This spastic constriction must have been directly caused by surgical trauma to the smooth muscle fibres and their interlacing sympathetic nerve-plexuses.

A year later the following case repeated these conditions under somewhat different circumstances:—

CASE 2. M. F., 31. Widow. Nullipara. Entered B. C. H. (Gyn. 187-125), on Jan. 2, 1913, with complaint of irregular flowing for past three weeks, with headache, indigestion, and pain in the lower part of the abdomen for a much longer period, in fact ever since a laparotomy done 6 or 7 years before for "inflammation of the left tube and ovary." Her history was otherwise unimportant.

On physical examination she was found to be well developed and nourished, slightly obese and flabby; her heart and lungs were normal. The abdomen was full, soft, tympanitic throughout, with a well-healed median hypogastric linear laparotomy scar. Vaginal examination showed a stretched introitus and intact perineum and cervix. The uterus was completely retroverted and adherent. In the right vault was a hard, non-sensitive mass, the size of a hen's egg. The left vault was empty. There was a slight bloody discharge. Urine, normal. T. 99.4°, P. 88.

The patient was kept under observation for several days, during which she continued to flow slightly and complained considerably of backache, flatulence, and cramp-like pains in the lower abdomen.

The diagnosis was made of adherent retroversion of the uterus, with chronic right salpingitis, and probably intestinal adhesions. Laparotomy was advised, for the breaking up of these adhesions and the performance of ventral fixation of the uterus, which it was expected would relieve the backache, flowing and pain. Operation was accepted, and the patient prepared in the usual manner.

Operation. (Dr. Green and Dr. Harvie.) On Jan. 10, under ether anesthesia, a median laparotomy incision was made alongside the old scar. Small intestine was found adherent along the entire line of incision, and was separated with great difficulty. During the process the intestine was subjected to considerable traction and manipulation. On entering the peritoneal cavity, the entire pelvis was found roofed over with dense adhesions, involving the sigmoid. With great difficulty these were separated. The uterus was found firmly adherent by its posterior surface to the floor of the pelvis, but was gradually freed and raised. The appendix and the left uterine appendages were absent. The right ovary was cystic and was removed. The fundus of the uterus was then firmly fixed to the anterior abdominal wall, and the abdomen closed in layers without drainage, the old scar being resected.

The patient's condition remained good till the next morning, when she vomited, became rapidly distended, bowels could not be moved, and in spite of treatment she grew rapidly worse and died 26 hours after operation.

Permission for autopsy was refused, but post-mortem examination through the operative wound showed a condition essentially similar to that described in the first case. The stomach and upper portion of the small intestine were immensely dilated. At the point where the intestine was separated along the line of incision, there was a spastic

annular contracture involving about an inch and a half of the gut. Distal to this point the remainder of the small intestine and all the colon was collapsed. There was no evidence of peritonitis.

CONCLUSIONS.

The cause of death in these two cases was intestinal obstruction from a localized tonic contraction of the circular smooth muscle fibres of the small intestine, due to surgical trauma. Kelly and Noble¹ describe the condition under the term dynamic or hyper-dynamic ileus, and state that it constitutes 2% of all cases of intestinal obstruction. From the nature of its pathology, which is probably a mechanical injury to the plexuses of Auerbach and Meissner, the most convenient descriptive term for the condition seems to be spastic paralytic ileus.

The moral of these two cases is the immense importance of avoiding all pinching trauma to the bowel during laparotomy. In the second case, this was perhaps inevitable, in the first it might easily have been prevented. The small intestine seems much more liable than the large to spastic paralysis. Hence in appendicectomy, traction should *never* be made on the ileum for the purpose of bringing the cecum into the wound, but only the large intestine should be employed for such traction.

Medical Progress.

A REVIEW OF THE PROGRESS IN PATHOLOGY FOR 1912.

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INFECTIOUS DISEASES:

Syphilis.
Trypanosomiasis.
Cultivation of Spirochetes.
Experimental Pneumonia.
Polymyelitis.

It is the purpose of this review to include recent advances in the pathology and etiology of diseases which are liable to be of interest to the general medical reader. The small attention paid to pathological anatomy and histology does not mean that a great deal of work has not been done, but with the present highly developed knowledge of lesions, it could not be otherwise than that original papers along these lines should be too highly specialized and technical to be of great interest to the general reader.

The bulk of the work published from pathological departments, which is of interest, has been along experimental lines. A great deal of

¹ Gynecology and Operative Surgery, vol. ii, pp. 397-398.

it has been done in laboratories connected with departments of medicine, surgery, and even physiology. There is a decided tendency of growth in one sort of pathological research, away from pathology and towards departments presided over by heads of clinical departments, and this type of work, namely, the application of chemical methods to the study of disease processes, is one of the most important fields of research in medicine today. The tendency of growth already noted, seems to indicate beyond doubt that this line of research belongs with the clinic.

Of general interest in the consideration of the development of pathological physiology is the invention by Folin of a series of new methods applicable to problems in metabolism, and requiring such small quantities of material, blood, urine, feces and perhaps even lymph, that observations can be made upon human beings over extended periods. Another important contribution to possibilities is the perfection of methods for the study of respiration which can be applied to hospital cases, largely contributed by the Carnegie Institute in Boston.

In this review, many interesting subjects have been omitted because their bearing is chiefly clinical, and should be included in a review of progress in medicine.

EXPERIMENTAL CANCER RESEARCH.

The most important recent contribution to the etiology of malignant tumors is a series of observations made by Rous on tumors of fowls, which are inoculable, and which may be transmitted by the injection of bacteria and cell-free filtrates. Rous' first report was made two years ago (*Journal of Experimental Medicine*, 1910, Vol. 12). The tumor was a spindle cell sarcoma which could readily be transferred to fowls of the same strain. Apparently when the tumor filtrate is injected, injury must be done to cells before the new growth can take origin (*Journal of the American Medical Association*, Vol. lviii, No. 23). If the filtrate is injected into the blood stream, taking especial care not to allow it to come in contact with the vessel walls where punctured, no tumor formation occurs, but if foreign inert substances are added, multiple tumors form. Similarly, in direct injection into the tissues, the tumor first takes origin along the needle path. The nature of the filterable agent which causes this sarcoma is puzzling. It will pass through Berkefeld filters holding back minute bacteria, although it will not go through the Chamberlain F filter. All attempts to demonstrate the organism with the dark field apparatus have been futile. Heating to 55 degrees centigrade destroys this tumor-producing substance; likewise toluol, chloroform 50% alcohol and 2% phenol. It is rapidly destroyed by bile and by saponin, thus behaving like animal organisms in distinction to bacteria. The nature of the virus producing this chicken

sarcoma suggests very strongly a living organized agent, although this has by no means been proved. Very recently Rous reported a second chicken tumor; this time an osteochondro sarcoma, which is produced by a filterable agent (*Journal of the American Medical Association*, Vol. lix, No. 20). The finding of this second type of tumor, which is reproduced by the injection of bacteria, free and cell-free filtrates, is of great significance, in that it shows that there is a selective behavior to the filterable agent. In the case of the first tumor, discovered by Rous, the growths are invariably of the spindle cell sarcoma type; in the second tumor, they are always of the osteochondro sarcoma type. Rous concludes that these substances are probably living viruses, and that these findings with the chicken tumors largely demolish the theoretical basis on which objections to an extrinsic cause for cancer have been built up.

In connection with the subject of cancer in animals, the report by Irwin F. Smith, pathologist in charge of the Government Laboratory of Plant Industry, on the structure and development of crown gall is of great interest (Bureau of Plant Industry, United States Department of Agriculture, Bulletin 255). Smith terms crown gall a plant cancer, and one is forced to admit that these growths in plants resemble in general aspects the behavior of tumors in animals. Crown gall occurs in a variety of plants, and may affect any part of the root or plant shoot. The growths are composed of plant cells, individually similar to normal plant cells, but failing to differentiate and to produce normal plant structures. Smith has proved the infectious nature, and has been able to isolate a bacterium, which, when injected, will produce these tumors. Smith's evidence for considering the crown gall growth to be of the nature of a neoplasm is well founded. The demonstration of a specific cause for the proliferation is of unusual interest, particularly when viewed in the light of Rous' experiments with fowl carcinoma.

NEUROBLASTOMA.

A fairly large number of cases have been reported during 1912 of the type of tumor to which Wright first called attention in 1910, and called by him neurocytoma or neuroblastoma (*Journal of Experimental Medicine*, Vol. 12, No. 4). L. Pick has recently written a monograph (*Berliner Klinische Wochenschrift*, 1912, Nos. 1 and 2), collecting all the reported cases of tumors of this type, that is, malignant tumors arising from embryonic sympathetic nerve cells, giving the name *Ganglioma Embryonale sympathetisum*. He corroborates the work of Wright by agreeing that these tumors arise in nests of embryonic sympathetic nerve cells. By special staining methods the fibril formation can always be demonstrated, if the material is fresh. In some instances, the fibrils are very easily found. These tumors are most often found in the adrenal

glands; oftentimes in combination with multiple tumors of the liver, tumors in the skull and in the lymph nodes. It is now certain that the cases of simultaneous tumors of the adrenal glands and orbit, known as Hutchinson's syndrome, are tumors of the sympathetic nerve type. In another paper (*Zeitschrift für die gesamte Neurologie und Psychiatrie*, Bd. 6, Heft 4), L. Pick and M. Bieschowsky have collected cases and summarized knowledge concerning the ganglio-neuromata of the brain, and show that these tumors are not excessively rare.

Following these publications of Pick, there have been other cases reported in this country by Symmers (*Journal of the American Medical Association*, Vol. lx, No. 5), and abroad by Friedrich (*Frankfurter Zeitschrift für Pathologie*, Bd. 10, 1912, Heft 3) and Landau (*Frankfurter Zeitschrift für Pathologie*, Bd. 11, 1912, Heft 1). These papers, unquestionably stimulated by the publication of Wright's, definitely establish the existence and frequency of a hitherto not generally recognized group of tumors.

The writer of this review has seen two unpublished cases, both occurring in Montreal. One from the prenasal fossa of a child with metastases in the cervical lymph nodes, and another from an adolescent female with generalized metastases to bone, liver, lungs and lymph nodes; this latter tumor was probably primary in the adrenals.

It may safely be predicted that a large number of such cases will be reported from this country and abroad during the next few years.

CHLOROMA.

The German literature of the last few years contains numerous reports of cases of so-called chlor-leukemia, and in fact, in nearly every case of chloroma recently reported, leukemia has existed. A concise statement of the present knowledge on chloroma is to be found in the paper by Burgess (*Journal of Medical Research*, Vol. 27, No. 2, November, 1912) who reviews the literature and reports two new cases. Burgess' conclusions, which are fairly conclusively supported by the evidence he presents, are that the tumors called chloromas are simply green tumors, which represent a part of the pathological processes in leukemia; that the type of leukemia is myelogenous leukemia and not lymphatic leukemia. The absence of granular cells is simply indicative of the acuteness of the process and the invasion of the blood and tissues by myeloblasts, which are not yet differentiated. The conception that myelogenous leukemia is a blood metastasis of a true tumor, whose origin is in the bone marrow, and whose cells invade the blood stream and the bone marrow, explains the connection between leukemia and chloroma. According to Burgess, in certain cases of myelogenous leukemia, in which the cells are largely undifferentiated and multiply rapidly, other tissues are invaded. Some times in this way, nodules of tumor cells

are formed. These masses, if green, are called chloroma. These conclusions of Burgess are in general agreement with recent work done abroad. Burgess has materially contributed to the general knowledge by virtue of the superior technical methods he has employed. The nature of the color of the tumors still remains somewhat of an enigma. It is to be noted in this connection, that the layer of white cells obtained by centrifugalizing blood of myelogenous leukemia cases always has a distinct greenish color.

SYPHILIS.

The most important contributions to the pathology of syphilis, aside from the cultivation of the spirochete and the completion of the requirements of Koch's Laws, are a few new facts regarding the distribution of the treponema in tissues. Warthin, in a number of papers, which are briefly summarized under the heading, "Cardiac Syphilis," (*Ohio State Medical Journal*, March, 1912), has reported 12 cases of sudden death in children and infants, due to cardiac insufficiency. There was no suspicion of congenital syphilis; furthermore, there was nothing that would be attributed by the pathologist to syphilis, but on examination of various tissues by Levaditi's method, spirochetes, associated with certain histological changes, have been found. He has come to the conclusion that there is a certain form of myocarditis which is dependent upon the presence of colonies of spirochetes in heart muscle. In 35 cases of acquired syphilis in the adult, he has found myocardial changes associated with the presence of spirochetes. The majority of these cases were supposed to have been successfully treated, and in some of them not even the attending physicians associated the final conditions with syphilis. The great importance of Warthin's work is that unexplained death due to myocardial changes may rest solely upon the lesions produced by the *Treponema pallidum*, in cases giving practically no other evidence of syphilis.

Noguchi and Moore (*Journal of Experimental Medicine*, Vol. 17, No. 2) have demonstrated the *Treponema pallidum* in 12 out of 70 brains, from cases of general paresis. The age of the cases varied from 33 to 60 years; 10 were men and 2 women; 7 were of the cerebral type and 5 of the tabetic. Anatomically the brain showed the usual thickening of the pia and microscopically there was the usual infiltration with plasma cells and lymphoid cells in the meninges and around the vessels. The spirochetes were found distributed in the substance of the brain, singly and in groups, and oftentimes, far in the substance, away from the vessels, and unsurrounded by evidence of any cellular reaction.

These findings are of great importance in that they demonstrate that paresis is a syphilitic affection; that the lesions are due to the presence of the parasites, and not to toxic substances elaborated elsewhere.

TRYPANOSOMIASIS.

Trypanosomes have been found in the blood of domestic cattle in every part of the globe, and a recent bulletin of the United States Department of Agriculture (Bulletin No. 145, Bureau of Animal Industry, Howard Crawley) shows that trypanosomes exist in the blood of 75% of yearling and adult American cattle. These trypanosomes are only to be demonstrated by making blood cultures, that is, adding large quantities of blood to bouillon. The trypanosomes multiply in the layer of white cells and platelets that forms above the bottom layer of red cells. Crawley has given the name *Trypanosoma americanum*.

Work done in Nyassaland during 1912 by Bruce, Kinghorn and Yorke and their associates, has conclusively established the status of *Trypanosoma rhodesiensi* as a new species, parasitic for man. This trypanosome has been found in a fairly large proportion of antelope. Experimentally it has been transmitted by *Glossina morsitans*, which is the common tsetse fly of dryer regions, and hitherto supposed to transmit trypanosomes pathogenic for cattle only. The great importance of this work is evident, and it will unquestionably be productive of campaigns against trypanosomiasis along new lines. This work on trypanosomiasis is abstracted in *The Sleeping Sickness Bulletin*, and the *Tropical Diseases Bulletin* of London, directed by A. G. Bagshawe.

Wolbach and Binger (*Journal of Medical Research*, September, 1912) in a research directed towards ascertaining the factors concerned in the production of the lesions of trypanosomiasis, have shown that the trypanosomes do not remain confined to the blood vessels and lymphatics, and that they invade the connective tissue structures of all organs and the substance of the brain. The finding of trypanosomes in the substance of the brain, remote from the lesions, indicates that they migrate freely, and also that the pathology, which closely resembles that of general paresis, is due to the actual presence of the trypanosomes in the meninges and brain substance. In general, they conclude that the lesions of trypanosomiasis are due to the presence of the trypanosomes in the affected tissues. Previous theories considered chiefly the possible effect of toxins elaborated in the blood stream.

CULTIVATION OF SPIROCHETES.

Noguchi has been most active during the last year with cultivation experiments, using spirochetes from many sources. His method for cultivating the *Treponema pallidum* seems to be simple and more certain than those of European workers. His first paper was published in the *Journal of Experimental Medicine*, Vol. 14, and here the material employed consisted of lesions produced in rabbits. Later, *Journal of Experimental Medicine*, Vol. 15, he succeeded in cultivating the *Treponema pallidum* directly from

human lesions, and has shown that these cultures are pathogenic for monkeys. To Noguchi belongs the credit for first fulfilling all the requirements of Koch's Laws for the spirochete of syphilis. His medium consists of combinations of sterile ascitic fluid and agar, to which pieces of fresh sterile rabbit tissue is added, kidney or testicle. Strict anaerobic conditions are maintained by filling the tubes to a considerable depth, and covering the medium with a layer of paraffin oil. In his early work, these tubes were placed in an oxygen-free atmosphere of hydrogen. The success of Noguchi's method depends on the fact that after stab cultures have been made in his medium, consisting of two parts of slightly alkaline nutrient agar jelly and one part ascitic fluid, the spirochetes multiply and migrate out, away from the line of puncture and bacteria, so that after two or three weeks of incubation at body temperature, hazy zones are obtained, which consist of colonies of spirochetes. By making repeated transfers, he had been able to separate mixed cultures of spirochetes, and has paved the way for important work on the study and differentiation of the mouth spirochetes. So far, he has cultivated three different new spirochetes from the mouth cavity: *Treponema microdentium*, *Treponema macrodentium* (*Journal of Experimental Medicine*, Vol. 15, No. 1) and *Treponema mucosum* (*Journal of Experimental Medicine*, Vol. 16, No. 2). The last named came from a case of pyorrhea alveolaris and is distinguished from other mouth spirochetes by the production of mucin. In morphology, it is very much like the *Treponema pallidum*, from which it is distinguished, by the production of mucin, and a fetid odor in cultures.

Other spirochetes which Noguchi has cultivated are: *Spirocheta phagedenis*, a new species which he found in phagedenic lesions on human external genitalia (*Journal of Experimental Medicine*, Vol. 16, No. 3). *Treponema calligyrum*, a new species from condylomata of man, *Spirocheta refringens*, and a whole series of spirochetes of the relapsing fever type, including *Spirocheta obermeiri*, *Spirocheta duttoni*, *Spirocheta kochi*, *Spirocheta novyi*, (*Journal of Experimental Medicine*, Vol. 16, No. 2) and *Spirocheta gallinarum*, the spirochete of fowls (*Journal of Experimental Medicine*, Vol. 16, No. 5).

The importance of these methods of Noguchi, and his success with them cannot be overestimated, as it opens a field for systematic investigation of spirochetes and pathological processes produced by them. As yet, no one has confirmed Noguchi's work. One reason may be that he gives rather meagre details, and in work of this character, personal niceties of technic are of greatest importance.

EXPERIMENTAL PNEUMONIA.

Lamar and Meltzer (*Journal of Experimental Medicine*, Vol. 15) report a series of experiments

on dogs in which they produced pneumonia in 42 successive cases with a mortality of at least 16%. Their method is to introduce pneumococcus cultures by intratracheal insufflation. They claim to have produced a typical lobar pneumonia. Control experiments with salt solution, broth serum and mixtures of serum and soap solution injected in the same way as the cultures did not produce consolidation. Other experiments with streptococcus and influenza bacillus produced a type of inflammation quite different from the consolidation produced by the pneumococcus. In a few instances they produced lobar pneumonia with Friedlander's pneumo-bacillus. This work has attracted considerable attention, because it claims to be the first successful experimental production of lobar pneumonia in animals.

POLIOMYELITIS.

The most important work of the past year in poliomyelitis has been directed toward the manner of transmission. Rosenau, as is well known in this community, reported at the International Congress of Hygiene in Washington in September, successful transmission experiments with the ordinary stable fly, *Stomoxys calcitrans*. This work was shortly afterwards corroborated by Anderson and Goldberger of the Public Health and Marine Hospital Service.

In the report of the State Medical Institute of Sweden to the Fifteenth International Congress of Hygiene, held in Washington, 1912, a large number of careful experiments directed towards the demonstration of the presence of the virus of poliomyelitis on the mucous membranes of abortive cases and healthy persons are recorded. In six families the existence of carriers of the virus were found. In three families, several virus carriers were found, although in no family was there more than one typical case with paralysis. These experiments have been criticized by Flexner on the ground that, while the monkeys injected with the mouth and nose washings of the suspected individuals developed paralysis and sometimes died, they did not show the characteristic pathology of poliomyelitis. Distinct lesions, however, were found, the atypical nature of which the experimenters attributed to the diminished virulence of the virus.

Flexner, Clark and Fraser (*Journal of the American Medical Association*, Vol. lx, No. 3) describe an instance in which they obtained from the healthy parents of a child suffering from an acute attack of epidemic poliomyelitis, material which when injected into monkeys gave characteristic symptoms and pathology of poliomyelitis. This material was obtained by irrigating the naso-pharyngeal cavities of the mother and father with normal saline. The experiment proves in a more conclusive manner than the Danish investigators were able to do, that apparently normal humans may harbor the virus of poliomyelitis.

Of even greater interest is the report by Flexner and Noguchi (*Journal of the American Medical Association*, Vol. lx, No. 5) of the cultivation of the virus of poliomyelitis. The technic employed was essentially that of Noguchi for the cultivation of spirochetes, which is described elsewhere in this review. Colonies were obtained in the ascitic fluid agar medium, which were composed of minute globoid bodies just within the microscopic range of vision. Cultures from human tissues in the third, and from monkey tissue in the fifth generation have caused typical experimental poliomyelitis in monkeys. Other experiments by the authors are in progress with a view of excluding a remote possibility of the virus being passively carried over from test tube to test tube.

These cultivation experiments, if capable of confirmation, will have a tremendous effect on the investigation of diseases produced by filterable micro-organisms, for it is certain that at least some of the principles underlying the problem of the cultivation of filterable organisms will have been solved.

(To be continued.)

Reports of Societies.

SECTION ON GENERAL MEDICINE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

MEETING OF MONDAY, JANUARY 27, 1913, AT 8.15 P. M.

The President, DR. H. R. M. LANDIS, in the Chair.

A CONSIDERATION OF CERTAIN TYPES OF ARTHRITIS DEFORMANS AND THEIR MANAGEMENT.

ROBERT B. OSGOOD, M.D., Boston: Proof of the existence of arthritis deformans goes back to three thousand years B. C. The views expressed tonight will be from an orthopedic point of view, and we shall leave unsettled the question whether we are dealing with one or more than one distinct disease. We shall adopt a temporary nomenclature, which we realize is imperfect, but attempt to define what seem to us distinct clinical types. The four types to be discussed are: Infectious, Toxemic, Atrophic, Hypertrophic. We find it difficult to connect acute articular rheumatism in any way with the chronic manifestations of arthritis deformans, and we believe it has no causal relation. We have been equally successful in associating true gout with the types to be discussed. By the chronic infectious polyarthritis we mean an arthritis usually of more or less sudden onset. If unaffected by treatment, the disease is commonly progressive. We may include in this type those cases of gonorrheal arthritis in which the cocci may be recovered from the joints and those cases in which other bacteria have been found either in the joint effusions or in the tissues, especially the villi removed at operation. In the second type, chronic toxemic polyarthritis, we may include the cases of chronic polyarthritis following influenza, associated with chronic infections of the nasopharynx and sinuses, ulcerative processes in