limited chiefly by pain and effusion; muscular spasm is not prominent.

One or many large or small joints may be affected in any of the varieties of infectious arthritis, though the gonorrhœal virus is apt

FIG. 224.—Atrophic Arthritis. Early stage.

to lodge in few joints (oftenest the knee or ankle) and the "rheumatic" virus in many joints, while the typhoid poison has a predilection for the spine.

III. *Atrophic Arthritis.*—Two types must be recognized: (*a*) A monarticular form, secondary usually to tabes or syringomyelia ("Charcot's joint," "neuropathic joint"), and other diseases of the spinal cord. (*b*) A polyarticular primary form ("rheumatoid arthritis").

In both, the distinguishing characteristic is atrophy and destruction of cartilage, bone, and joint membranes—a process which in the early stages can be identified only by the *x*-ray (see Fig. 222).

Later the disintegration of the joint is usually evident, and is followed by distortions, contractures, and ankylosis.

(*a*) The *monarticular form* is generally easy to recognize on account of its rapid, painless course, with semifluctuant swelling, secondary to a well-marked cord lesion, such as locomotor ataxia. A large joint is almost always affected, oftenest the knee, less often the hip, shoulder, or elbow. The joint shows abnormal mobility and the bones can often be felt to grate (see Fig. 223).

(*b*) The *primary polyarticular form* usually begins in the fingers, and is very apt to occur *symmetrically*, *i.e.*, in corresponding joints of both hands at the same time (see Fig. 224). The joints are enlarged, boggy, spindle shaped (owing to the rapid atrophy of the interossei), often abnormally white, apparently fluctuant, and show trophic skin lesions (glossy skin, sweating, mottling) (see Fig. 225). The terminal finger-joints are rarely swollen. Late in the course of the disease a ring of constriction often marks the line of articulation (see Fig. 226). Pain is not severe until motion is attempted or unless the joint is jarred and stirred up by some traumatism.

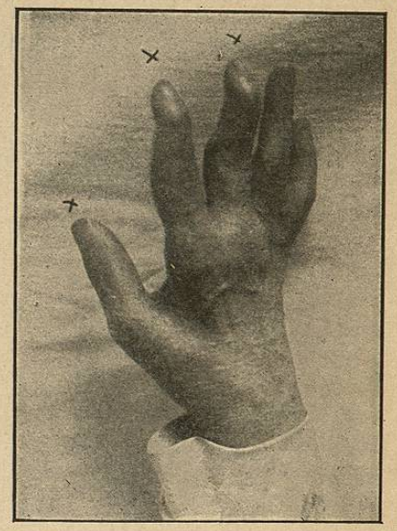

FIG. 225.—Atrophic Arthritis. (Goldthwaite.)

The changes progress slowly and attack new and larger joints, moving centrally from the periphery. At any stage the process may become arrested, but usually not until *ankylosis* or *contractures* have occurred in one or many joints. Some of the "ossified men" of dime museums are in the ankylosed stage of this terrible malady.

Flexion of fingers with hyperextension of the terminal joints and deflection to the ulnar side are common deformities.

IV. *Hypertrophic Arthritis.*—Bony enlargement and osteophytic spurs are the distinguishing feature. The new bone is oftenest deposited round the edges of the articular cartilage, forming an irregular fungoid ring ("ring bone" in horses) or "lip" near the joint.

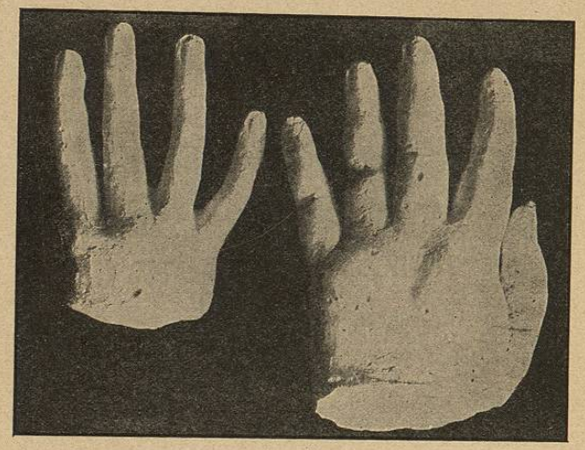

FIG. 226.—Atrophic Arthritis. Late stage with constriction ring at the joint line. (Goldthwaite.)

The attachments of the ligaments (*e.g.*, the anterior lateral ligament of the spine or the cotyloid ligament in the hip-joint) furnish another favorite site for the bony deposits.

(*a*) In the terminal finger-joints ("*Heberden's nodes*") the process may remain for years without extending to any other articulation and without producing any discomfort (Figs. 50 and 227).

(*b*) The disease may be limited to the hip-joint ("morbus coxæ senilis") or to any other single joint, producing purely mechanical disturbances by limitation of motion. There is no considerable muscular spasm, and motion is quite free up to a certain point, at

which it is suddenly "locked" by the interference of the bony outgrowths. The situation, size, and shape of these outgrowths can be shown, as a rule, by the *x*-ray alone. Pain and swelling are slight or absent, unless traumatism (internal or external) stirs

FIG. 227.—Hypertrophic Arthritis with Heberden's Nodes.

up the joint and produces a synovitis. The chief complaint is of *stiffness*.

(*c*) Several joints may be affected, and there may result much pain because nerves pass through or over the new-formed bone and are compressed by it. This form is most often seen in the spine ("spondylitis deformans," "osteoarthritis"), where a portion of the front and side of the vertebral column is "plastered over" with new-formed bone (see Fig. 228), which later invades the interverte-

bral cartilage and produces ankylosis (see Fig. 229), either a straight "ramrod" spine or a forward curved spine.

FIG. 228.—Hypertrophic Arthritis of Spine. (Goldthwaite.)

In the early stages the disease is recognized by:

(*a*) *Nerve pain*, running round the body or down the legs,[1] as the intercostal and spinal nerves are pressed on.

(*b*) *Limitation of Motion.* The process is usually unilateral, wholly or predominantly; hence the patient can usually bend much

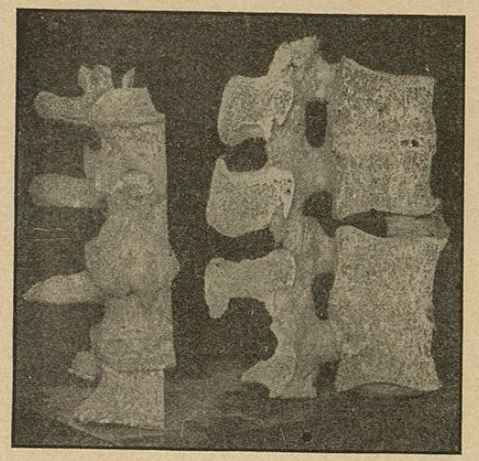

FIG. 229.—Hypertrophic Arthritis (Spine) of Spine with Ankylosis. (Goldthwaite.)

better to one side (see Figs. 230 and 231) than to the other. Motion is also more or less limited in other directions, but forward bending is fairly well performed as a rule, in sharp contrast with "lumbago," which renders forward bending and the subsequent recovery almost impossible.

(*c*) *Coughing* or *sneezing often gives great pain*, probably because the costo-vertebral joints are involved in the new growth; if ankylosis of these joints occurs later, the respiratory movements of the chest are interfered with.

V. *Gouty Arthritis.*—The deposits of urate of sodium in the soft structures around the joint are, like those in the ear (see

[1] Many neuralgias and sciaticas are due to this disease.

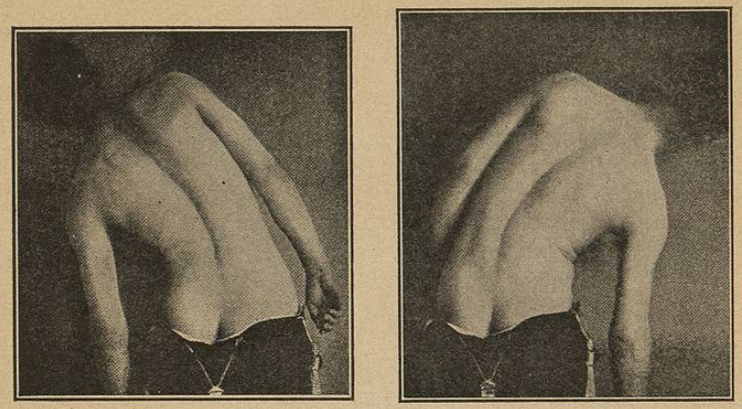

FIG. 230.—Showing Normal Flexibility of Spine. (Goldthwaite.)

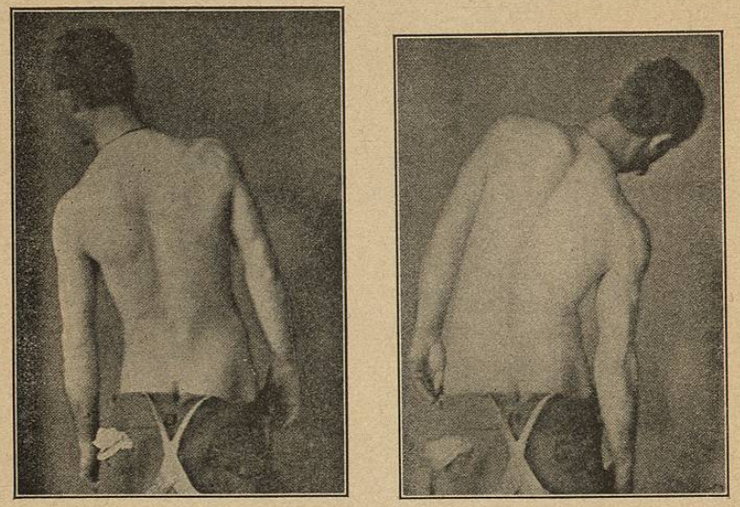

FIG. 231.—Hypertrophic Arthritis of Spine. Motion to left limited. (Goldthwaite.)

Fig. 232), close beneath the skin or perforate it, and hence are recognizable (as above explained) by microscopic examination.

They somewhat resemble the nodes of hypertrophic arthritis, but are not attached to the bone and can be moved about in the soft structures over it. *x*-Ray examination shows that there is often considerable destruction of bone in the vicinity of the tophi (see Figs. 233 and 234).

VI. *Hæmophilic Arthritis.*—A chronic stiffening and enlargement of the joint, resembling in many respects the joint of hypertrophic arthritis, but often accompanied by the formation of fibrous adhesions, ensues in some cases of hæmophilia, presumably as a result of frequent hemorrhages and serous oozings in the joint. The diagnosis depends on the evidence of hæmophilia, the youth of the patient, and the absence of infection as a causative factor.

FIG. 232.—Gouty Tophus in the Ear.

FIG. 233.—Gouty Arthritis. (Goldthwaite.)

Relative Frequency of the Various Joint Lesions.[1]—The following table was prepared by Dr. Vickery[2] from the records of

Fig. 234.—*x*-Ray of Hand in Gouty Arthritis. (Goldthwaite.)

the Massachusetts General Hospital (1893–1903):

Infectious arthritis	Acute rheumatic arthritis	591	873
	Subacute rheumatic arthritis	193	
	Gonorrhœal arthritis	86	
	Typhoid arthritis (spine)	3	
Hypertrophic and atrophic arthritis			43
Gout			9

[1] Chronic villous arthritis ("dry joint") is a purely local process and therefore receives no further mention here.

[2] Boston Med. and Surg. Jour., November 17th, 1904.

CHAPTER XXV.

THE NERVOUS SYSTEM.

Examination of the Nervous System.

The outlines of neurological diagnosis depend on knowledge of:

I. Disturbances of motion.

II. Disturbances of sensation.

III. Disturbances of reflexes (including sphincteric and sexual reflexes).

IV. Disturbances of electrical excitability.

V. Disturbances of speech and handwriting.

VI. Disturbances of nutrition ("trophic").

VII. Psychic disorders.

I shall attempt no *topical diagnosis* of nerve lesions, no diagnosis, that is, depending on memorizing the brain areas, cord levels, or skin-and-muscle areas corresponding to particular nerve lesions. The general practitioner for whom this book is intended will not attempt to carry such points in his head, but will refer to specialists or special text-books when the case confronts him. The general methods most often employed are all that I attempt to describe.

I. Disorders of Motion.

1. Gaits.
2. Paralyses.
3. Spasms and tremors.
4. Ataxia.

1. *Gaits.*—The most important gaits are:

(*a*) The *spastic.*

(*b*) The *ataxic.*