without excoriation or ulceration and with a relaxed sphincter, suggests a suspicion which may be verified by discovery of the gonococcus in the pus.

There may or may not be swollen folds about the anus, and condylomata (pointed) may or may not abound; nor is the funnel shape of the anus and the disappearance of the ano-rectal folds, found in old pederasts, to be confidently expected in every case. The grade of inflammation has varied greatly in the reported cases from almost nothing up to an ulcerated condition with abundant purulent discharge, foul and putrid, flowing over excoriated fissures, amid fleshy tabs and rankly growing warts.

The subjective symptoms, of course, vary with the grade of local inflammation. Defecation may be normal or excruciatingly painful.

In the old chronic cases, when there is stricture and ulceration, the diagnosis may lie between gonorrhea and tubercle, a point that the laboratory will decide.

Treatment.—Cleanliness, hot sitz baths, laxatives to keep the rectum empty, suppositories of cocain and opium are indicated, and rest in bed is obligatory in bad cases. Injections should be given twice a day through a small soft tube, and should always be hot. Such injections should be soothing, bactericidal, not astringent. Boric acid, and very mild sulpho-carbolate-of-zinc solutions (1 : 2,000) are helpful. The permanganate of potash (1 : 5,000 or weaker) ought to be useful. I am not aware that it has been tried. Bichlorid is too irritating. Nitrate of silver, 1 : 20,000, and increased very materially towards the end of the trouble, is of undoubted value.

Light cases recover spontaneously with little or no care, and old chronic ones with ulceration, etc., which are rebellious, give rise to a suspicion of mixed infection, perhaps tubercular. No one has seen a sufficient number of these cases to formulate a satisfactory routine of treatment, which must be along general surgical lines, recognising the infective nature of the malady, with cleanliness, rest, drainage, and antisepsis as the objective points.

BUCCAL GONORRHEA

This alleged malady is as yet too obscure to require more than mention. The older cases of swelling of lips, gums, and tongue after bestial practices have no value, as gonococcal examinations were not made. The cases in which gonococci have been found, or diplococci, at least, are those of Cutler,[1] a woman confessing the cause,

[1] N. Y. Med. J., Nov. 10, 1888, p. 521.

but her mouth inflammation came on within less than twenty-four hours after exposure, and of Dohm,[1] several infants, one notably with purulent ophthalmia. The mucous membrane of the mouth became eroded on the eighth day after birth, and the false membrane showed gonococci from which cultures were made. The mother had putrid vaginal secretion and condylomata. Rossinski[2] records infants with coincident suppuration of the mouth and conjunctiva, and Leyden[3] has about the same testimony to adduce.

All this makes a pretty poor claim, but no harm comes of allowing it. These mouth lesions get well under a mild bichlorid lotion.

Still less definite is the gonorrhea of the nose, where, Heaven knows, it ought to be common if it occur at all, for the dirty fingers of dirty men approach the nostrils perhaps more often than any other mucous orifice. The nose may be dismissed in spite of specious claims, and finally, the testimony upon which umbilical gonorrhea rests is too trivial even for citation.

The same may be said of the alleged affections of the nervous centres, and of the undoubted involvement of the connective tissue, the skin, and the lymphatic system.

But two definite lines of gonococcal infection remain for serious consideration, the one mostly by direct contamination, the eye, the other by metastasis, gonorrheal rheumatism.

GONORRHEAL RHEUMATISM—SYSTEMIC GONORRHEA

Systemic gonorrheal infections, especially their more acute and malignant forms, have, within the past few years, claimed a greater share of the attention of the profession than their frequency warrants, a claim which is due to their activity and their severity.

Gonorrheal rheumatism has long been recognised. We have learned that it is caused by the presence in the circulation of the gonococci or of their toxins and the deposition of the germs or of their products in the affected joints. Gonorrheal rheumatism, then, is a form of systemic gonorrheal infection. This fact is attested by the febrile manifestations associated with the acute forms of the disease; but the more striking condition—which has been recently described by many authors—is a virulent septicemia or a pyemia arising from some focus of gonorrheal suppuration (usually from a prostatic abscess). This follows a course similar to that of a like condition produced by the ordinary pyogenic cocci, terminating usu-

[1] Revue des maladies de l'enfance, 1891, p. 282.
[2] *Ibid.* (citation from Zeitschr. f. Geburtsh. u. Gyn., 1891), S. 282.
[3] Centralbl. f. Gyn., 1894, S. 185.

ally in recovery if a septicemia, and in death if a pyemia. It is often associated with a malignant endocarditis.

Though rare, some 70 cases of the disease have been reported. The gonococci have several times been found in the blood and many times amid ulcerations upon the valves of the heart. Thayer and Lazear[1] and Prohaska[2] have reviewed this phase of the subject.

In spite of all these varieties of systemic gonorrheal infection, I must protest against the belief that gonorrhea is habitually a systemic, and not a local disease. In the innumerable majority of cases the local symptoms of gonorrhea constitute the whole malady, and these cases, in which the germ or its toxin escapes into the system, are altogether exceptional. It is entirely misleading to class gonorrhea with such diseases as diphtheria, in which, although a serious local lesion exists, the systemic condition is always paramount.

Systemic gonorrhea, or gonorrheal rheumatism, as it is usually called, affects a number of structures, fibrous and serous—the joints, the sheaths of tendons, the bursæ, the fasciæ, the eye, the nerves, the pleura, the valves and lining membrane of the heart, the veins, the periosteum, and the perichondrium. As to the cause: it would be idle now to cite the formidable array of names favouring toxins, gonococcus, nerve influence, mixed infection, etc. There is no end to it, but an ounce of positive proof is worth more than a ton of negative evidence, and it is now clear that the gonococcus has been found in and cultivated from all these tissues—and that puts an end to the question of theory.

The method of metastasis indeed may be said to have been detected by Wertheim, who announced it at the sixth general congress of gynecology in Vienna on June 6, 1895. Wertheim excised a small bit of mucous membrane from the posterior wall of the bladder of a young girl having gonorrheal cystitis, and found gonococci not only in the submucous tissue, but also in the venous capillaries, although the arterial capillaries showed none.

Gonorrheal rheumatism was first known when, at about the same time in the year 1781, Salle and Swediaur described an inflammatory articular affection dependent upon gonorrhea. Since then the identity of the causes of the two maladies, the gonococcus, has been amply demonstrated.[3]

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[1] J. of Exper. Med., 1899, iv, 81. [2] Virchow's Archiv, 1901, clxiv, 492.

[3] Among the best names connected with the advance of knowledge along this line may be mentioned Hunter, Cooper, B. Brodie, Brandes, Bonnet, Diday, Rollet, Fournier, whose bibliography of older authors may be found in the Art médical, 1857, vol. vi; Observations et matériaux pour servir à l'histoire de l'arthropathie blennorrhagique. Ch. Ravel and Fournièr, Dict. de méd. et de chir. prat., and Sée, Le gonocoque, Paris, 1896, furnish valuable information for modern investigators. Among these are Finger, Gohn, Schlagenhaufer, Kammerer, Respighi and Burci, Horteloup and Bosquet, Bergmann and Bumm, Hartley, Deutschmann, Lindemann, Stern, Jacquet, Hoeck, Young, McCaskey (Ulcerative Endocarditis in which Gonococci were Found. N. Y. Med. Record, 1900, lviii, 1005), etc.

But a personal idiosyncrasy also pervades the issue, since certain individuals, not ordinarily subject to rheumatic attacks, suffer from a peculiar form of rheumatism when they get a gonorrhea. They will remain well between the gonorrheal attacks, but have a new rheumatism whenever a new urethral inflammation is acquired. Brandes gives the history of such a case where a fresh attack of rheumatism attended six successive gonorrheas, and Fournier mentions a quadruple relapse. I have often seen double, once quadruple relapse. Königer[1] chronicles a patient, never rheumatic except during three successive gonorrheas at two and a half years' interval, once complicated with iritis, once with iridochoroiditis.

None of the ordinary causes of articular rheumatism seem to have any power to produce the gonorrheal variety. Gonorrheal rheumatism does not need for its production any co-operation of cold, of moisture, or of fatigue, nor, indeed, is its immediate cause any modification in the discharge, or any medicine taken, or any injection used. The only efficient cause is the gonococcus, and why the gonococcus is efficiently active in some individuals and not in others is unknown. Doubtless it always exists in the inflamed locality in the earlier stages of the rheumatic malady. Later other pyogenic microbes may coexist with it, and may even dominate and ultimately extinguish it, as in an old, suppurating, disorganized joint.

When this complaint has once complicated a gonorrhea, the chances are that every succeeding urethral inflammation will be attended by rheumatism in spite of all efforts to prevent it. Fortunately only a small minority of gonorrheal patients are liable to the rheumatic complication. An ordinary patient with gonorrhea, even though he have a pronounced rheumatic diathesis, may expose himself to cold, moisture, and fatigue without getting rheumatism; or, if he does get an attack, its course is not varied nor its symptoms modified by the coexistence of urethral discharge.

Women possess a strange immunity. They do have the malady, but only exceptionally. It is supposed that an explanation of this is the fact that the vagina and not the urethra is the usual seat of gonorrhea in the female, but this is the statement of a fact, not a reason.

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[1] Ueber die sogenannten metastatischen Complicationen der Gonorrhea. Inaug. Dissert., Berlin, 1873.

Gonorrheal rheumatism resembles rheumatic gout more than rheumatism. The local inflammatory character of the symptoms is often inconsiderable, and the constitutional sympathy is not of a severity proportionate to the trouble in the joints. But, on the other hand, desperate conditions of hydrarthrosis and of suppurative destruction of joints may also owe their origin solely to the gonococcus as a first cause.

The date of the appearance of the rheumatic complication is variable. It may be noticed as early as the fifth day after the beginning of the urethral discharge, but usually does not come on until later, the fifth to the sixteenth day (Fournier), more rarely during the second or the third month or at any later period. The gonococcal infection does not occur until the microbe has reached the deep urethra, and as long as the malady lingers there rheumatism is a possibility.

The discharge is not generally modified, although it sometimes diminishes a few days after the rheumatic symptoms have set in, which may be explained either by the fact that the rheumatism keeps the patient more at rest, or by the revulsive action that any intervening inflammatory affection may exert over a purulent discharge. When it comes on late in a gonorrhea its advent is often preceded by an exacerbation of the discharge for a few days.

The seat of the disease is variable. Joints take the first rank, the synovial sheaths of tendons and muscles next, then come the synovial bursæ and the nerves. The eye not infrequently suffers. The pericardium, pleura, meninges of the brain and cord suffer occasionally. Fournier tabulates 120 joint cases. In these the knee was involved most often—in over two-thirds of all the cases—the ankle in about one-fourth. Bornemann's statistics [1]—278 collated cases—record the knee as involved in seven-eighths of the cases; while Finger's more extensive collection, added to his own experience, gives the knee the preference in only about one-third of the observations—136 times in 375 cases.[2] These variations, while notable, always leave the knee the first place, so that the conclusion is justified that the large joints, particularly the knee, are by far the most often involved. The affection is not absolutely confined to a single joint, but shows a tendency to be mono-articular. Fournier's division into three prominent varieties is convenient and practical.

Varieties.—*The first form, hydrarthrosis*, is common, usually attacks the knee, sometimes the ankle or the elbow, and is habitually

[1] Studier over den Gonorrhoiske Rheumatismus. Copenhagen. Cited by Taylor, Venereal Diseases, p. 262.

[2] Archiv f. Derm. u. Syph., 1894, xxviii, 2, S. 296.

mono-articular. It comes on insidiously, but the effusion, which is often considerable, may also take place rapidly. Pain is moderate, increased by moving the joint, but the discomfort may be so moderate as to be ignored. The skin over the joint is not reddened, there may be no constitutional disturbance. The affection remains indolent, usually lasting for months.

The second form is more like ordinary rheumatism. Some local and general febrile reaction is the rule, more than one joint is usually implicated, and there is often trouble in the tendons, the eyes, etc. The symptoms are those of ordinary rheumatism, only less acute. The pain, at first severe, is commonly much modified by rest, far more so than is the case in ordinary rheumatism. Constitutional symptoms occur, but fever is slight, and subsides after a few days while the local disturbance continues. This relative lack of proportion between the constitutional and local symptoms is one of the diagnostic features. In moderate cases, when only one joint is involved, there may be no constitutional symptoms whatsoever. When several joints are implicated they are implicated consecutively. The malady, however, never becomes so general as inflammatory rheumatism sometimes does. It is more stationary, less mobile, and does not jump from one joint to another. When a new joint is involved those previously implicated continue to suffer, with, of course, occasional exceptions. Resolution is even more tardy than in ordinary rheumatism. A secondary hydrarthrosis, rare in simple rheumatism, is not uncommon in the gonorrheal variety. The sweating, so constant in simple rheumatism, is unusual and of short duration. The acid, concentrated urine seen in simple rheumatism does not occur, nor does the blood show the same excess of fibrin. Finally, inflammations of the pericardium, the pleura, etc., are rarely encountered,[1] and do not differ in symptoms or treatment from the same conditions due to other causes. The same is true of the occasional pyemic and spinal-cord gonorrheal affections, which are occasionally recorded.

Slow resolution is the usual termination of polyarticular gonorrheal rheumatism; but pains in the joints and very persistent stiffness may be left behind, more rarely chronic hydrarthrosis, chiefly

[1] Baudin, Recueil de mém. de méd. de chir. et de pharm. mil., septembre et octobre, 1875; Marty, Archiv. gén. de méd., 1876; Desnos, Gaz. hebd., 16 novembre, 1877; Morel, Thèse de Paris, 1878; Fleury, J. de méd. de Bordeaux, 9 septembre, 1883; Schedler, Zur Casuistik der Herz Affectionen nach Tripper, Inaug. Dissert., Berlin, 1880; Young, *loc. cit.*; McCaskey, *loc. cit.*, the bibliography of Sée and Lartogau, deal with recent literature; a study of a case of gonorrheal ulcerative endocarditis with cultivation of the gonococcus, Am. J. of the Med. Sci., Jan., 1901, p. 52.

of the smaller articulations (Brandes), ankylosis, or even suppuration and disintegration of the joint, more especially in lymphatic, tuberculous, and debilitated subjects. Acute secondary suppuration is rare.

The third form which the affection may assume is that of vague ambulatory—sometimes very persistent—pains in joints, which do not appear to have suffered any structural alteration, and of which the function is undisturbed—the knee, wrist, shoulder, foot, and jaw. This pain, which may be the only symptom, is rebellious to treatment, and, after it has gradually subsided, is likely to return if from any cause the amount of urethral discharge increases.

The synovial sheaths of the tendons of the extremities may be affected, either alone, or, more commonly, in connection with whatever joints are involved. There are tumefaction along the course of the tendon, redness of the integument, occasionally very intense if the tendon be superficial, severe pain on pressure, and partial or entire abolition of the movement of the muscle belonging to the involved tendon. This affection, like the others, undergoes gradual resolution. Hot local anodyne fomentations are indicated, blisters, or, best of all, the Paquelin cautery.

The bursæ also may suffer. In this case we have an acute or a subacute hygroma, which is peculiarly painful and sensitive to pressure for a long time. Two bursæ seem most vulnerable, the one lying between the tendo achillis and the os calcis, the other beneath the inferior tuberosity of the same bone. This explains the pain in the heel so often complained of by these patients. Other bursæ suffer, but more rarely.

The acute symptoms accompanying inflammation of the bursæ usually yield rapidly to local depletion and sedatives—later to a blister. Fournier mentions a case of gonorrheal hygroma of a bursa over the ischium. The attending symptoms were so severe as to lead to a diagnosis of deep suppuration. After preparations to incise the swelling had been made a sharp pain suddenly appeared in the knee, and the operation was postponed. In a few days the hygroma disappeared "with surprising rapidity," while the knee-joint became acutely inflamed.

Diagnosis.—Gonorrheal rheumatism may attack the muscles as well as the joints. The nerves do not always escape. Fournier observed sciatica 5 times among his 39 cases. Diplopia (Fournier), deafness (Swediaur, Fournier), and small superficial collections of serum near the affected joints (Fournier, Ricord, Féréol) have been mentioned as rare occasional complications, to which may be added perichondritis and periostitis. The following excellent table, ar-

ranged by Fournier, gives at a glance the characteristics distinguishing gonorrheal from ordinary rheumatism:

Gonorrheal Rheumatism	*Simple Rheumatism*
1. Cause: Gonorrhea. No influence of cold in the production of the rheumatism.	1. No etiological relation with the state of the urethra. Habitual causes: Cold, inheritance, rheumatic diathesis, etc.
2. Very rarely observed in women.	2. Common in the female, although less frequent than in the male.
3. Non-febrile, or much less so than simple rheumatism. Even in acute cases reaction never attains the habitual intensity of rheumatic fever.	3. Reactional phenomena much more intense and prolonged than in gonorrheal rheumatism.
4. Symptoms habitually limited to a small number of joints. The affection never becomes general to the same extent as does simple rheumatism.	4. Symptoms usually involve a number of the articulations; sometimes nearly all of them.
5. Less movable than simple rheumatism, going from one joint to another less quickly. No delitescence; no real jumping from one joint to another.	5. Symptoms: Movable, ambulatory fluxions; rapid delitescence, jumping from one joint to another.
6. Local pains generally moderate, always less than in simple rheumatism; sometimes remarkably indolent.	6. Pains always rather intense, sometimes excessive, disappearing less rapidly than those of gonorrheal rheumatism.
7. Frequently a tendency to hydrarthrosis following the acute fluxion.	7. Little or no tendency to consecutive hydrarthrosis.
8. No sweating.	8. Abundant sweats, constituting a symptom almost essential to the malady.
9. Urine not modified.	9. Urine specially modified.
10. Blood not furnishing a marked buffy coat.	10. Blood forming a firm, concave clot with buffy coat.
11. Cardiac complications very exceptional.	11. Cardiac complications frequent.
12. Frequent coincidence with a special ophthalmia, inflammation of the synovial sheaths of the tendons, inflammation of the bursæ, etc. The latter localities may be exclusively implicated.	12. Acute rheumatism does not affect the eye; the bursæ escape, as do usually the sheaths of the tendons.
13. Relapse in the course of successive gonorrheas very frequent.	13. Relapse frequent, but always independent of the state of the urethra.

Treatment.—Ordinary treatment for acute or for chronic rheumatic or gouty maladies does not benefit patients with gonorrheal rheumatism. Neither salicylic acid, iodid of potassium, colchicum nor quinin modifies the symptoms in a specific or a notable manner. Although in special cases any of these remedies may sometimes seem to do much good, they are not to be relied upon. Local measures are of the first importance. The treatment internally is tonic, die-

tetic, hygienic—in short, rational—with an alkali if the urine is overacid. The sooner the urethral discharge is controlled the more quickly will the rheumatic symptoms cease, although the latter may outlast the former many months. Rest is most important, the joint being splinted in the acute stage. Leeches, hot fomentations, or a blister will soon bring on the subacute stage, if indeed the inflammatory phenomena have not been subacute from the first. The diet should be low while the patient is confined to bed. Probably the best early treatment in acute and subacute cases is absolute rest with hot fomentations, the joint being first lightly rubbed with pure salicylate of methyl, then wrapped up in moist hot flannel and covered with gutta-percha tissue, while large doses of the oil of wintergreen are administered internally, and energetic local treatment is employed to cure the urethral discharge. Sometimes pure ichthyol spread over the joint seems to work fairly well in the earlier stages, but nothing can be surely counted upon as helpful unless the urethral discharge is controlled.

In the later stages, when hydrarthrosis is established and threatens to become chronic, the surgeon must face a serious responsibility, for the integrity of the joint is involved in the ultimate issue.

In my opinion, no treatment for this condition can be compared to the irrigation of the joint with hot bichlorid-of-mercury solution at a strength of 1: 5,000 to 1: 1,000. I used this many years ago upon the knee-joint, making two punctures with rather large trocars, one on each side of the joint (for the fluid is not always limpid, but may contain viscid and clotted fibrinous material), and first thoroughly washing the joint cavity with prolonged hot-salt irrigation, and then with two quarts of a bichlorid solution, and putting it up under moderate pressure, later using blisters or the Paquelin cautery, and finally elastic pressure.

That these cases are serious is shown by Halstead's statistics given in Young's[1] paper. Halstead opens the joint, irrigates with bichlorid, and then closes the joint with sutures. He reports 11 cases with the result—cured 3, improved 2, ankylosed 1, not improved 1, not stated 4.

In acute bursitis I know nothing so good as the Paquelin cautery or a blister generously applied.

In chronic cases, wherever situated, the choice in local treatment lies between tincture of iodin, ichthyol, Paquelin cautery, and repeated small blisters, followed by rubber bandage, massage, hot and cold douches, Russian and Turkish baths.

[1] *Loc. cit.*

Finally, in very chronic cases a mercurial course sometimes assists, and the iodid of potassium as well, although there be no suspicion of syphilis attaching to the history; and ultimately in very old cases, in broken-down subjects, nothing excels iron, strychnin, mineral acids, hypophosphites, and cod-liver oil judiciously alternated, unless it be a course of treatment at suitable hot springs.

A suppurating disorganized joint calls for the knife, drainage, or excision, as the case may be, along general surgical lines.

But be it remembered first, last, and always, that the urethral discharge must be controlled by local measures in order to obtain the best and quickest results, and the patient must not feel discouraged if his recovery is slow. It is the nature of the malady to be obstinate.

AFFECTIONS OF THE EYE DUE TO GONORRHEA

All gonorrheal affections of the eye are directly due to the gonococcus, the lighter varieties to metastatic infection, the virulent conjunctivitis only to direct contamination by gonorrheal pus.

The eye has been an excellent field for the study of the gonococcus, both clinically and laboratorially, and all investigators who have there sought the gonococcus intelligently have found it in the pus and in the tissues. It is a waste of time to cite the legion of authorities on this point. Sée[1] may be profitably consulted for all earlier bibliography up to his date. The clinical side has been amply established long ago by the inoculations made purposely in the effort to cure pannus.

The concomitance of arthritic infantile maladies with gonorrheal ophthalmia has been noted by Vignaudon (cited by Sée), who in a study of 20 cases of arthritis in children found that 10 had coincident vulvitis and 12 ophthalmia; and the very frequent concomitance of latent gonorrhea in the mother with ophthalmia neonatorum in the child has long since been established, notably since the researches by Kraus,[2] Zweifel,[3] and Kroner.[4]

But yet not every case of this last-named malady is of gonorrheal origin, as proved by the repeated instances in which the gonococcus is not found in the conjunctival pus of ophthalmia neonatorum. Yet even in the metastatic sero-vascular ophthalmia the gonococcus has been detected in the secretions, surely much attenuated in virulence or a specific conjunctivitis would have ensued.

[1] Le gonocoque, 1896.
[2] Centralb. f. prakt. Augenheilk., 1882, S. 134.
[3] Archiv f. Gyn., xxii, S. 318.
[4] *Ibid.*, xxv, S. 109.

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