

sis, embolisms, traumatism, endarteritis obliterans (senile gangrene); in association with infectious and inflammatory processes, as in carbuncles and necrosis of bone; in trophic conditions like syringomyelia, leprosy; in ergotism, Raynaud's disease, diabetic gangrene, etc. The clinical features and treatment vary according to the circumstances.

ULCERS

occur in a considerable variety of conditions, as in syphilis, epithelioma, lupus vulgaris, from injuries, inflammatory and infectious processes, trophic influences, and after separation of the slough in gangrenous cases.

CICATRICAL CONTRACTIONS

often occur about the hands and fingers, with consequences ranging up to extreme deformity and disability, the usefulness of the hand being at times almost completely destroyed. These contractions may develop after the cicatrization of wounds or ulcers of any sort, as after lupus or syphilitic ulcers, but especially after the healing of ulcers from burns. Protracted granulation favors the development of deforming cicatrices. The deformities produced are very various, consisting of palmar, dorsal, or lateral deflections of the fingers, acquired syndactylism, etc.

The successful treatment of these cases is quite difficult, as there is a strong tendency to recurrence after



FIG. 2486.—Cicatricial Contraction in the Hand. (Gross.)

ordinary plastic procedures. As a prophylactic measure may be mentioned treatment of ulcers likely to be followed by contracting cicatrices in such manner as to shorten the period of granulation and healing, as by attention to aseptics or by skin grafting. Still, in slow-healing ulcers like those from burns there is little certainty of escaping later contraction. Even the keeping of the parts in a corrected or overcorrected position by splints or appliances is not very successful.

The ordinary plastic operations sometimes succeed, but often do not secure permanent results. Among such procedures may be mentioned the lifting of a V-shaped flap, exsection of the cicatricial tissue, straightening of the parts, and final suturing of the wound in a Y-form. The Thiersch and Reverdin modes of skin-grafting for filling defects after dissecting out the vicious tissue are

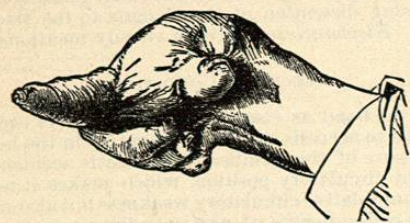


FIG. 2487.—Cicatricial Contraction in Hand. (Erichsen.)

not very successful. A medicinal method of treatment of this and similar conditions, by the administration of thiosinamin, has been highly commended by a few, but has not come into general use. This drug is said to exert

a selective disintegrating action on scar tissue; it is administered hypodermically, 0.1 to 0.2 gm. being injected deep into muscles (triceps or glutei) every three days, or by the mouth, 0.2 daily in capsules, kept up if necessary for weeks.

The treatment recommended as most successful in these cases is a radical transplantation of a skin flap, one end of which is left with its original attachment and vascular supply intact until the flap is firmly united in its new position. The contracting scar tissues are divided and removed as much as possible, and the deformity is corrected. Into the gap thus left a flap of proper size, composed of the entire thickness of the skin, is brought and sutured. One end of the flap, affording the best vascular supply, is left unsevered from its original attachment until, after two to four weeks, the flap is well united in its new position. This flap can be taken in any convenient situation from the thorax, abdomen, or back, and the hand and arm bandaged in place until union is complete, when the flap is entirely detached from its original situation. In some cases it is probable that a similar flap could be taken from the dorsum of the hand and twisted around in position to fill a defect.

In intractable cases of great deformity amputation may be indicated, though it should be remembered that often a poor finger is more useful than no finger at all.

ACQUIRED DEFORMITIES.

The deformities to the acquirement of which the hand is subject are so various in their possible forms and diversities that they are hardly susceptible of useful classification. They may consist in loss of substance or parts, as from traumatism, amputations, necrosis of bone or other tissue; in abnormal adhesions, in contractions of tissue, in deflections and distortions of fingers and hand from numerous causes, in nutritive alterations, in the results of occupation (occupation deformities). Most of the congenital forms of deformity may be duplicated by acquired conditions, as acquired acheiria, ectrodactylism, or hypophalangism from amputation or necrosis, acquired syndactylism from adhesions, acquired club hand or clinodactyly. The causes and nature of acquired deformities are so various that no general statements as to treatment can be made; each case must be managed according to its character.

EFFECTS OF OCCUPATION ON THE HAND.

The effects of an individual's occupation or habitual mode of life and environment may become marked by reactive consequences, structural and functional, upon various parts of the body, and especially upon the hand, since this member is so actively and constantly exposed and employed. The effects produced on the hand by occupation are not only of some clinical importance but are also of anthropological interest and medico-legal significance. An extensive study of the effects produced by a large number of occupations, especially from a medico-legal standpoint, made by M. Vernois, may be found in the *Annales de l'hygiène publique et de médecine légale*, 1862, 2d series, vol. xvii., pp. 104-190.

Among the many various factors which produce effects on the hand may be mentioned friction and pressure, as from the use of instruments and tools or the manipulation of machinery, which may have hypertrophic, irritative, or destructive consequences; frequent exposure to chemical substances, with irritant, caustic, emollient, staining, or other action; exposure to physical agencies, heat, cold, weather, sun; deposition of foreign matter;

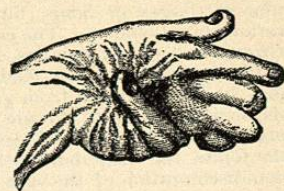


FIG. 2488.—Cicatricial Contraction with Backward Deflection of Little Finger. (Erichsen.)

the frequent repetition of slight traumatism, "occupation insults," ultimately producing cumulative results. Any of the tissues and any part of the hand may be the seat of the alterations produced by occupation, and the changes may be either organic, with definite structural alterations, or functional and without anatomical changes. The particular changes set up vary in their site and nature according to the circumstances. While many avocations do not produce definite effects on the hand, others do produce distinctive and characteristic results.

Only a brief consideration of the general effects produced in the various tissues can be attempted here. For full and detailed information on the subject reference may be made to such works as that of Vernois, already cited.

The epidermis, from its superficial and exposed position, naturally exhibits marked effects from use. From continued pressure or friction it becomes very often hypertrophied, thickened, and hardened, especially on the palm, and either over the whole palmar surface or in circumscribed and distinctive localities (callosities) according to the site of pressure, as on the left finger tips of violinists. Or from exposure to water and other fluids, caustics, alkalis, acids, and similar strong chemicals, the epidermis may be softened, thinned, atrophied, or even entirely destroyed.

The cutis vera may from the action of irritants, etc., undergo inflammatory changes, or present erythema, blisters, pustules, ulcerations, fissures, cracks, etc. Later in such cases the skin exhibits cicatrices. The skin may be discolored from the action of chemicals and dyestuffs or exposure to the sun and weather. Foreign material, powders, flour, etc., in many cases is deposited under the nails or in fissures or folds of the skin. Foreign particles, as of iron or iron oxide in grindstone workers, may become permanently embedded in the skin, producing a tattooage effect similar to the particles of gunpowder often found deposited in the cutis. Impregnation of the skin with substances like resins or sulphur may produce a corresponding distinct odor. Increase or decrease of the delicacy of the sense of touch may be produced by practice or by thinning or thickening of the epidermis. The temperature of the hand may be affected by alterations in the development of the superficial vessels, being lowered in those who work with their hands in cold water, or habitually elevated and increased in those who work in hot places (as bakers).

The nails are subject to special changes, as discoloration by chemicals or dyes, wearing off of the edges, or hypertrophy at particular points. The hairs may be discolored, or destroyed in places by pressure or chemicals.

The subcutaneous tissues may be thinned or thickened by the same factors that produce like results on the cuticle and cutis. The hands of those engaged in hard manual labor often exhibit a marked general palmar induration, the skin and underlying tissues being generally thickened, hard, rigid, and inelastic, and somewhat contracted so that the fingers are held slightly flexed and their full extensibility is somewhat impaired. From the

action of irritants subcutaneous oedematous accumulations may be developed. Enlarged bursae may appear at points exposed to pressure, as on the back of the right wrist in sawyers (Vernois).

The veins of the hand may become dilated from habitual exposure to heat. The muscles may to a certain extent become hypertrophied, atrophied, or shortened, according to their use or disuse. Special muscular activity and mobility and manual dexterity are developed in most occupations, as in pianists and many others. Habitual holding of the hand in certain positions, as with drivers, sometimes results in more or less rigid fixation of the hand or fingers in a flexed or other position—the *occupation* or *habit contracture*. Overuse of groups of muscles sometimes causes them to atrophy—*occupation muscular atrophy*. The nerves do not undergo perceptible anatomical alterations, but various occupations may produce serious functional nervous disorders of the hand, forming the important clinical class known as "occupation neuroses," typified by writers' cramp.

The articulations may be variously affected by occupation. Sometimes the mobility of the joint is increased, sometimes it is diminished, or there may be complete ankylosis. The finger joints may be enlarged, from exposure to repeated injury, as in baseball players. Partial luxations may occur, and deflections of the phalanges may be produced (as a backward deviation or superextensibility of the distal phalanx of the thumb in jewelers). From being kept in habitual special positions, corresponding changes may take place in the articular structures, as pressure atrophies, lengthening or shortening of ligaments, etc. Even the bones may undergo changes, as a spatuliform flattening of the phalanges from pressure.

From this résumé it will be seen that a great variety of changes in the hand may be produced by the occupation, varying in their situation, extent, and character according to the particular causative factors that may be at work in each case. The alterations may be anatomical or physiological, structural or functional. Three or four clinically important groups of conditions may be specially distinguished and mentioned: *occupation deformities*, in which alterations of form are produced; *occupation dermatoses*, embracing in general changes produced in the skin; *occupation dermatitis* and other inflammatory processes consequent upon the occupation; and *occupation neuroses*, covering the morbid functional nervous conditions induced by occupation or habit.

As an example of occupation deformities may be mentioned the effects often produced in the hands of baseball players, which are very characteristic (Fig. 2489). The typical changes in these cases consist in an enlargement of one or more of the distal phalangeal joints, along with slight lateral or palmar deflection of the terminal phalanges, which have a shortened appearance. Sometimes the affected joints are partially or completely ankylosed, though not always so.

No general rules as to treatment can be laid down, as the lesions and factors are so various in different cases. Change of occupation is obviously a therapeutic measure

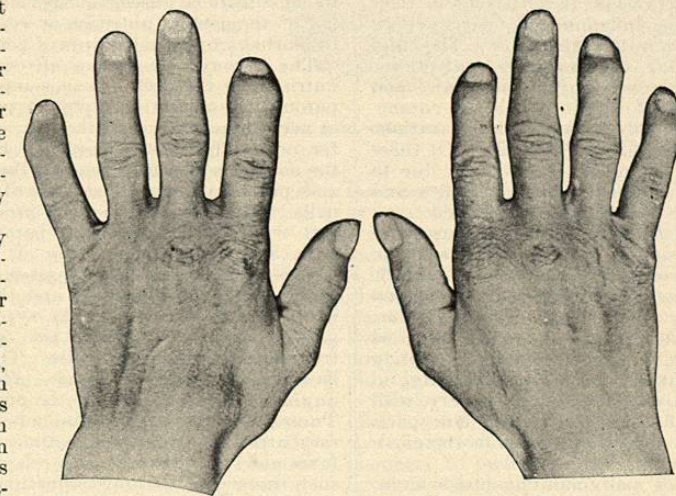


FIG. 2489.—Hands of a Baseball Player, Showing Characteristic Alterations. (Original.)

of general applicability in these cases. Occupation dermatitis and occupation neuroses will be referred to subsequently.

AFFECTIONS OF THE NAILS.

These are usually treated in full in works on dermatology, and will be only briefly reviewed here. The lesions of these structures may be divided into inflammatory and necrotic conditions (paronychias), changes in the substance of the nails (nutritive or trophic changes), atrophy, absence, hypertrophy, changes in form, changes in color, and parasitic conditions.

Inflammatory and Necrotic Conditions—Paronychia.—The nail substance from its histological structure cannot itself be the seat of real inflammation. The tissues contiguous to the nail and from which it derives its growth and nutrition (the bed, matrix, and root of the nail), are, however, subject to special forms of inflammation, and to such conditions the terms onychia (or onychitis) and paronychia are variously given. The term onychia is also applied to certain purely nutritive and trophic lesions of the nails. Other affections of these tissues in their clinical features resemble inflammatory paronychias, though primarily rather necrotic in character. The chief varieties of paronychia are the traumatic, infectious, malignant, syphilitic, tuberculous, diabetic, toxic, and trophic forms, besides those forms in which the cutaneous tissues adjacent to the nails are affected with various skin diseases, especially eczema and psoriasis. Of these forms of paronychia, the common acute variety due to infection with pyogenic bacteria and the syphilitic and tuberculous varieties have been already considered.

Traumatic Onychia and Paronychia is that caused by injuries, especially contusions. In cases of great violence the nail may be loosened and immediately cast off. In less severe cases, effusion and transformation of blood may give the nail a black color; in the course of time the nail often becomes slowly and gradually loosened from its bed, in whole or in part, and may be entirely cast off. If infection occurs the case is materially aggravated. The tendency is toward repair and recovery, with ultimate reproduction of a perfect nail. The parts should be kept protected, dead nail should be removed, and infection guarded against.

Malignant Paronychia (or malignant onychia) is an indolent inflammatory, suppurating, necrotic, or ulcerative affection of the nail matrix and bed, originating in a slight traumatism, and confined usually to a single nail. It affects especially persons of lowered vitality and in unhealthy condition, especially those of scrofulous diathesis, diabetics, and those prone to infections; it is commonest in children. It begins with simple inflammation, later proceeding to suppuration and ulceration. The nail becomes thickened, opaque, discolored, loosened, and cast off. The course of the disease is slow and indolent, and may become chronic; or the ulcer may slowly heal, and an imperfect nail be formed. The inflammation frequently extends to the subcutaneous tissues or the bone. In scrofulous cases the process is probably sometimes really tuberculous. The treatment consists in local measures to stimulate healing, and in vigorous constitutional and tonic treatment.

Diabetic Paronychia is the form of diabetic gangrene in which the circumungual tissues are the seat of the necrotic process or tendency, shown by sluggish inflammation or ulceration. The treatment is that of the constitutional disease.

Toxic Paronychia, that produced by the action of toxic agents, is well exemplified by the characteristic local lesions—ulcers at the roots of the nails—produced by arsenic in the hands of those who work with this substance. The obvious treatment is discontinuance of the cause.

Trophic Paronychia is the necrotic and inflammatory process about the nails which results from morbid nervous action in various neuroses such as syringomyelia or Morvan's disease, "glossy skin," Raynaud's disease, lep-

rosy. The process is primarily degenerative and necrotic, but the lowered vitality of the tissues predisposes to sluggish infection and inflammation. The destruction of tissue may be extensive, involving even the bone, and the course is apt to be prolonged. The treatment is local and that of the cause.

Nutritive Alterations of the Nails.—While the nail substance proper is scarcely liable to inflammation, it is subject to nutritive and trophic alterations, mostly of a degenerative character, which may be produced by a considerable variety of causes.

The term onychia is applied to some forms of these alterations. The changes of a degenerative, malnutritive, or trophic character which the nails may exhibit are very various, such as loss of lustre, changes in color (white spots, etc.), softening, brittleness, friability, fragility, thinning, thickening, longitudinal or transverse furrows and ridges, laminations, exfoliation, splitting, irregularity of surface (elevations and depressions), etc.

These trophic alterations may be grouped into three etiological classes: (a) those due to local conditions or causes, as paronychia, dermatoses, trauma; (b) those due to constitutional diseases, especially those with a lowering of the general nutrition or vitality, and (c) those due to morbid trophic influences of nervous origin.

The paronychias do not all cause impairment of the nutrition of the nail, but in some cases, as in malignant paronychia, ulcerative syphilitic paronychia, and trophic or necrotic paronychias, the nail substance is apt to suffer, or may be entirely cast off. Skin diseases affecting the nails or adjacent cutaneous tissues, especially eczema and psoriasis, may cause malnutritive changes in the nails. Similar effects may be produced by trauma, contact with strong chemicals, parasitic affections of the nails, etc.

Severe constitutional diseases in which there is a great drain on the vital powers and the general nutrition is lowered, such as acute fevers, syphilis, scurvy, diabetes, gout, cancer, and others, also senility, may produce trophic changes in the nails. The syphilitic onychias have been already described. After acute diseases the unguis changes appear in the period of convalescence. Transverse furrows or white bands, representing temporary arrest of growth, sometimes appear after typhoid fever and other diseases. In relapsing fever two or three such transverse markings sometimes occur, one following and corresponding to each febrile paroxysm. Longitudinal ridges—"reedy nail"—occur in gout, senility, and other conditions.

In the third class of cases nutritive changes in the nails are produced by morbid, trophic, nervous influences arising from various nervous disorders, as in association with neuritis—multiple neuritis, gouty neuritis, leprosy, "glossy skin"—or with central nervous diseases.

In the treatment of these conditions the nails should be kept trimmed and in good order, protected by a coating of wax, and guarded against injury. The local or general condition giving rise to the unguis lesions should receive the appropriate treatment.

Atrophy of the Nail can scarcely be distinguished from certain forms of nutritive alterations, and is similar in its etiology and pathology to the latter.

Absence of the Nails (Anonychia) may be congenital or acquired. Rarely the nails are entirely absent from birth, either without any other developmental anomaly or in association with developmental defects like hypophalangism. The nail may be totally and permanently abolished by traumatism or diseases causing complete destruction of the nail-forming tissues.

Hypertrophy of the Nail (Onychiauxis) may consist in an increase in thickness, or in a lateral expansion (in-growing nail). Both conditions are much commoner in the toes than in the fingers. In many cases enlargement of the nail is a result of nutritive abnormality, the increased nail substance being discolored, friable, brittle, fragile, etc. Hypertrophy of the finger nails occurs in connection with congenital dactylomegaly, traumatism, occupation effects, lack of cleanness, syphilis (hypertro-

phic syphilitic onychia), fungous growths, chronic skin troubles in the vicinity like eczema and psoriasis, nutritive and neurotrophic influences. The treatment is that of the cause.

Changes in Form of the Nails may result from traumatism, occupation effects, nutritive or circulatory disturbances, or local disease. An increased transverse curvature is said to be produced by syphilis, hemiplegia, and free perspiration. An increased longitudinal curvature occurs in Hippocratic fingers and hypertrophic pulmonary osteoarthropathy. "Spoon nail" is a condition in which the nail is concave transversely, with everted edges; it has been observed in connection with wasting diseases. Changes in relative length and breadth of the nails may also occur, as in rickets, in which the nail is said to be relatively shortened.

Changes in Color of the Nails may arise from staining by extrinsic substances or from intrinsic pathological processes.

The commonest change of color is to white, in the form of white spots, white bands, or whiteness of the entire nail. **White spots** on the nail ("flores unguium") are very common in children, usually occurring without perceptible cause; they may also be produced by injuries, trophic alterations, and constitutional diseases. Their pathology is not well understood. They are attributed to the presence of air in the nail substance. **Transverse white bands** sometimes appear after febrile attacks, sometimes occur in persons in good health, sometimes are congenital. **Complete whitening** of the nail occurs rarely, as after severe fevers or in paralytic.

Black Discolorations of the nails are common, from extravasation and transformation of blood pigment after contusions. Small black spots rarely appear on the nails after severe illness.

Parasitic Affections of the Nails.—The nails may be invaded by various parasites, either fungous (onychomycosis) or animal. The commonest form of onychomycosis is that produced by the trichophyton fungus; this, however, is infrequent, and usually secondary to or associated with tinea trichophytina elsewhere. Rarely the nails are affected by favus. Nails invaded by fungous growth are thickened, soft, brittle, lustreless, grayish or yellowish-white, and in a defective nutritive condition. The appearance is similar to that of nails suffering malnutritive or trophic alterations, so that the diagnosis is with most certainty made by microscopical examination.

Scabies occasionally affects the nails.

The treatment of nails infected with parasites consists in removal of the nail by scraping or applications of caustic alkali, with parasiticide applications (creosote, acetic acid, mercury bichloride, sulphur, etc.).

AFFECTIONS OF THE SKIN.

The consideration of the dermatoses of the hand and fingers belongs to the province of dermatology and can be only very briefly touched upon here. The skin of the hand is in general subject to disease in a similar manner to the rest of the body; but special or peculiar features are exhibited in many of the dermatoses of this locality, caused by exposure of the hand to atmospheric and meteorological conditions, to acute or chronic irritant influences of mechanical or chemical nature, and other factors.

Some dermatoses affect the hands indifferently or similarly or along with other parts of the body, without any peculiar features or special susceptibility or insusceptibility, as pemphigus, dermatitis herpetiformis, lichen ruber, ichthyosis, impetigo herpetiformis, prurigo, herpes zoster, molluscum contagiosum, scleroderma, mycosis fungoides, cornu cutaneum, and many others. To some dermatoses the hand is not at all subject, as seborrhoea, tinea versicolor; or less subject than other locali-

ties, as corns, psoriasis. To some dermatoses the hand is especially prone, and more susceptible than are many other parts of the body, though without manifesting any specially distinctive features, as erythema multiforme, herpes iris, pellagra, framboesia, impetigo, impetigo contagiosa, callosity, warts, glossy skin, pompholyx, tinea circinata, scabies, occupation dermatoses. Some skin affections may exhibit peculiar features about the hand, as some forms of eczema and syphilides. Some derma-

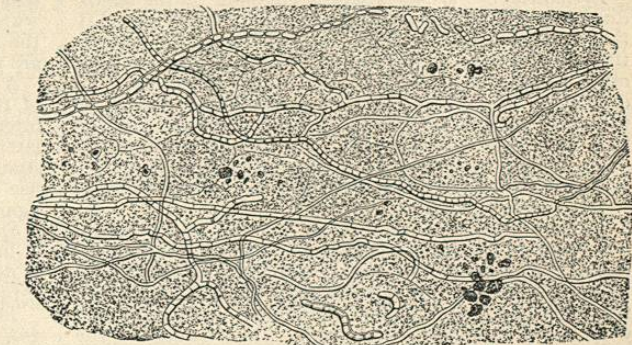


FIG. 2490.—Onychomycosis Trichophytina. Microscopical Appearance, Showing Fungus. (Kaposi.)

toses are peculiar to the hand, or to the hand and foot, as keratosis palmaris, affections of the nails.

In many instances there is a marked difference in the liability of the palmar and dorsal surfaces of the hand to skin disease. Thus, the absence of hairs and sebaceous glands in the palm renders this area insusceptible to diseases of these structures, as acne. The dorsum of the hand is more prone to tuberculous dermatoses, erythema multiforme, keratosis senilis, tinea circinata; while the palm is more subject to most syphilides.

Eczema in its different varieties, acute and chronic, often occurs upon the hands, the liability of which to this dermatosis is increased by the exposure of these members to meteorological influences and to chemical irritants (especially alkalis). The chapping of hands is a form of eczema, induced by exposure to irritating influences. Onychias may result from eczema of the nails or their vicinity. On the palms eczema exhibits special features. Eczema about the hands is apt to be protracted and chronic, and very resistant to treatment.

Psoriasis may occur both on the palms and backs of the hand, but is less common in this locality than in other situations. Occurring in or about the nails, it may cause an onychia. The backs of the hands are among the commonest seats of *erythema multiforme* and *herpes iris*. The hands are also favorite seats of *impetigo* and *impetigo contagiosa*. The hand may be affected with *dermatitis herpetiformis*, *pemphigus*, *herpes zoster*, *lichen ruber*, *ichthyosis*, and many other skin diseases in a manner similar to or along with other parts of the body. *Tinea circinata* is common on the back of the hands. *Favus* is much more rare in this situation; sometimes the nails become involved from scratching an infected scalp. The hand is the favorite seat of *scabies*. *Ainhum* sometimes occurs here and causes constriction and amputation of the fingers and even of the forearm. *Pompholyx* (or *dysidrosis*) is a rare vesicular affection, running on to maceration and exfoliation of the epidermis, that involves chiefly the palms and soles, though it may extend to or occur in other localities. *Callosities* are very common about the palm, resulting from habitual pressure or friction; manual labor also causes a general hardening of the palmar epidermis. *Corns* occasionally occur on the hand. *Keratosis palmaris* is a rare condition in which the epithelium of the palm becomes converted into a horny plate. *Glossy skin* is a trophic affection of the skin, due to nerve lesions or injuries generally, affecting especially the fin-

gers; the skin undergoes malnutritive changes, or even actual necrosis, with onychia and pain. *Scleroderma* is a rare condition of sclerosis and contraction of the skin by which the hand as well as other parts of the body may be affected; in the hand it may produce great deformity and disability, the fingers being partly flexed, rigid, immovable, sometimes twisted, and in the later stages with atrophic changes. Tuberculous and syphilitic dermatoses, warts, and affections of the nails have been already considered.

Dermatitis of various kinds is common on the hands, due to their exposure to irritating conditions. Dermatitis traumatica results from traumatic irritation, dermatitis calorica from exposure to the rays of the sun or to other sources of heat and cold, burns, frost bites. In dermatitis medicamentosa lesions sometimes appear on the hands (as from the internal use of copaiba and chloral). The hands are very subject to dermatitis venenata, resulting from direct contact (either accidentally, temporarily, or habitually) with irritating or toxic substances, as in *rhilus dermatitis*.

Allied to dermatitis traumatica, calorica, and venenata is a group of conditions which may be collectively designated *occupation dermatoses* or *occupation dermatitis*, to which the hand is very subject from repeated and habitual exposure to a variety of pathogenic influences incident to the occupation pursued. The changes in the epidermis, corium, and subcutaneous layer produced by occupation traumatism have been detailed above. In some occupations acute dermatitis may be set up from time to time. Thus, surgeons are sometimes subject to an acute inflammatory condition of the skin of the hands and forearms from hard scrubbing and prolonged exposure to liquids and to irritant chemicals like soft soap, mercuric bichloride, and oxalic acid.

For detailed information as to the clinical features and treatment of the various dermatoses of the hand reference should be made to works on dermatology.

AFFECTIONS OF THE BURSE.

The bursæ of the wrist, hand, and fingers may undergo development or enlargement, forming a variety of ganglion, either from pressure or irritation (as in some occupations), from rheumatic or gouty causes, or from causes not apparent. Rarely they may undergo inflammation—*bursitis*.

AFFECTIONS OF THE BONES.

The affections of the bones of the hand are not sufficiently distinctive to require special consideration here. The involvement of the bones in developmental abnormalities, hypertrophic conditions, cartilaginous and bony tumors, fractures, infectious conditions, syphilis, and tuberculosis, has been already considered. Osteomyelitis, osteitis, periostitis, and other bone lesions do not present unusual features in the hand. In rickets the hand is little affected; the nails and terminal phalanges are said to be shortened in this condition. In osteomalacia the bones of the hand and fingers may become curved and bent; the distal phalanges especially are flattened, bent backward, blunt, and clubbed. The articular ends of the bones may participate in affections of the joints.

AFFECTIONS OF THE JOINTS.

The articulations of the hand and fingers, while liable like other joints to the various arthropathic conditions, present some distinctive and peculiar pathologic features. *Injuries*.—The ordinary injuries which these joints may suffer—wounds, blows, contusions—do not differ in their clinical characteristics or treatment from the like injuries of joints in general. Sprains of the wrist or finger joints require the usual treatment, immobilization, sedative or counterirritant applications, etc.

Dislocations of the joints under consideration may according to site be divided into radiocarpal, carpal, carpo-

metacarpal, metacarpophalangeal, and phalangeal dislocations. From an etiological standpoint they may be divided into three classes: congenital dislocations, spontaneous (acquired) dislocations, and the ordinary traumatic dislocations.

Congenital Dislocations of any of the joints of this region may occur and have been observed, though very rarely.

A few cases of dislocations of the wrist existing at birth have been observed, forming a variety of club hand. The dislocation may be either forward or backward, and is generally associated with a shortening of the forearm. Both hands may be affected. The hands are usually well formed and quite useful.

A few cases are also recorded of congenital dislocation of the phalanges, at either the metacarpophalangeal or interphalangeal articulations, and in a palmar, dorsal, or lateral direction. Several fingers are usually involved simultaneously. The treatment consists in prolonged use of splints or corrective apparatus, with section of ligaments if necessary.

Spontaneous Dislocations or subluxations of the wrist or finger joints may occur in consequence of deforming or destructive joint lesions, as in arthritis deformans, or suppurative, tuberculous, or syphilitic arthritis.

There is a special class of cases in which a *spontaneous anterior subluxation of the wrist* gradually develops in adolescents engaged in hard manual labor. In this condition there is a partial forward dislocation of the carpus, with an undue prominence of the lower ends of the radius and ulna posteriorly, a diminished range of extension, an increased range of flexion, and a prominence of the flexor tendons. The ligaments are lax and the bones soft. Pain is usually present, at least until full growth is attained. This condition develops from about the age of fifteen to twenty-five years, in persons (especially females) engaged in hard manual work while the bones and joint structures are still soft, weak, and undeveloped. The superior strength and excessive action of the flexor muscles is supposed to be the determining cause of the anterior displacement. The deformity is difficult to overcome. The treatment consists in the use of corrective apparatus, stimulation of the strength and nutrition of the extensor muscles by massage, electricity, and exercise, the use of spring apparatus to reinforce and aid the action of the extensors, and suspension of excessive use of the flexors.

Traumatic Dislocations.—Dislocation of the wrist at the *radiocarpal* junction may occur backward or forward, or extremely rarely laterally (outward). This accident is far less common than Colles' fracture of the radius, which usually results from violence at this point. Reduction is effected by traction and direct manipulation.

Dislocation of the distal row of *carpal* bones from the proximal row has been noted in a very few instances. Dislocation of single carpal bones, forward or backward, may also occur. In some persons with weak and lax wrist joints single carpal bones may easily and repeatedly slip backward. Reduction is effected by pressure back into place, with use of a tight bandage to prevent recurrence.

Dislocation of metacarpal bones at the *carpometacarpal* junction rarely occurs. The metacarpal bone of the thumb is the one oftenest dislocated at this joint, the dislocation being forward, backward, or outward. The other metacarpal bones may also, very rarely, be dislocated either forward or backward. The bones may be dislocated singly, or more than one may be involved simultaneously. Reduction is usually easily effected by pressure of the bone into place, after which it should for a time be kept in position by splints or bandages to prevent recurrence.

Dislocations at the *metacarpophalangeal* articulations may be either forward or backward. The anterior luxations do not usually present special difficulties in reduction, which is accomplished by traction or by flexion, together with direct pressure.

The backward dislocation of the proximal phalanx of the thumb is a condition of some seriousness, from the difficulty sometimes encountered in effecting reduction. The phalanx may be superextended, or bent backward at an angle with the metacarpal bone; or in a still worse degree of luxation the base of the phalanx may overlap and lie behind the head of the metacarpal bone, the phalanx lying in the same direction as the metacarpus. The anterior ligament of the joint, which is firmly united with the phalanx but only loosely to the metacarpal bone, is torn loose from the latter bone, and if it becomes interposed between the ends of the two displaced bones it forms a serious obstacle to reduction. The lateral ligaments and the sesamoid bones in the tendons of the flexor brevis pollicis may also intervene between the two bones, while the slipping and retention of the base of the phalanx between the two tendons of insertion of the flexor brevis also interferes with reduction. Premature attempts to flex the dislocated phalanx only aggravate the trouble and should therefore be carefully avoided. In reduction, the metacarpal bone should be pressed toward the palm to relax the flexor brevis; the phalanx should be superextended well backward; the base of the phalanx should then be pushed by direct pressure into place, or until the anterior margin of its articular surface engages the posterior edge of the metacarpal joint surface; then by flexion of the phalanx the bone can be made to come into place. If this fails, rotation of the phalanx to free one side of the joint and then the other, combined with direct pressure or extension, may succeed. Sometimes all methods of manipulation fail, and a cutting operation may be necessary; in this case the anterior ligament may be put in proper position through a median palmar incision, or the tendon of the flexor brevis and the lateral ligament may be divided on one side, or pulled aside. In case of entire failure to effect reduction a moderate degree of movement and usefulness of the thumb will usually be ultimately obtained.

Dislocations of the other fingers at the metacarpophalangeal articulations are less common than of the thumb. They present similar features, sometimes similar difficulties in reduction of the backward luxations, and require the same treatment as in the case of the thumb.

Dislocations of phalanges at the *interphalangeal* articulations are common, and may take place in a palmar, dorsal, or lateral direction. Reduction is usually easily accomplished by traction and pressure.

A backward dislocation of the terminal phalanx occurs especially in baseball players (described by R. Abbe), in which the end of the middle phalanx is tightly caught between the flexor tendons and through an opening in the anterior ligament, rendering reduction difficult and often necessitating incision upon the joint in order to correct the displacement.

Ankylosis of the wrist or smaller joints of the hand and fingers is very common, resulting usually from traumas, blows, and wounds. Very slight injuries are often sufficient to cause ankylosis of these joints. Even prolonged immobilization may cause stiffening, even of the wrist; hence, in conditions like fractures, requiring prolonged fixation of the hand or fingers, it is advisable to practise passive movement, massage, etc., of the joints at sufficiently short intervals. Operations about the finger joints, even if entirely aseptic, are exceedingly apt to be followed by ankylosis; in considering the advisability of operation in various cases this danger should be borne in mind, as the condition desired to be remedied may be preferable to possible or probable ankylosis consequent upon operation. After such operations the joint should be exercised frequently and for a long time, to prevent ankylosis as far as possible.

Ankylosis may also be a sequela of inflammatory, infectious, or necrotic conditions. Congenital ankylosis of the small joints of the hand and fingers occurs rarely, sometimes being a hereditary abnormality of development. In a considerable proportion of cases of ossifying myositis a developmental ankylosis of the carpometacarpal,

metacarpophalangeal, or interphalangeal articulation of the thumb is present.

There is little chance of completely restoring the mobility of an ankylosed finger joint, though arthrectomy or breaking up of the adhesions and bands may be attempted. If the joint is ankylosed at an inconvenient angle an improvement in the position can at least be obtained by operation.

Arthrogenous Deflections of the hand or fingers may arise from a variety of causes, as altered configuration of the joint structures (as in arthritis deformans), ankylosis in malposition, adhesions and contractions of the articular tissues, inflammatory or necrotic processes, developmental abnormalities, dislocations, etc. The clinical features and treatment of these conditions vary with the cause. Hammer finger, due to shortness of the lateral ligaments, is an arthrogenous deflection that will be considered subsequently.

Enlargement of the joints of the hand is very common, and while (unless associated with partial or complete ankylosis) it usually causes little or no disability or impairment of function, it is unsightly. It arises from very diverse causes. Enlarged joints are very frequently produced by injuries (see Fig. 2489), and sometimes only slight injuries are sufficient to cause considerable deformity of this kind. The finger joints are often enlarged in persons engaged in manual labor. Deposits or hyperplastic processes about the joints, as in gout and arthritis deformans, are a common cause of enlarged joints. Another cause is found in neurotrophic influences, as in Charcot's arthropathy of locomotor ataxia and syringomyelia. Systemic conditions may also be etiological factors; thus, the proximal phalangeal joints are said to be enlarged in cases of dilated stomach. Enlarged joints of the hand should be treated according to their cause.

Secondary Alterations may develop in certain circumstances in the joints under consideration. When the joints (not being primarily affected) remain in fixed positions for a long time, as in the contractures of nervous diseases, Dupuytren's contraction, hammer finger, and the like, they after a time undergo compensatory, degenerative, or other secondary changes and become accommodated to their habitual position, so that if the primary cause of the malposition is done away with, the secondary alterations in the joint structures will still interfere with correction of the deformity. It is therefore important to avoid prolonged immobility or submobility of the hand or digits as much as is possible, so as to prevent secondary joint changes that may prove more or less irremediable.

Synovitis and Arthritis.—The inflammatory affections of the joints of the hand are chiefly of traumatic, infectious, tuberculous, syphilitic, gonorrhœal, or rheumatic nature. In addition to these are the rheumatoid arthroses, arthritis deformans, gout, and chronic rheumatism, characterized by abnormal trophic processes or deposition of abnormal material.

Traumatic Arthritis, resulting from injuries, without infection, may in the fingers be followed by ankylosis.

Infectious Arthritis in this member arises from infection by pyogenic bacteria, introduced through wounds or extension from neighboring infected areas.

Tuberculous Arthritis (which has already been referred to) as a primary disease involves especially the large joints of the body, among which the wrist occasionally suffers. The joints of the fingers may rarely be involved in tuberculous processes, but usually only secondarily by extension from tuberculous foci in the neighboring bones or skin.

Syphilitic involvement of the finger joints may occur in connection with syphilitic dactylitis, which has been considered above.

Gonorrhœal Arthritis occurs in the wrist and small joints of the hand in a considerable proportion (upward of ten per cent.) of all the cases of gonorrhœal rheumatism. It runs a course of very variable length, and of varying degrees of severity, from a mild synovitis to