(3) **Pleurodynia** involves the intercostal muscles on one side, and in some instances the pectorals and serratus magnus. This is, perhaps, the most painful form of the disease, as the chest cannot be at rest. It is more common on the left than on the right side. A deep breath, or coughing, causes very intense pain, and the respiratory movements are restricted on the affected side. There may be pain on pressure, sometimes over a very limited area. It may be difficult to distinguish from intercostal neuralgia, in which affection, however, the pain is usually more circumscribed and paroxysmal, and there are tender points along the course of the nerves. It is sometimes mistaken for pleurisy, but careful physical examination readily distinguishes between the two affections.

(4) Among other forms which may be mentioned are **cephalodynia,** affecting the muscles of the head; **scapulodynia, omodynia,** and **dorsodynia,** affecting the muscles about the shoulder and upper part of the back. Myalgia may also occur in the abdominal muscles and in the muscles of the extremities.

Treatment.—Rest of the affected muscles is of the first importance. Strapping the side will sometimes completely relieve pleurodynia. No belief is more wide-spread among the public than the efficacy of porous plasters for muscular pains of all sorts, particularly those about the trunk. If the pain is severe and agonizing, a hypodermic of morphia gives immediate relief. For lumbago acupuncture is, in acute cases, the most efficient treatment. Needles of from three to four inches in length (ordinary bonnet-needles, sterilized, will do) are thrust into the lumbar muscles at the seat of the pain, and withdrawn after five or ten minutes. In many instances the relief is immediate, and I can corroborate fully the statements of Ringer, who taught me this practice, as to its extraordinary and prompt efficacy in many instances. The constant current is sometimes very beneficial. In many forms of myalgia the thermo-cautery gives great relief. In obstinate cases blisters may be tried. Hot fomentations are soothing, and at the outset a Turkish bath may cut short the attack. In chronic cases iodide of potassium may be used, and both guaiacum and sulphur have been strongly recommended. Persons subject to this affection should be warmly clothed, and avoid, if possible, exposure to cold and damp. In gouty persons the diet should be restricted and the alkaline mineral waters taken freely. Large doses of nux vomica are sometimes beneficial.

V. ARTHRITIS DEFORMANS (*Rheumatoid arthritis*).

Definition.—A chronic disease of the joints, characterized by changes in the cartilages and synovial membranes, with periarticular formation of bone and great deformity.

Etiology.—Long believed to be intimately associated both with gout and rheumatism (whence the names rheumatic gout and rheumatoid arthritis), this close relationship seems now very doubtful, since in a majority of the cases no history of either affection can be determined. It is difficult to separate some cases from ordinary chronic rheumatism, but the multiple form has, in all probability, a nervous origin, as suggested by J. K. Mitchell. This view is based upon such facts as the association of the disease with shock, worry, and grief; the similarity of the arthritis to the arthropathies due to disease of the cord, as in locomotor ataxia; the symmetrical distribution of the lesions; the remarkable trophic changes which lead to alterations in the skin and nails, and occasionally to muscular wasting out of proportion to the joint mischief. Ord regards the disease as analogous to progressive muscular atrophy and due either to a primary lesion in the cord or to changes the result of peripheral irritation, traumatic, uterine, urethral, etc. The true nature of the disease is still obscure, but the neuro-trophic theory meets very many of the facts. Females are more liable to the disease than males. In Archibald E. Garrod's table of 500 cases there were 411 females and 89 males. It most commonly sets in between the ages of twenty and thirty, but it may begin as late as fifty. It occurs also in children; within the past five years there have been at my clinics four cases in children under twelve. The degree of deformity may be extreme even at this early age. Hereditary influences are not uncommon. In Garrod's cases there were in 216 instances a family history of joint disease. Seguin has reported the occurrence of three cases in children of the same family. It is stated that the disease is more common in families with phthisical history. It seems to be more frequent in women who have had ovarian and uterine trouble, or who are sterile. In this country acute rheumatism or gout in the forebears is rare. Mental worry, grief, and anxiety seem frequent antecedents. It is an affection quite as common in the rich as in the poorer classes, though in England and the continent the latter seem more prone to the disease. Though often attributed to cold or damp, and occasionally to injury, there is no evidence that these are efficient causes.

Morbid Anatomy.—The changes in the joints differ essentially from those of gout in the absence of deposits of urate of soda, and from chronic rheumatism by the existence of extensive structural alterations, particularly in the cartilages. We are largely indebted to the magnificent work of Adams for our knowledge of the anatomy of this disease. The changes begin in the cartilages and synovial membranes, the cells of which proliferate. The cartilage covering the joint undergoes a peculiar fibrillation, becomes soft, and is either absorbed or gradually thinned by attrition, thus laying bare the ends of the bone, which become smooth, polished, and eburnated. At the margins, where the pressure is less, the proliferating elements may develop into irregular nodules, which ossify and enlarge the heads of the bones, forming osteophytes which completely lock the joint. The periosteum may also form new bone. There is usu-

ally great thickening of the ligaments, and finally complete anchylosis results. This is rarely, however, a true anchylosis, but is caused by the osteophytes and thickened ligaments. There are often hyperostosis and increase in the articular ends of the bone in length and thickness. In long-standing cases and in old persons there may, on the other hand, be great atrophy of the heads of the affected bones. The spongy substance becomes friable, and in the hip-joint the wasting may reach such an extreme grade that the articulating surface lies between the trochanters. This is sometimes called *morbus coxæ senilis*. The anatomical changes may lead to great deformity. The metacarpal joints are enlarged and thickened, and the fingers are deflected toward the ulnar side. The toes often show a similar deflection.

The muscles become atrophied, and in some cases the wasting reaches a high grade. Neuritis has been demonstrated in the nerves about the joints.

Symptoms.—Charcot makes a convenient division of the cases into Heberden's nodosities, the general progressive form, and the partial or mono-articular form.

Heberden's Nodosities.—In this form the fingers are affected, and little hard nodules develop gradually at the sides of the distal phalanges. They are much more common in women than in men. They begin usually between the thirtieth and fortieth year. The subjects may be in perfect health, though more commonly they have digestive troubles, neuralgia, or rheumatic pains, or have had gout. Although these nodules are usually regarded as gouty, in many cases no manifestations of this disease occur. Heberden did not lay any stress upon the association. In the early stage the joints may be swollen, tender, and slightly red, particularly when knocked. The attacks of pain and swelling may come on in the joints at long intervals or follow indiscretion in diet. The little tubercles at the sides of the dorsal surface of the second phalanx increase in size, and give the characteristic appearance to the affection. The cartilages also become soft, and the ends of the bones eburnated. The condition is not curable; but there is this hopeful feature—the subjects of these nodosities rarely have involvement of the larger joints. They have been regarded, too, as an indication of longevity. Charcot states that in women with these nodes cancer seems more frequent.

General Progressive Form.—This occurs in two varieties, acute and chronic. The *acute* form may resemble, at its outset, ordinary articular rheumatism. There is involvement of many joints; swelling, particularly of the synovial sheaths and bursæ; not often redness; but there is moderate fever. Howard describes this condition as most frequent in young women from twenty to thirty years of age, often in connection with recent delivery, lactation, or rapid child-bearing. Acute cases may develop at the menopause. It may also come on in children. "These patients suffer in their general health, become weak, pale, depressed in spirits, and lose

flesh. In several cases of this form marked intervals of improvement have occurred; the local disease has ceased to progress, and tolerable comfort has been experienced perhaps until pregnancy, delivery, or lactation again determine a fresh outbreak of the disease."

The *chronic* form is by far the most common. The joints are usually involved symmetrically. The first symptoms are pain on movement and slight swelling, which may be in the joint itself or in the peri-articular sheaths. In some cases the effusion is marked, in others slight. The local conditions vary greatly, and periods of improvement alternate with attacks of swelling, redness, and pain. At first only one or two joints are affected; usually the joints of the hands, then the knees and feet; gradually other articulations are involved, and in extreme cases every articulation in the body is affected. Pain is an extremely variable symptom. Some cases proceed to the most extreme deformity without pain; in others the suffering is very great, particularly at night and during the exacerbations of the disease. There are cases in which pain of an agonizing character is an almost constant symptom, requiring for years the use of morphia.

Gradually the shape of the joints is greatly altered, partly by the presence of osteophytes, partly by the great thickening of the capsular ligaments, and still more by the retraction of the muscles. In moving the affected joint crepitation can be felt, due to the eburnation of the articular surfaces. Ultimately the joints become completely locked, not by a true bony anchylosis, but by the osteophytes which form around the articular surfaces, like ring-bone in horses. There is also a spurious anchylosis, caused by the thickening of the capsular ligaments and fibrous adhesions. The muscles about the joints undergo important changes. Atrophy from disuse gradually supervenes, and contractures tend to flex the thigh upon the abdomen and the leg upon the thigh. There are cases with rapid muscular wasting, symmetrical involvement of the joints, and trophic changes, which strongly suggest a central origin. Numbness, tingling, pigmentation or glossiness of the skin, and onychia may be present. In extreme cases the patient is completely helpless, and lies on one side with the legs drawn up, the arms fixed, and all the articulations of the extremities locked. Fortunately, it often happens in these severe general cases that the joints of the hand are not so much affected, and the patient may be able to knit or to write, though unable to walk or to use the arms. It is surprising indeed how much certain patients with advanced arthritis deformans can accomplish. No one who had seen the beautiful models and microscopic preparations of the late H. D. Schmidt, of New Orleans, could imagine that he had been afflicted for years with a most extreme grade of this terrible disease. In many cases, after involving two or three joints, the disease becomes arrested, and no further development occurs. It may be limited to the wrists, or to the knees and wrists, or to the knees and ankles. A majority of the patients finally reach a

quiescent stage, in which they are free from pain and enjoy excellent health, suffering only from the inconvenience and crippling necessarily associated with the disease.

Coincident affections are not uncommon. In the active stage the patients are often anæmic and suffer from dyspepsia, which may recur at intervals. There is no tendency to involvement of the heart.

The **partial** or **mono-articular** form affects chiefly old persons, and is seen particularly in the hip, the knee, the spinal column, or shoulder. It is, in its anatomical features, identical with the general disease. In the hip and shoulder the muscles early show wasting, and in the hip the condition ultimately becomes that already described as *morbus coxæ senilis*. These cases seem not infrequently to follow an injury. They differ from the polyarticular form in occurring chiefly in men and at a later period of life. One of the most interesting forms affects the vertebræ, completely locking the articulations, and producing the condition known as *spondylitis deformans*. When the cervical spine is involved the head cannot be moved up and down, but is carried stiffly. Usually rotation can be effected. The dorsal and lumbar spines may also be involved, and the body cannot be flexed in the slightest degree. No other joints may be affected.

Diagnosis.—Arthritis deformans can rarely be mistaken for either rheumatism or gout. It is important to distinguish from the mono-articular form the local arthritis of the shoulder-joint which is characterized by pain, thickening of the capsule and of the ligaments, wasting of the shoulder-girdle muscles, and sometimes by neuritis. This is an affection which is quite distinct from arthritis deformans, and is, moreover, in a majority of cases curable.

Treatment.—Arthritis deformans is an incurable disease. In many cases, after involvement of two or three joints, the progress is arrested. Too often it invades successively all the articulations, and in ten, fifteen, or twenty years the crippling becomes general and permanent.

The best that can be hoped for is a gradual arrest. It is useless to saturate the patients with iodide of potassium, salicylates, or quinine. Arsenic seems to do good as a general tonic. The improvement may be marked if large doses of it are given. Iron should be used freely, if there is anæmia. Careful attention to the digestion, plenty of good food, and fresh air are important measures. Hydrotherapy, with carefully performed massage, is best for the alleviation of the pain, and may possibly restrain the progress of the affection. In early cases local improvement and often great gain in the general strength follow a prolonged treatment at the hot mineral baths; but the practitioner should exercise care in recommending this mode of treatment, which is of very doubtful value when the disease is well established. I have repeatedly known cases to be rendered much worse by residence at these institutions. When good results, it is largely from change of scene and climate, and the careful regulation of the diet. The local treatment is of benefit in arresting the progress. When there are much heat and pain the limb should be at rest, cold compresses applied at night, the joints wrapped in oiled silk, and in the morning thoroughly massaged. It is surprising how much can be done by carefully applied friction to reduce the thickening, to promote absorption of effusion, and to restore mobility. Massage is also of special benefit in maintaining the nutrition of the muscles, which early tend to atrophy. In the case of the knees this mode of treatment will sometimes prevent the retraction of the muscles and the gradual flexion of the legs on the thighs. No benefit can be expected from electricity.

VI. GOUT (*Podagra.*)

Definition.—A nutritional disorder, associated with an excessive formation of uric acid, and characterized clinically by attacks of acute arthritis, by the gradual deposition of urate of soda in and about the joints, and by the occurrence of irregular constitutional symptoms.

Etiology.—It is now generally recognized that the disease depends upon disturbed metabolism; most probably upon defective oxidation of nitrogenous food-stuffs.

Among important etiological factors in gout are the following:

(*a*) *Hereditary Influences.*—Statistics show that in from fifty to sixty per cent of all cases the disease existed in the parents or grandparents. The transmission is supposed to be more marked from the male side. Cases with a strong hereditary taint have been known to develop before puberty. The disease has been seen even in infants at the breast. Males are more subject to the disease than females. It rarely develops before the thirtieth year; and in a large majority of the cases the first manifestations appear before the age of fifty. (*b*) *Alcohol* is the most potent factor in the etiology of the disease. Fermented liquors favor its development much more than distilled spirits, and it prevails most extensively in countries like England and Germany, which consume the most beer and ale. Probably the greater tendency of malt liquors to induce gout is associated with the production of an acid dyspepsia. The lighter beers used in this country are much less liable to produce gout than the heavier English and Scotch ales. (*c*) *Food* plays a *rôle* equal in importance to that of alcohol. From the time of Hippocrates overeating has been regarded as a special predisposing cause. The excessive use of food, particularly of meats, disturbs gastric digestion and leads to the formation of lactic and volatile fatty acids. It is held by Garrod and others that these tend to decrease the alkalinity of the blood and to reduce its power of holding urates in solution. A special form of gouty dyspepsia has been described. A robust and active digestion is, however, often met in gouty persons. Gout is by no means confined to the rich. In England the combination of