such Exigencies Have Not Been Specifically Provided For in the Constitution

I. REQUIREMENTS FOR MEMBERSHIP.
(1) Form of application blank to be used for the purpose of furnishing the Executive Committee with necessary data concerning the applicant, and for the purpose of Society Records: and have been engaged actively in X-Ray work for at least two years after his graduation, and must submit a Scientific Paper on Roentgenology to the Executive Committee, which if approved, may be published in the proceedings of the Society.

APPLICATION FOR MEMBERSHIP IN THE AMERICAN ROENTGEN RAY SOCIETY

Date.....

Name....., Age....., Birthplace.....

Residence

Medical Degree obtained at.....

Collegiate or other degrees.....

Served as Interne in the following Hospitals.....

Years of Practice of Medicine..... Years of Practice of Roentgenology.....

Preliminary knowledge of and training in Roentgenology obtained where.....

Extent of practice outside of Roentgenology.....

Other specialties practiced.....

Present Hospital and Medical College Connections

Membership in Learned Societies.....

Bibliography

Signature.....

Proposed by: Signature

Signature

Approved by Signature

Executive Signature

Committee: Signature

This application must be signed by two members in good standing in the Society, and acquainted personally with the applicant; it must be accompanied by letters of recommendation from:—

(a) Those who sign.

(b) At least one practicing physician or surgeon in good standing residing in the applicant's immediate vicinity.

(2) An applicant for Active membership must have been a graduate in medicine,

(3) Applications must be sent to the Chairman of the Executive Committee at least six months before the next meeting at which they are to be acted upon. He shall publish or cause to be published, the names and addresses of such applicants, together with the names of the members proposing them, either in the Journal or by personal letter to each member of the Society, at least once before the next meeting at which the names of the applicants are to be acted

upon. Any objections held by members against such applicants should be sent to the Chairman of the Executive Committee as soon as possible for filing.

(4) The names and addresses of such applicants, together with the names of the members proposing them, shall be publicly read before the Society before they are acted upon by the Executive Committee.

(5) The Executive Committee shall have power to hold over for further consideration any applications that are: (a) not made public according to the manner above prescribed; or, (b) not entirely satisfactory to the Committee, or for reasons of furnishing insufficient data.

(6) The Executive Committee shall have power, as heretofore, to reject any application upon which they find good reason not to report favorably.

(7) Applicants shall be accorded the privilege of attending scientific sessions of the meetings as guests of the Society.

The above Resolution was reported to the Society by the Executive Committee, and adopted by three-fourths vote of the active members of the Society present, after fulfilling all of the requirements prescribed by the Constitution for the adoption of a Constitutional Amendment, September 23, 1911.

By-Laws

1. A Nominating Committee of three shall be appointed by the President on the next to the last day of the meeting. Said Committee shall make report on the last day of the meeting.*

2. The newly-elected officers shall take office at the close of the last day of the meeting at which they are elected.

3. All matters of parliamentary usage not already provided for, shall be decided according to Roberts' Rules of Order.

4. Papers shall be limited in reading to twenty minutes. Openers of discussion shall be allowed ten minutes, and all others five minutes. No person shall speak twice on the same subject except by permission of the meeting.

5. A member found guilty of reprehensible conduct may be expelled from the Society on recommendation of the Executive Committee, and by a two-thirds vote of members present.

6. The order of business shall be:—

(1) Call to order.

(2) Reading of minutes.

(3) Unfinished business.

(4) Reports of committees.

(5) Election of members.

(6) New business.

(7) Announcement of Nominating Committee by the President, or report of the same to the Society.

(8) Reading of essays.

* See Constitution, Article V., Section 5, and Article VII.

LIST OF MEMBERS OF THE AMERICAN ROENTGEN RAY SOCIETY, OCTOBER, 1914

Abel A. J.	Syracuse N. Y.	630 University Block
Adair J. W.	Marion, Ohio	
Albee F. H.	New York, N. Y.	125 W. 41st St.
*Albers-Schoenberg Heinrich	Hamburg, Germany	
Ashburg Howard E.	Baltimore, Md.	1017 Cathedral St.
Austin Robert Emmett	San Diego, Cal.	1007-8-9 American National Bank Bldg.
Baetjer Frederick H.	Baltimore, Md.	4 E. Madison St.
Barsness Nellie M.	St. Paul, Minn.	4 E. 10th St.
Bassler Anthony	New York City	21 W 74th St.
Beck Emil	Chicago, Ill.	2632 Lake View Ave.
Bergman A. P.	New Haven, Conn.	157 Bradley St.
Bierwith J. C.	Brooklyn, N. Y.	253 Henry St.
Birdsall Edgar	Glen Falls, N. Y.	Colvin Bldg.
Bissell Frank S.	Minneapolis, Minn.	820 Donaldson Bldg.
Blaine Edward S.	Chicago, Ill.	Cook County Hosp.
Boggs Russell H.	Pittsburg, Pa.	315 Empire Bldg.
Bowen Chas. F.	Columbus, Ohio	125 S. Grant Ave. or Grant Hosp.
Bowen David R.	Philadelphia, Pa.	922 S. St. Bernard St.
Bowman Wm. B.	Los Angeles, Cal.	818 Brockman Bldg.
Brady E. T.	Roanoke, Va.	1232 Clark Ave., or Watt & Clay Bldg.
Brown J. Gordon	Colorado Springs, Col.	118 E. Monument St.
Brown J. E.	Montclair, N. J.	43 S. Fullerton Ave.
Brown Percy	Boston, Mass.	155 Newbury St.
Brown W. Tyler	Norwich, Conn.	275 Broadway
Burch John H.	Syracuse, N. Y.	417 W. Genesee St.
Butler Patrick F.	Boston, Mass.	520 Beacon St.
Burgess Chas. J.	Lawrence, Mass.	624 Broadway
Brosius Wm. L.	Galatin, Mo.	200 S. Market St.
Caldwell Eugene W.	New York, N. Y.	480 Park Ave.
Carman Russell D.	Rochester, Minn.	
Case J. T.	Battle Creek, Mich.	
Chene G. C.	Detroit, Mich.	706 Gas Bldg.
Childs Samuel Beresford	Denver, Col.	342 Metropolitan Bldg.
Clark Stanley	South Bend, Ind.	314 J. M. S. Bldg.
Cole Albert M.	Indianapolis, Ind.	712 Hume-Mansur Bldg.
Cole Lewis Gregory	New York	103 Park Ave.
Coon C. E.	Syracuse, N. Y.	507 Gurney Bldg.
Corman Leighton R.	Rochester, N. Y.	266 Alexander St.
Cotton Albertus	Baltimore, Md.	1303 Maryland Ave.
Crane A. W.	Kalamazoo, Mich.	420 S. Rose St.
Cummings Samuel	Toronto, Canada	3 Queen's Park
Cunningham L. W.	Jacksonville, Fla.	418 St. James Bldg.

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† Corresponding Members.

Cunningham R. H.	New York	60 W. Loth St.
*Cannon W. B.	Boston, Mass.	Harvard Medical School
Davenport Anna K.	San Francisco, Cal.	391 Sutter St.
Dachtler Henry W.	Toledo, Ohio	224-6 Michigan St.
Daland Judson	Philadelphia, Pa.	317 S. 18th St.
Darling Byron C.	New York	122 E. 34th St.
Deetjen W. Christian	Baltimore, Md.	1702 Eutaw Place
Derr John Sebastian	Atlanta, Ga.	355 Candler Annex
Devitt William	Manayunk, Phila., Pa.	130 Green Lane
Dieffenbach W. H.	New York, N. Y.	S. E. Cor. Broadway and 56th St.
Dodd Walter J.	Boston, Mass.	205 Beacon St.
Donaldson C. A.	Minneapolis, Minn.	900 Nicollet Ave.
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Dunham Kennon	Cincinnati, Ohio	2503 Auburn Ave.
Eagar William H.	Halifax, Nova Scotia	183 Pleasant St.
Eastmond Chas.	Brooklyn, N. Y.	67 Hansom Place
Edmondson John H.	Birmingham, Ala.	First Natl. Bank Bldg.
Edward H. Threlkeld	S. Bethlehem, Pa.	314 W. 4th St.
*Edwards J. Hall	Birmingham, Eng.	
Edwards Ernest Gardner	La Junta, Col.	
Eisen Paul	Chicago, Ill.	2551 N. Clark St.
Evans Wm. Albert	Detroit, Mich.	32 Adams Ave. W.
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Frank Jacob W.	Philadelphia, Pa.	114 N. 17th St.
George Ariel W.	Boston, Mass.	259 Beacon St.
Gibbes Robert W.	Columbia, S. C.	
Girdwood W. P.	Montreal, Quebec, Canada	615 University St.
Granger Amadee	New Orleans, La.	1212 Maison-Blanche Bldg.
Granger Frank B.	Boston, Mass.	591 Beacon St.
Gray Alfred L.	Richmond, Va.	312 E. Franklin St.
Greaves Harrison W.	Philadelphia, Pa.	750 S. 53rd St.
Grier G. W.	Pittsburg, Pa.	519 Jenkins Bldg.
Groover Thomas A.	Washington, D. C.	1410 M. St. N. W.
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Hagopian Mugur	Philadelphia, Pa.	613 Perry Bldg.
Hamilton Wilbur S.	San Antonio, Texas	Moore Bldg.
Hammond Roland	Providence, R. I.	266 Benefit St.
Harris L. Hererschel	New South Wales, Australia.	215 Macquire
Hartung Adolph	Chicago, Ill.	31 N. State St.
Hatch Edward S.	New Orleans, La.	1126 Maison-Blanche Bldg.
Hazen Chas. M.	Bon Air, Va.	
Heberding John	Youngstown, Ohio.	11 W. Federal St.
Heck Stanton	Salem, Ohio	
Herbert Edward	Fall River, Mass.	140 Purchase St.
Heublin A. C.	Hartford, Conn.	42 High St.

* Honorary Members.

† Corresponding Members.

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Hill Walter C.	Cleveland, Ohio	533 Osborn Bldg.
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Holmes G. W.	Brookline, Mass.	11 Wellington Road
*Holzknecht G.	Vienna, Austria	
Hopkins William H.	Geneva, N. Y.	40 Park Place
Hubeny John M.	Chicago, Ill.	31 N. State St.
Hull T. A.	Troy, N. Y.	3 Union Place
Hulst Henry	Grand Rapids, Mich.	100 Fountain St.
†Humphris Francis Howard	London, Eng.	8 W. Chapel St.
Hunter Jas. W., Jr.	Norfolk, Va.	221 Dickson Bldg.
Hoyt Chas. W.	Rochester, N. Y.	50 Westminster Road
Imboden Harry M.	New York, N. Y.	480 Park Ave.
Jaches Leopold	New York, N. Y.	27 E. 95th St.
Jannses J. S.	Milwaukee, Wis.	128 Wisconsin St.
Jennings Curtis H.	Fitchburg, Mass.	
Johnston Geo. C.	Pittsburg, Pa.	811 Jenkins Arcade
Kast Ludwig	New York, N. Y.	771 Madison Ave.
*Kohler Alban	Wiesbaden, Germany	
*Klynens Rue	Antwerp, Belgium	Rue Ommerganck
Lange Sidney	Cincinnati, Ohio	5 Garfield Place
Law Frederick Manwaring	New York, N. Y.	576 Fifth Ave.
Leaming Edward	New York, N. Y.	33 W. 67th St.
LeWald L. T.	New York, N. Y.	Gibbs X-Ray Laboratory, 338 East 26th.
Lindemuth E. C.	Indianapolis, Ind.	605-613 Hume-Mansur Bldg.
Lothrop E. P.	Buffalo, N. Y.	153 Delaware Ave.
Luger Alfred	Boston, Mass.	697 Huntingdon Ave.
McCollin S. Mason	Philadelphia, Pa.	1823 Arch St.
MacKee G. M.	New York, N. Y.	58 W. 58th St.
MacMinn C. A.	Schenectady, N. Y.	5 Park Place
Manges Willis F.	Philadelphia, Pa.	264 S. 16th St.
Marsh Jas. P.	Troy, N. Y.	1828 Fifth Ave.
Martin J. M.	Dallas, Texas	312 Wilson Bldg.
Means Hugh J.	Columbus, Ohio	715 N. High St.
Meisenbach Roland O.	Buffalo, N. Y.	140 Allen St.
Meter Edward G.	Reading, Pa.	948 Penn St.
Mick W. H.	Omaha, Neb.	476 Branders Bldg.
Miller Albert G.	Philadelphia, Pa.	2150 N. 21st St.
Morton William J.	New York, N. Y.	19 East 28th St.
Nadler A. G.	New Haven, Conn.	377 Orange St.
Newcomet William S.	Philadelphia, Pa.	3501 Baring St.
Olmstead Ingersoll	Hamilton, Ontario, Canada	215 James St. S.
Ormsby Oliver S.	Chicago, Ill.	100 State St.
Palmer Myron Botsford	Rochester, N. Y.	53 S. Fitzhugh St.
Pancoast Henry	Bala, Pa.	P. O. Box 203
Peabody C. M.	South Orange, N. J.	
Peery P. C.	Jacksonville, Fla.	210 Laura St.

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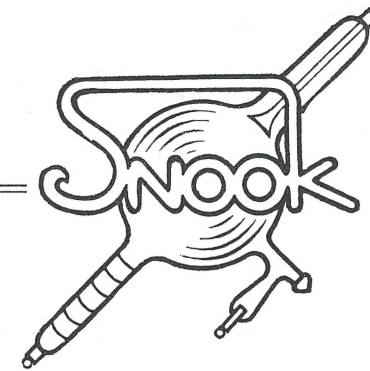
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