

the joints was restored. Local applications are highly important. Frictions of the affected parts with cod-liver oil, after a general warm bath, are an excellent expedient. Warm baths, the Turkish or Russian baths, with local douches, are often, but not invariably, highly useful. The method of friction and movements, known as *massage*, is probably the best of the local means of treatment. Good results are obtained from the baths of the Hot Springs of Arkansas, the warm and hot springs of Virginia, the sulphurous waters of the Licks of Kentucky and of Saratoga, the Michigan springs, St. Catherine's of Canada, and numerous other "resorts" in this country. Mud-baths are also employed on a large scale, for the relief of rheumatism and affections of the skin, in certain parts of Germany. In chronic rheumatism excellent results are obtained from the use of galvanism. A current of large volume and low intensity should be applied to the affected joints to procure absorption of effusions, and the sympathetic ganglia should also be brought within the circuit. When galvanism is to be applied, the positive pole should be placed over the principal nerve-bundles above, and the negative pole brushed over the joint-region. Each joint should be taken up in turn, and the applications be faithfully made, and the electrical treatment pursued for a long time.

GOUT—PODAGRA.

Definition.—By the term *gout* is meant a constitutional malady, inherited, and characterized by the occurrence of paroxysms of severe pain in a small joint—the great-toe usually—due to the presence of uric acid in the blood, and the deposit of the urates in the structures of the articulation. *Podagra* is the Latin name for gout in the foot; *chiragra*, for gout in the hand; and *gonagra*, for gout in the knee.

Causes.—Unquestionably, heredity is the chief etiological factor. The causes which rendered the disease hereditary will, of course, produce the disease anew in those subjected to their operation. As a disorder of the upper classes—of those having wealth, leisure, and the opportunity for indulgence in the pleasures of the table—gout has had a position of distinction. Sydenham consoled himself for his sufferings from gout by the reflection that it is an eminently respectable disease, by which more rich men than paupers, more wise men than fools, are afflicted. But this satisfaction is no longer afforded the victims of this malady. Gout is a result of lead-poisoning, and indulgence in the drinking of beer and other malt-liquors, and it therefore occupies a more humble position than formerly. Men suffer from attacks of gout much more frequently than women, and this fact is as true of inherited as of acquired gout. It is suggested by Garrod (originally by Hippocrates) that the catamenial function acts as a "safeguard," because, when the inherited tendency exists, the out-

breaks rarely occur until after the menopause. The chief reason of the comparative exemption enjoyed by women is the difference in habits; when women adopt the meat-eating, and beer- and wine-drinking habits of men, they suffer the same consequences. Gout begins at a comparatively early age, when the bodily predisposition and the habits of life favor its appearance. Paroxysms may begin at fifteen, but when the disease is acquired they are postponed to thirty-five or later. The period of greatest predominance of the affection is from thirty-five to sixty-five, and after the latter age it is less and less common. The habits of the individual are largely concerned with the early production of gout. The drinkers of malt-liquors and wines, especially the sweet wines, suffer early. It is the large consumption of beer which develops the gouty condition in the laboring classes. The excessive consumption of animal food, especially when washed down with malt-liquors and wines, is an influential factor. Garrod first demonstrated the important fact that lead-poisoning manifests itself, in a certain proportion of cases, by paroxysms of gout. This statement, at first received with incredulity, is now universally admitted.* The explanation is, that lead greatly lessens the excretion of uric acid, and the proof is afforded in the increased quantity of uric acid in the blood. The climate has an effect on the occurrence of the seizures, winter being the season of greatest tendency to them, and hence they are often avoided by the timely transfer to a warm winter locality.

Pathological Anatomy.—The changes in the joints are characteristic when a single joint has been affected, and once only. In such a case a part of the head of the metatarsal bone was covered with a white incrustation after thirteen years (Garrod). The whole articular surface of the affected joint attacked is, in severe cases, covered with a whitish deposit, to the synovial fringes. First, a transparent fluid is exuded into the substance of the cartilage; the water is absorbed, leaving the white incrustation composed of bundles of acicular crystals radiating from a center. This material is urate of soda. Most of the articulations are, in old and severe cases, more or less affected, but the tarsus and carpus and the surfaces of the metatarsal and metacarpal bones and some of the phalanges are chiefly diseased. More or less urate deposits have been found in the bone itself. The presence of this material excites ordinary inflammation, and hence the thickening and deformity observed about the diseased joints are partly due to the products of inflammation, mixed with the chalk-like accretions of urate of soda. The blood also contains urate of soda, and in the perspiration uric acid is frequently present, and also is in excess in the fluids transuded into the pericardium and peritoneum. During the gouty

* Wilks, Dr. Samuel, "Guy's Hospital Reports," 1869-'70, p. 40.

paroxysm the blood is said to contain an abnormal quantity of fibrin. The most important of the changes in internal organs is that disease of the kidney known as the "gouty kidney." Crystals of urate of soda are deposited in the tubules and inter-tubular tissues, and may be seen by the naked eye as white lines. The kidneys are small, granular, and fibrous. In the vascular system, atheromatous changes of the senile type are precipitated by attacks of gout.

Symptoms.—**ACUTE GOUT.**—Gout is not always manifested by the same signs and symptoms: it may be acute, chronic, or irregular. The paroxysm of acute gout may or may not be preceded by prodromic symptoms. In many patients certain symptoms appear invariably, and announce the approaching attack. These preliminary symptoms may consist of gastric disorder—as headache, nausea, a coated tongue, constipation, a muddy skin, a yellow conjunctiva; of nervous disturbance—as restlessness, wakefulness, despondency, irritability, peevishness, or exhilaration, and high spirits, etc.; or they may experience a more or less febrile condition, as shivering, rise of temperature, and sweating. In many cases any indications of the approaching tempest are wanting. The patient is awakened out of a sound sleep about 2 A. M., or between 12 M. and 5 A. M., with a sense of uneasiness rapidly growing into acute pain in the ball of the great-toe, if a recent case. The part the seat of pain is red, hot, swollen, and so exquisitely sensitive that the lightest touch, the weight of the bedclothing, the jar of one walking over the floor, can not be borne. The veins of the foot are swollen. Now and then the muscles of the leg start with sudden spasms, and a hot pain pierces the joint. No position gives relief. If the foot be placed on the floor the veins swell still more, the joint becomes deep red, almost purple, and the pain becomes agonizing, so that the patient gladly foregoes any attempt to walk. As a rule, a feverish state develops; some chilliness is first experienced, then the temperature rises, the pulse quickens, there are thirst and a coated tongue. The urine voided during the paroxysm is dense, deep red, acid, and deposits copiously the brick-dust sediment. After several hours of severe suffering, and in the early morning, the pain abates, the skin is covered with a warm perspiration, and a general sense of relief is experienced. If, now, the foot is kept elevated and at rest, and all excitement avoided, the relief continues through the day; the joint is less red, less swollen, and less tender; but when evening approaches sharp pains again fly through the joint, the swelling rises again, and another night of agony is passed. The same experience may be repeated for several days and nights longer—exacerbations at night, comparative ease by day. If no treatment of any kind is instituted, the case may continue in this way for a week, for ten days, even for two weeks, but the usual duration under the present treatment is but four or five days. When the joint and surrounding tissue are much swollen, the pain becomes less

severe; but toward the end of the paroxysm the swelling subsides, the redness also, and desquamation of the epidermis is apt to take place in fine scales, and sometimes in large flakes. The swelling veins collapse, but when the foot is first placed on the floor they quickly fill, and the whole member feels sore, and tingles, and is painful from a fine pricking. The ankle and foot are stiff and awkward for many days. The system is much depressed by an attack of acute gout, the body-weight is lessened, the lines deepen in the face. When the attack is over, the ravages committed by it are quickly repaired, and a feeling of well-being, often of exhilaration, takes the place of the hebetude of mind, and the bodily distress, or other disagreeable sensations which preceded the outbreak. The patient may continue free from gouty paroxysms for two or three years, but he is usually visited again in about a year. The same joint may be attacked as before, which is more frequently the left metatarso-phalangeal joint of the great-toe, but this seizure may be concerned with the right, or both. A similar interval may elapse before the next seizure, when the inflammation may be in the same joints as in the previous paroxysms, or may extend to the other articulations of the foot, and to the ankle. In the further progress of the case other joints are affected—those of the upper extremity, the hip, the knee, etc.—and the attacks come nearer together, until ultimately they may be expected at any time. As the paroxysms increase in number, they decline in severity, but grow longer in duration. The skin does not recover, but remains red and livid, while the veins become varicose. Meanwhile, the systemic condition tends to permanence, and the general as well as local symptoms persist.

CHRONIC GOUT.—The distinction between acute and chronic gout consists in the wider diffusion of the articular troubles, their less pronounced character, and the preponderance of the constitutional state, in the latter or chronic form of the malady. The affections of the digestive organs, which precede the paroxysms, and are present in less degree at all times, consist of acidity, flatulence, pain about the epigastrium and through the hepatic region, distress after eating, hæmorrhoids, constipation alternating with diarrhœa, a coated tongue, and fetid and heavy breath. Sometimes the paroxysms are preceded by various nervous symptoms—especially by feelings of depression, irritability, twitching of the muscles, cramps in the legs, palpitation, and occasionally intermittence of the heart-beat. The paroxysms occur at any time, but they develop slowly, and there are less pronounced local and general symptoms, and they do not have the critical character, nor produce the relief, of the acute seizures. The deposits about the joints increase with the duration of the case; and the joints become hard, knobby, and are often much distorted. These deposits or *tophi* (chalk-stones) form not only about the joints proper, but in the ten-

dons and bursa, producing deformity and seriously impairing the functions of the articulations. Among other places, these tophaceous deposits form on the helix of the ear.

Course, Duration, and Termination.—Gout is a very chronic disease, for, although there is an *acute gout*, this form is merely an exacerbation of the chronic disease. The first paroxysms are separated by long intervals, but after some years the *chronic gout* is established. This continues with varying fortunes for several years. The complications which increase the gravity of the disease are numerous. The chalk-stones seem at first to be important only as they deform joints and impair functions, but they are foreign bodies, excite inflammation and ulcerations which show no disposition to heal, but continue to discharge, and if numerous may wear out the strength and cause death by exhaustion. The changes in the kidneys ultimately become highly influential factors in the morbid complexus. These organs separate less and less excrementitious matter; the urine is pale, of low specific gravity, and contains albumen. The changes in the kidneys may be the main causes of the cerebral symptoms which occur toward the end, and of the cerebral hæmorrhage with which so many gouty subjects are carried off. During the course of chronic gout, various troubles arise in internal organs, and are styled *gouty*. "Gout in the stomach," "gout in the head," are popular phrases, which indicate the general belief that gout abandons the joints to attack internal organs. This notion was also represented in the technical phrase "retrocedent gout." That such a retrocession, or metastasis, does actually occur, is no longer maintained. Important changes of structure take place in internal organs, as a result of chronic gout, and hence, indirectly, gout may be responsible for various diseases. "Gouty kidney," as it is called, and the serious result of the change have been already referred to. Atheromatous and calcareous degeneration of the vessels leads to attacks of angina pectoris (gout in the heart, in popular language) and to cerebral hæmorrhage (gout in the head). The changes in the composition of the blood, which belong to gout, are fruitful causes of acute inflammations, as pneumonia, pleuritis, etc. The mode in which cases of gout may ultimately terminate is indicated in these observations on the changes wrought by the disease. When the lesions of chronic gout are established, we must take a hopeless view of the situation. When the disease is inherited, although it may not have proceeded far, the probability of affording some permanent relief is less than in the acquired disease. When the first paroxysm has occurred, the prognosis will be greatly affected by the disposition of the patient and his power of self-control.

Diagnosis.—Errors of diagnosis are possible only in the case of chronic gout, and between this and *arthritis deformans*. The differ-

entiation may, however, be readily made. *Arthritis deformans* occurs among the poor and ill-nourished—in women chiefly, and at or before middle life. There are no paroxysms; it is gradual in its growth, and affects the two sides in a symmetrical manner, and is not accompanied by urate-of-soda deposits.

Treatment.—The treatment of gout is concerned with the paroxysm, with the chronic form of the disease, and with the intervals between the paroxysms. There are two methods of treating the paroxysms of gout—the expectant and the eliminant. By the expectant, the patient is put at rest, the joint is wrapped in cotton-wool, a laxative is administered, and the diet is reduced to slops. Under this method the duration of the attack is protracted, but the ultimate results are better than if more active treatment were pursued, provided the patient make such change in his mode of life as may be necessary. The suffering is so great, however, that the patient is usually clamorous for relief, and hence more active measures are necessary. There are but two remedies which exert a really curative influence on gout—colchicum and salicylic acid. Colchicum has been used for many years, and has demonstrated its power to alleviate the pain and shorten the duration of the acute attacks. The active principle, *colchicine*, is preferable to the crude drug. It may be given advantageously with quinine, morphine, and compound extract of colocynth. The wine and tincture may also be employed. In the various prescriptions for gout, besides colchicum there are usually an alkali, a potash-salt, and a purgative, colocynth. The object is to secure elimination of the urate of soda and prevent its deposition. Salicylates have recently been employed with great success to relieve the gouty attack. They may not be given when the stomach is very irritable, or in atonic gout, but, in the usual acute gout in a vigorous subject, the relief afforded is surely remarkable. If the stomach is very irritable, effervescing salines—the common effervescing, or the Sedlitz-powders if there be constipation—are useful by promoting elimination by the various organs of excretion. If the pain is very severe, morphine, hypodermatically, will afford prompt relief, but remedies of this kind must be used sparingly because of their effect in stopping elimination. Local treatment is of doubtful utility. Leeches applied in the neighborhood are of real service if there is much swelling, the patient robust, and the attack recent. Blisters in the neighborhood of the joint are always safe, are useful as regards the subsequent course of the case, and afford much immediate relief. Besides these measures, it is necessary only to support the foot at a considerable elevation, maintain rest, and cover the painful joint with some cotton. Excessive warmth and much covering are hurtful. A man who has suffered an attack of gout should at once change his mode of living. As to drop from an abundant and rich diet to a poor and spare diet involves much risk, the change

should be made gradually. The diet of a gouty subject should consist chiefly of vegetables and fruit; he should take fresh meat once a day; coffee and tea should be given up, and skimmed milk substituted; eggs are also injurious, and all dishes into which eggs enter; pastry, cakes, hot bread, sweetmeats, spices, and condiments, are to be avoided, while oysters, fish, soups, may be eaten. Next to careful regulation of the diet, exercise is most important. Walking, riding, rowing, but especially walking, should be carried out systematically, and, when inclement weather prevents exercise without, it should be done in-doors. If no other mode of exercise is possible, passive movements, massage, and faradization of the muscles, can be conducted in bed if need be. Cold bathing is objectionable. The patient should wear flannel, and migrate from a cold winter climate to a warm one if his means permit. Certain kinds of waters are serviceable: in this country, Saratoga, especially the Vichy spring, the alkaline waters of Wisconsin, and of St. Catharine's, Canada, the Warm Springs of Virginia, and the Hot Springs of Arkansas; abroad, Vichy, Carlsbad, Wiesbaden, Homburg, etc. Elimination may be maintained by drinking freely of ordinary drinking-water. Much of the efficacy of alkaline waters is due to the quantity of fluid swallowed. Excellent results are obtained from the use of the lithia salts in chronic gout. These preparations promote the excretion of uric acid, and apparently the solution of the deposited urate of soda. The interval between the attacks is lengthened, and the attacks are less violent and of shorter duration, when the citrate of lithia has been given for some time. In atonic gout a modified course must be pursued. With the potash and lithia salts must be combined quinine and iron; the food must be nourishing without being abnormally stimulating, and massage and faradism perform the part of active exercise.

ARTHRITIS DEFORMANS.

Definition.—By *arthritis deformans* is meant a chronic inflammation of the joints, without fever and without suppuration, progressive, and causing nearly symmetrical enlargement and deformity of various articulations. It is called *rheumatoid arthritis* by Garrod, and *rheumatic arthritis* and *rheumatic gout* by various authors. As the supposed rheumatic character of the disease is more than doubtful, the term employed by the German writers—*arthritis deformans*—is preferable, because no theory is coupled with it.

Causes.—Arthritis deformans does not appear to be propagated by hereditary tendency. It is more especially a disease of women than of men, and is apparently associated with disorders of the menstrual function, particularly at the climacteric period. Cases do occur among men, and sometimes they are exceptionally severe. Poverty and bad

hygiene, exposure and hard work, with inadequate food, prolonged lactation and frequent pregnancies, are among the most influential causes. Garrod holds that it may have its origin in the tubercular diathesis. It is usually regarded as a disease of advanced life, but cases occur from the period of puberty on. Moral causes are very influential in its production—for the disease has repeatedly followed grief, anxiety, and moral depression. As various changes in the joints are produced by certain troubles of the spinal cord, a state of the nerve-centers is invoked to account for this disease. Joints that are injured, as the ball of the great-toe by a tight shoe, are the first to undergo the change.

Pathological Anatomy.—At an early period there are seen only the changes of inflammation—hyperæmia of the synovial membrane and an increased amount of fluid in the joint. After absorption of fluid has occurred, the capsule of the joint is found to be thickened, and the ligaments are elongated, thus permitting ready dislocation. The cartilages are absorbed, and the bones rubbing together are polished and hard, like ivory, a condition which is called "eburnation." The articular extremities become thickened and broader, and are flattened out, their margins projecting, and studded with irregularly rounded bony outgrowths. The fluid contents of the affected joints consist of a much altered synovial fluid, especially rich in mucin, and containing cholesterin and lecithin (Hoppe-Seyler*). In occasional cases the capsule of the joint is partly or wholly ossified. Not only the joints, but the adjacent tendons and their sheaths and the bursæ, become ossified, and the muscles waste and undergo fatty degeneration.

Symptoms.—Slow enlargement of a joint that is exposed to injury, as the wrist in a laundress, the thimble-finger in a seamstress, or, after a more or less prolonged period of trouble and anxiety, the general health being reduced by nursing, the knee or some other joint becomes painful and swells. The first attempt may subside, and presently the same joint or another may undergo the same process, but a subsidence no longer takes place, and the joint remains swollen. In a short time other joints are attacked. In other cases the first symptom experienced is pain in the articulations, which subsequently become swollen. The joint is sensitive to atmospherical changes, and feels sore when flexed or extended. Acute pains extend along the nerves in the neighborhood. Thus, if the changes have begun in the hip, the pain is felt in the sciatic nerve. After the pain has continued for some time, the joints are observed to be enlarging. The fingers and toes, knees and wrists, are affected in the more youthful subjects, while, in the senile, the hips, spine, and shoulders are more especially visited. When the

* Virchow's "Archiv," Band iv, s. 252.

deposits about the joints have attained a certain magnitude, their mobility is lessened. After a more or less prolonged rest the parts become rigid, and motion is difficult until the persistent use of the members limbers them again. The osseous deposits about the joints and tendons at length reach such a stage of development that the affected joints have a very limited range of movement. The thickened joints are not red, but pale, and, although painful, are not tender. The changes in the articulating surfaces and the relaxation of the tendons lead to subluxations. When the articular cartilages are removed, and the ends of the bones rub together, a grating is produced that is felt by the patient and through the soft parts. This crepitant sound may also be due to the movements of the tendons through their partially ossified sheaths, or by the collision of the osseous masses which form about the various articulations. The hands are peculiarly prone to take on this deformity. The heads of the metacarpal bones and the phalanges are distorted by large nodules. "The metacarpo-phalangeal articulations of the fingers are flexed, the first phalangeal extended, causing the second phalanx to be thrown backward, and the second phalangeal joint is also flexed. The phalangeal joint of the thumb is usually extended or bent backward" (Garrod). When the larger joints of the lower extremities are affected, especially the hip, the gait has a characteristic halt and limp. The spread of the arthritis through the articulations is symmetrical, or nearly so.* The muscles of the limbs waste, the subcutaneous fat disappears, and hence the members have a wasted appearance, which recalls the myopathies of spinal origin. When the vertebræ are affected, ankylosis takes place, reducing the flexible spinal column to the rigidity of an iron bar. Various ill results follow. If the cervical vertebræ are ankylosed, the patient's head is kept erect and rigid without power of bending or turning; if the dorsal and lumbar vertebræ are ankylosed, the body is twisted and immovable. In the worst cases, finally, all the joints are spoiled, are fixed in bony ankylosis, and motion is no longer possible.

Course, Duration, and Termination.—Arthritis deformans is one of the most chronic of diseases, continuing on its course for ten, twenty, even thirty years, or longer. It is a progressive disease, and does not cease or get well spontaneously, yet it sometimes remains stationary for months and years at a time. Although of itself not affecting the constitution in a marked way, and sometimes not at all impairing the general health, in other cases life is rendered intolerable and the strength is exhausted by suffering and loss of sleep. Most obstinate sciatica may attend on the disease in the hip, and neuralgia, contractures, paralyses, etc., may be caused by the osseous deposits along the

* Hutchison, "Transactions of the Pathological Society," vol. xxiii, p. 194.

spine. Otherwise the disease continues through life, not apparently abridging it.

Treatment.—The only remedies which have appeared to do any good are iodine and galvanism. The compound solution is an eligible form, which we may give in the dose of five minims, three times a day. Iodine-ointment may be carefully rubbed into the affected joints. The oleate of mercury and morphine may also be painted over (not rubbed in) the joint, and along the course of painful nerves. Galvanic currents should be transmitted through the cervical sympathetic, and be applied also to the affected parts, the principal nerve-trunks being included in the circuit. As many as forty to sixty cups should be used, and large, well-moistened sponge electrodes should be applied. Warm baths, massage, passive motion, and faradization of the muscles, are among the very useful expedients to be employed in these cases. Undoubtedly good results have been obtained from the use of arsenic, if given early in the disease. If anæmia exist, as is so often the case, iron is necessary. If the nutrition is low, cod-liver oil and the hypophosphites may be given with advantage.

DIABETES MELLITUS.

Definition.—*Diabetes* is a chronic disease characterized by the constant presence of grape-sugar in the urine, by an increased urinary discharge, and by progressive wasting of the body. The occasional and temporary presence of sugar in the urine does not constitute *diabetes mellitus*, although it may precede the fully developed disease. *Diabetes insipidus* is a malady in which the urinary water is largely increased in amount.

Causes.—Climate exerts a certain influence in the causation of diabetes, but the influence is capricious and there are no obvious reasons for the greater prevalence of this disease in one locality than in another. Race seems, in respect to one people at least, to be concerned—the Jews, who are apparently more frequently the victims of diabetes than the Christians. It is distinctly hereditary, and, although this fact has not been properly appreciated heretofore, the examples of hereditary transmission are becoming so numerous that this will hereafter occupy a high position in the etiology of the disease (Senator). Diabetes is more common in males—three to one, according to Brunton,* who bases his statement on the statistics of eight German and French authors. But this proportion does not hold good for children, with whom females are more given to the disease (Durand-Fardel, Senator), and this is the experience of the author. Diabetes occurs at all ages, but is most frequent in middle life—from thirty to forty for males, and

* Reynolds's "System of Medicine," article "Diabetes."