

mon and characteristic condition in certain senile and rheumatoid cases.

A small number of cases have been reported in which the distal phalanx of the thumb has been congenitally bent laterally, either to the ulnar or to the radial side, at a sharp angle. Some of these cases were hereditary, others were associated with other deformities, as club foot; the cause of this abnormality is hence developmental. The treatment, if undertaken sufficiently early, should consist in gradual correction of the deformity and fixation by splints until permanent improvement is obtained. Removal of a wedge-shaped piece of bone from the phalanx has proven successful in one case; while division of the lateral ligament and excision of a portion of the head of the phalanx did not give satisfactory results in another instance.

There is another well-marked class of lateral deflections of the phalanges, affecting chiefly the little fingers, which occurs occasionally, often associated to a certain degree with hammer finger. Exceptionally the deflection may be toward the ulnar side, or the middle phalanx may be the one bent, or the ring finger, or some finger other than the little finger, may be affected; but usually this abnormality manifests itself as a radial deflection of the terminal phalanx of the little finger (phalanx vara). The deviation is not generally more than about twenty-five or thirty degrees, and both little fingers are usually affected together. Anderson states that among eight hundred school children there were six cases of such lateral deflections, in five of which the little finger on both hands was affected, and in one the ring finger of one hand was involved. This lateral phalanx deflection is not infrequently exhibited by little fingers that are also affected with the condition termed hammer finger; and the writer has observed one case of phalanx vara of both little fingers in a woman who had a hammer toe but no hammer fingers, but whose mother and mother's brother had hammer fingers. Radial deflection of the distal phalanx of the little finger is said to be common in idiots of the so-called Mongol type. The condition is of developmental origin caused by irregular development of the phalangeal articulation. The abnormality is somewhat unsightly, but is not troublesome in any other way. The only advisable treatment is the use of splints for a time to straighten the finger.

BACKWARD DEFLECTIONS OF THE FINGERS (digitus superextensus).—Superextensions of the fingers or phalanges are among the less common of the deflections of the fingers; they are mostly acquired, and are due to various conditions.

The terminal phalanx of the thumb in many persons is capable of extension backward from the straight line to a marked degree, flexion not being interfered with; this is a normal developmental condition. The terminal phalanges of the other fingers are occasionally markedly extensible backward, and in such cases power of flexion is sometimes somewhat impaired.

Cicatricial contractions following dorsal ulcers, contractions of the dorsal digital fascia, joint lesions like arthritis deformans, adhesions of extensor tendons, section of flexor tendons, spasm of extensor muscles, paralysis of flexor muscles, are the other principal causes of superextended fingers or phalanges. In a considerable proportion of cases of hammer finger there is a hyperextended condition of the proximal phalanges of the affected fingers; and superextension of the distal phalanges in hammer fingers has been observed. In Dupuytren's contraction the writer has seen in one case a superextension of the distal phalanx caused by a band of contracted fascia that crossed from the palmar to the dorsal aspect of the finger. In dactylomegaly there is not infrequently phalangeal superextension.

The treatment of digital and phalangeal superextensions must be guided by general principles and the conditions present. Some cases will hardly require treatment, others are insusceptible of improvement. Gradual or forcible correction of the deformity with fixation by splints, division of contracting tendons or fibrous

bands, or lengthening or shortening of tendons by plastic procedures may result in lessening the deformity and impairment of function.

MICROCHEIRIA AND MICRODACTYLISM,

or abnormally small size of hand or fingers, may be due to retarded, deficient, or arrested development, or to atrophy or retrogression after full development has been once attained. Both congenital and acquired cases are distinguishable.

Brachydactyly, or short finger, is a form of microdactyly in which the deficiency in size affects especially the length of the finger.

In dwarfs and in conditions like achondroplasia, the hand and fingers are small but not diminished in size in proportion to the rest of the body or of the upper extremity; such cases are hardly to be classed as real microcheiria or microdactyly, in which the small size is relative as well as absolute.

Brachydactyly is caused by congenital absence of phalanges (hypophalangism) or by abnormal shortness of the phalanges or metacarpal bones. Cases have been observed in which a supernumerary phalanx even was present, but with sufficient abbreviation of the phalanges to constitute a condition of brachydactyly. Brachydactyly and other forms of congenital microdactyly are rare. Deficient size of the thumb, apparently developmental, occurs in a certain proportion of the cases of ossifying myositis; in this disease a corresponding anomaly of the great toes occurs much more frequently. Fingers associated with developmental abnormalities, such as supernumerary or syndactylic digits, are apt to be retarded or stunted in development unless the impediment is early removed. Injuries or diseases affecting digits during the period of development, in infancy or childhood, may arrest or retard their growth so that they may not attain full development. Loss of tissue or destruction of bone from injuries, inflammation (tuberculosis, etc.), ulceration, and the like, will if not replaced result in diminution of size. After full growth is attained atrophy and decrease in size may result from injuries, local disease, trophic influences from nervous lesions, etc.

HYPERTROPHY OF THE HAND OR FINGERS

(cheiromegaly or macrocheiria, dactylomegaly, megalodactylism, or macrodactylism).—Aside from such conditions as neoplasms, oedema, and dactylitis, enlargements and hypertrophies of the hand and fingers are mostly comprehended under the following groups:

- Congenital and idiopathic hypertrophy.
- Elephantiasis.
- Gigantism.
- Acromegaly.
- Hypertrophic pulmonary osteo-arthritis.
- Hippocratic or clubbed fingers.
- Myxodema.
- Syringomyelia.

Congenital and Idiopathic Hypertrophy.—The fingers, hand, and more or less of the upper extremity are sometimes the seat of a peculiar hypertrophy, which, though rare, presents a well-marked clinical type. This hypertrophy is of the same general nature as the condition called "congenital hypertrophy" which affects various other parts of the body, though the fingers are a favorite seat. Sometimes other parts of the body are affected along with the hand, as in the unilateral hypertrophy where the upper and lower extremity on the same side are enlarged.

When the upper extremity is involved it is far commoner for a portion only of the fingers or of the hand to be hypertrophied, the remaining fingers being normal; very rarely the entire extremity may be enlarged. Sometimes even when there is a general enlargement of the limb, some of the fingers are relatively much more enlarged than the others.

The hypertrophy is often, though not always, mani-

fest at birth, the affected fingers being then appreciably and materially larger than the others. Further enlargement proceeds progressively, or may take place rapidly at some time during the period of development. Cases of a high degree of hypertrophy and deformity are exhibited in young children, though the enlargement may develop even in adults. The cause of the hypertrophy is apparently some idiopathic developmental derange-

ment, the precise nature of which is unknown. The condition is sometimes called congenital elephantiasis, and has been thought by some to be a form of elephantiasis. Some of the cases reported, indeed, may have been real instances of elephantiasis. But if the term elephantiasis be limited to hypertrophies produced by occlusion of the lymph vessels, especially by the filaria, there is probably a genuine difference between the two conditions. Hereditary transmission of congenital dactylomegaly has not been especially noted.

The hypertrophy often does not involve all the tissues uniformly, but affects especially the bony, fatty, and vascular tissues. The bones are hypertrophied, and sometimes there are joint lesions. The adipose tissues are often relatively increased, even to the production of lipomatous tumors. Areas of excessive development of vascular structures are frequently exhibited, in the form of angiomas, angiectases, vascular naevi, varicose veins, lymphangiomas, etc. The arteries are said not to be enlarged so much as the veins and capillaries. Muscular strength is sometimes increased, often not, but the usefulness of the member is often impaired. The skin is usually not greatly altered. Syndactylism is sometimes present. Frequently some of the hypertrophied phalanges or fingers are deflected laterally or backward, from articular changes. The metacarpal portions of the affected fingers may, or may not, partake of the hypertrophy.

The enlargement is both in length and, markedly, in thickness. Various gradations of hypertrophy may occur, from slight enlargement up to great deformity and disability. In typical cases the overgrowth is frequently gigantic, so that the member may be highly de-

formed, unsightly, and useless. Increase of the middle finger, for instance, to a length of 13, 14, or 16 cm. (6½ in.), and to a circumference at its base of 32 cm. (13 in.), has been noted in more than one case. In one instance the hand weighed twelve pounds.

This hypertrophy is in the great majority of cases unilateral, and only exceptionally are both hands affected. In the unilateral cases the right and left hands are in-

involved with about equal frequency, with perhaps a slight difference in favor of the right. In the bilateral cases different fingers may be affected on the two hands. The middle and index fingers are much the most frequently involved, the middle more often than the index finger. The thumb is affected in a considerable proportion of the cases, the ring and little fingers infrequently. The three radial digits are therefore much the most liable to the disease. It is more usual for two or more adjacent fingers to be hypertrophied together than for one finger to be affected alone, though any of the digits may be enlarged alone. The commonest combinations are for the thumb, index, and middle fingers, or for the index and middle fingers to be affected together, next for the middle finger to be hypertrophied alone; the other fingers and combinations are less frequently involved.

Treatment of congenital dactylomegaly: In incipient cases ligation of the tributary arteries may be tried with a view of di-

minishing the supply of nutriment and hence retarding the hypertrophic process; success cannot be very confidently expected for this procedure. Compression of the growing fingers offers little hope of successful results. When fully developed amputation may be requisite to improve the appearance and usefulness of the hand, or to prevent the extension of the hypertrophic process to the remaining portion of the hand or limb.

Elephantiasis.—Exceedingly rarely is the hand or upper extremity the seat of true elephantiasis, that is, hypertrophy from lymph stasis, especially due to occlusion of lymph vessels by filaria, though a few cases are said to have been observed. Elephantiasis and the idiopathic hypertrophy just considered have points of resemblance

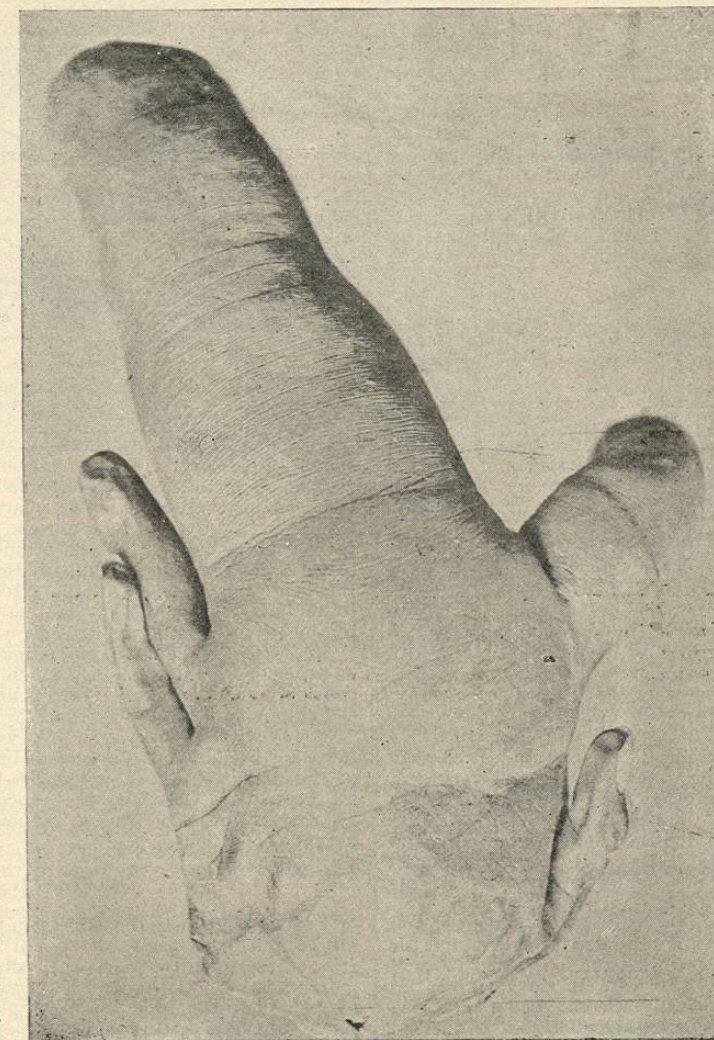


Fig. 2481.—Congenital Hypertrophy of Middle and Index Fingers in Mulatto Girl Aged Eleven Years; Reported as a Case of Congenital Elephantiasis. (T. L. Terry.)

and have been confounded with each other in some instances, but there is doubtless a definite pathological distinction between the two conditions. The treatment is the same as that of congenital dactylomegaly and of elephantiasis.

An elephantiasiform hypertrophy sometimes follows healing of lupus vulgaris on the hand, from chronic edema produced by occlusion and obliteration of lymph and blood-vessels, with tendency to recurrent dermatitis, cellulitis, and lymphangitis.

Gigantism.—In this condition the hand and fingers participate in the general enlargement of the body, but their development is not proportionally greater than that of the rest of the body.

Acromegaly.—In this rare condition the hands, along with the feet and bones of the head, undergo general hypertrophy, with, later, constitutional disturbances. It occurs rather more commonly in females, and usually begins to develop at the age of about twenty-five to thirty years. Etiologically and pathologically it is supposed to be usually associated with some morbid condition of the pituitary body. It is a chronic and slowly progressing condition.

In the upper extremity the lesions are chiefly confined to the hand and wrist, which are enlarged by a general hypertrophy of all the tissues, soft and hard. One of the first manifestations of the disease is an increase in thickness of the fingers, so that gloves and rings become too small. When the trouble is fully developed, the hand is enlarged generally, and is described as having a "spade-like" appearance. Its function and usefulness are unimpaired. The fingers are broad and sausage-shaped, and the terminal phalanges are not bulbous or larger than the rest of the digit. The nails are usually broad, flat, grooved, and friable.

Along with the hands the feet, face, and head are correspondingly affected. The results of treatment have not been very satisfactory.

Hypertrophic Pulmonary Osteo-arthropathy.—This is a rare condition in which the hands and feet, with the distal portions of the forearms and legs, undergo hypertrophy in association with chronic pulmonary, pleural, or bronchial disease, such as phthisis, tuberculosis, empyema, pneumonia, syphilitic and malignant thoracic disease, chronic bronchitis, etc., mostly conditions in which the arterialization of the blood is impaired. The condition is rare, only about sixty cases being recorded. Adults and males are affected most frequently, though children and females are not exempt. Usually the hypertrophic condition develops insidiously, gradually, and slowly, but in exceptional instances it has a sudden onset and rapid development, becoming well defined in the course of six or twelve weeks.

The hypertrophic condition consists in a general and symmetrical enlargement of the hands and feet and the distal extremities of the forearms and legs, other parts of the body being scarcely affected. In the members involved the bones are especially affected, being increased in length and thickness, partly by increased subperiosteal bone formation, partly from the development of wart-like bony nodules; the joints are also somewhat involved, from synovial effusion, erosion of articular cartilages, etc.; the soft parts are less implicated. In the upper extremity, the lower ends of the radius and ulna, the carpal, metacarpal, and phalangeal bones may all be involved. The terminal phalanges are usually markedly enlarged, giving the digits a club-shaped or drumstick appearance. The nails are much increased in size and very convex, both transversely and longitudinally, and arch over the ends of the fingers.

Pain, sometimes severe, is present in the hands in most cases, at least at some period in the course of the disease.

Among the features by which this condition can be differentially distinguished from acromegaly may be mentioned the association with pulmonary disease, the absence of any enlargement of the bones of the head, such as occurs in acromegaly, and the bulbous enlarge-

ment of the terminal phalanges and the shape of the nail, which are not manifested in acromegaly.

The essential pathological nature and cause of hypertrophic pulmonary osteo-arthropathy are not yet determined. The prevalent French theory is that the enlargement is produced by chronic inflammatory processes induced by toxæmic irritation. The condition probably has some relationship, and is even perhaps identical, with clubbed or Hippocratic fingers.

There is no definite treatment.

Hippocratic or Clubbed Fingers.—The term clubbed finger is employed to designate conditions in which the terminal phalanges or ends of the digits are enlarged and bulbous, that is, larger than the remainder of the fingers, giving them a club or drumstick shape. The fingers in hypertrophic pulmonary osteo-arthropathy and sometimes in myxœdema exhibit this condition. The term clubbed fingers is commonly used, and the term Hippocratic fingers is specifically used to designate a bulbous enlargement of the ends of the fingers, with a longitudinal curvature of the nail, that is occasionally present in chronic conditions in which the circulation is weakened, especially in pulmonary tuberculosis and heart diseases. The enlargement of the finger tips is brought about by a chronic state of or tendency to passive congestion, which occurs in these parts because, from their peripheral situation and distance from the heart, the strength of the circulation is here at a minimum. The condition can be treated only by attention to the general disturbance which causes it.

Myxœdema.—The hands and fingers share in the general enlargement of myxœdema, which it is unnecessary to consider generally here. There is no pitting on pressure, the fingers may be clubbed, and the nails are unaffected.

Syringomyelia.—In a very few cases of syringomyelia there has been observed a general increase in size of one of the hands and upper extremities from hypertrophy of all the tissues. It is possible that occasionally cheiromegaly may result from trophic influences in other morbid nervous conditions.

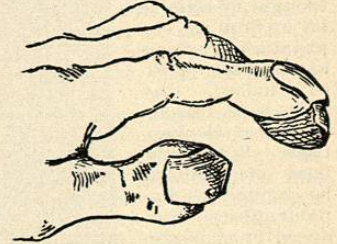


FIG. 2482.—Hippocratic Fingers. (Meillet and Richer.)

NEOPLASMS

of various kinds may develop upon the hands or fingers, but exhibit few features of special importance different from those manifested in other situations. Conditions more or less simulating tumors occur in various inflammatory, arthritic, tuberculous, syphilitic processes, etc. Aside from warts, this region is not particularly prone to the development of neoplasms. In some cases the tumors are of congenital and developmental origin, in others trauma exerts etiological influence, in many cases the cause is obscure.

The congenital tumors of the hand and fingers compose a group of cases in which the tumor is present at birth. Neoplasms of this class that have been observed are rudimentary supernumerary fingers, dermoid tumors and cysts, fibromata, lipomata, chondromata, and angiomata. Such congenital tumors are not common.

As already stated, *supernumerary fingers* are often of so rudimentary a structure that their digital nature is shown only by the presence of a small amount of osseous or cartilaginous tissue or a nail; such structures practically amount to tumors. These are usually attached by a soft pedicle and are most commonly situated on the ulnar margin of the hand or little finger. If we conceive such structures to be still more rudimentary, lacking all traces of bony or cartilaginous tissue or nail, we will

have left simply tumors composed of fibrous tissue covered with skin, and having no distinct digital characteristics. Congenital tumors of this nature have been ob-

noting especially in bone or periosteum; it occurs in its various forms, may attain great size, and may involve more than one finger.

The treatment of neoplasms of the hand and fingers must be guided by general principles and the circumstances of the case. Removal or excision of the tumor, or amputation if deformity is extreme, are the ordinary procedures. The malignant tumors require complete removal or amputation.

CYSTS

occasionally develop in this region. Dermoid cysts have been mentioned. Sebaceous cysts occasionally occur, sometimes induced by traumatism; cysts resembling wens in all respects even occur on the palmar surfaces, which are free from hair and sebaceous glands. Aneurisms and hydatid and cysticercus cysts rarely occur here. Ganglion will be considered subsequently.

TRAUMATISMS AND INJURIES.

From its exposed situation the hand is very subject to injuries of external origin, mechanical, chemical, thermic, etc. Mechanical traumas cause wounds, contusions,

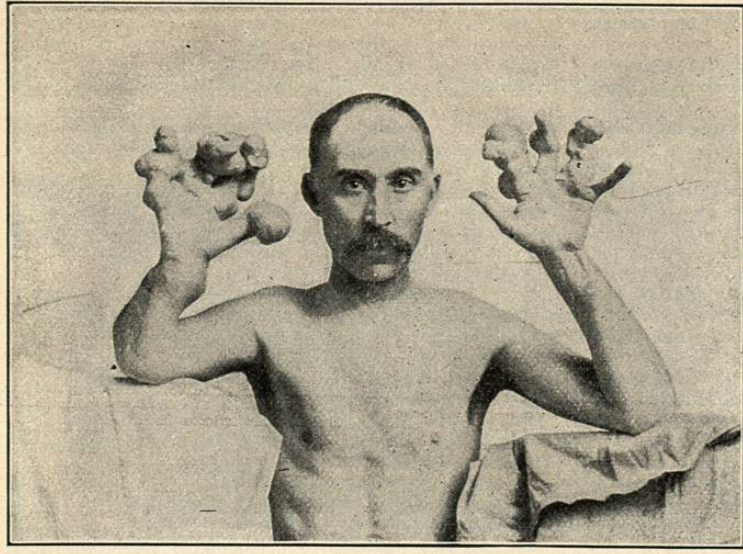


FIG. 2483.—Multiple Osteo-echondromata of Hands. (Whittaker.)

served, often pedunculated and on the ulnar side of the hand, and in some cases are doubtless supernumerary digits of extremely rudimentary character.

Dermoid Cysts or Tumors, congenital, containing epidermal tissue, hair, and sebaceous matter in their interior, are occasionally encountered in the region under consideration. Some of them are also perhaps supernumerary digits of very rudimentary and aberrant type.

Warts—the familiar verruca vulgaris—are very common on the hands and fingers, which are their favorite seats. They are especially common in childhood, occurring singly or in numbers. They consist of hypertrophied and elongated papillæ of the corium surmounted by thickened and horny epidermis. Among the methods of treatment may be mentioned cutting off the growth with knife or scissors and applying caustics—as silver nitrate, potassium hydrate, or chromic acid, solid or in solution—to the denuded surface.

Fibromata occur occasionally, situated in the subcutaneous tissues, or connected with tendons, periosteum, or bone.

Lipomata are rare in this situation. They may occur in connection with congenital dactylomegaly. They are usually diffuse, not circumscribed, and continuous with the subcutaneous tissue.

Chondromata are the commonest (aside from warts) of the benign neoplasms of the hand and fingers. Sometimes they are congenital, sometimes result from traumatism, usually arise without assignable cause. They occasionally develop in the soft tissues, but usually arise from the interior or the surface of the bones, the periosteum, or the joints. They may be firm or soft, may break down and ulcerate, and may ossify. They may be single or multiple, may involve one or several fingers, one hand or both hands. Often they attain a large size and occasion great deformity and disability, so that amputation may be required.

Osteomata and exostoses occur occasionally, arising especially from the bones or periosteum, and may occur in association with chondromata. **Neuromata** are said to have been observed in the hand. **Angiomata**, nævi, and erectile tumors sometimes occur in this situation.

Epithelioma develops in the skin of the hand, as in other situations. **Sarcoma** may attack the hand, origi-

nal sprains, dislocations, fractures. Various chemical substances produce irritation, inflammation, ulceration, or necrosis. Heat causes burns and scalds; cold produces frost bite.

Wounds of all kinds—incised, lacerated, contused, punctured, gunshot—are of common occurrence. Not infrequently portions of fingers or entire digits are cut or torn completely off. The treatment is that of wounds in general, the chief objects aimed at being hæmostasis, asepsis, coaptation. Aseptic wounds heal well and rapidly in this situation, but if infection occurs healing may be very slow; asepsis is therefore highly important, especially after bites of animals. Tendons and nerves, if severed, should be carefully sutured to avoid subsequent impairment of function. The hand should be immobilized while healing.

When portions of the fingers are entirely cut off or hang by a small neck or shred of tissue, there is some hope of obtaining complete reunion of the severed portion. The parts should be well cleaned and sutured nicely together. Well-authenticated cases are on record in which a part of a finger completely cut off has perfectly

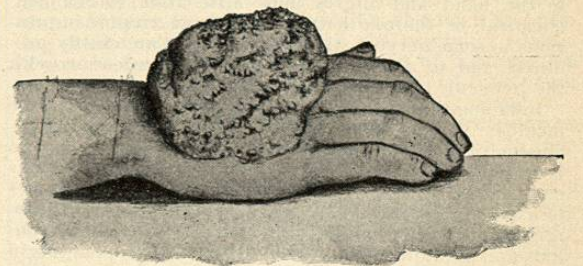


FIG. 2484.—Epithelioma of Hand. (B. F. Curtis.)

reunited to the stump when sutured back in place, so that an attempt should at least be made to save the finger in all such cases. A case has been reported in which the hand was almost severed from the forearm at the wrist, all the blood-vessels and muscles and most of the

bones being divided, leaving only the ulna and a small portion of skin intact; even in this case good union was obtained with re-establishment of the circulation and function of the hand. Such cases illustrate the advisability of conservative treatment of wounds of the hand, and of the attempt to save as much of the member as possible.

Contusions and crush injuries of the hand and fingers are very common, and exhibit all gradations from slight bruises to cases in which the hand is crushed and lacerated into a shapeless mass, as in machinery injuries. The treatment is to be guided by the circumstances, but it should be as conservative as possible, and it should be remembered that this region possesses great reparative power if uninfected. Complete destruction of the ends of the fingers by crush injuries, the nail and all the soft tissues to the bone being destroyed, may be followed by regeneration so complete that scarcely any trace of the injury will be perceptible. Unlike the lower extremity, lost parts of the hand or upper extremity cannot be satisfactorily replaced by mechanical apparatus, so that in injuries every attempt should be made to save as much as possible of this useful and unreplaceable member. Parts should not be amputated unless or until it is evident that repair is impossible.

Foreign bodies, like bullets or splinters lodged in the member, *bites* and *stings* of insects, and other poisoned wounds, etc., should receive the customary treatment, infection being especially guarded against. *Sprains* and *dislocations* will be considered in connection with the affections of the joints. *Fractures* of the metacarpal or phalangeal bones are simple of treatment, requiring reduction and immobilization.

Burns and scalds of the hand are very common, causing superficial dermatitis, ulceration, or more or less necrosis. If the destruction of tissue is extensive they are exceedingly apt to be followed by deforming and disabling cicatricial contractions.

Frost Bite.—From their small size, exposed situation, and distance from the circulatory centres, the fingers are often frozen, being exceeded in their liability to this accident only by the ears and toes. Frost bite is apt to cause complete necrosis of the tissues involved, though the gangrene may be slow, even weeks, in attaining its full development. The frozen parts should at first be thawed out very slowly, as by the use of cold water, in order to avoid inflammatory reaction. The subsequent treatment is that of the necrosis which may supervene, removal of the sloughs by poulticing, caustics, or excision, a sepsis, and protection of the resulting ulcer; and if the gangrene is extensive enough and when the limits of the necrotic process are demarked, amputation, preserving as much viable tissue as possible.

INFLAMMATORY CONDITIONS

in the hand and fingers may arise from mechanical, chemical, or thermic irritation, or from trophic impressions in some nervous diseases; but they are chiefly produced, and to a more serious degree, by infection with the pyogenic and other micro-organisms.

Inflammation in the hand may occur in any part of the member; it may affect special tissues or structures exclusively (as the joints, tendon sheaths, bones, etc.), to be considered subsequently, or it may involve various contiguous tissues. Inflammation affecting the tissues of a digit in general is termed dactylitis, though this designation is chiefly employed in connection with tuberculous and syphilitic dactylitis. Lesions of trophic origin will be considered in connection with the corresponding nervous disorders. Inflammations of infectious origin are intimately associated with the other pathological processes presented by the infection, so that often practically the two can scarcely be separated. The treatment of simple inflammations must be guided by the circumstances of the case, the cause, and the associated conditions.

INFECTIOUS AND PARASITIC CONDITIONS.

From its exposed location the hand is especially liable to infections. Pathogenic micro-organisms are very easily introduced through wounds, often so minute as to escape notice at the time, through blisters, through bites and scratches of animals and insects; a considerable variety of infections may thus become established. Much the most frequent of the infectious conditions of this member are those of suppurative nature. A small proportion of infections are represented by tuberculosis, syphilis, gonorrhœal lesions, leprosy, scabies, tinea, and others.

SUPPURATIVE AND RELATED INFLAMMATORY CONDITIONS, caused principally by the pyogenic staphylococci and streptococci, are the commonest of the infections of the hand, and occur in a variety of forms, as infected wounds, cellulitis, erysipelas, and abscess. In the initial stages of these conditions the morbid process may be purely inflammatory, suppuration setting in later. In some mild cases the morbid process does not pass beyond the stage of simple inflammation, being arrested before suppuration occurs. In some forms of erysipelas also typical suppuration does not occur.

The simplest form of pyogenic infection is that exhibited by *infected wounds*, in which the tissues adjacent to the injury are inflamed or suppurating.

In more severe cases the infection extends to tissues more distant from the wound. The treatment is the same as that of similar conditions elsewhere.

The terms cellulitis and erysipelas are in certain cases used interchangeably. Three forms may be distinguished—*indurative*, *exudative*, and *suppurative*.

Indurative Erysipelas is the form characterized by a slightly elevated, red, indurated, inflamed area on the skin, advancing into healthy tissue. This is the form commonly encountered in facial erysipelas; it occasionally occurs on the hand, originating from minute wounds, and only exceptionally proceeds to suppuration. Its treatment is that of the facial form, a variety of procedures being available, as cold applications, tincture of iodine, painting with solution of silver nitrate, injections of antiseptics, moist antiseptic applications, sedatives and emollients, etc.

Exudative Cellulitis is an infectious condition that often involves the upper extremity. The infecting organism gains entrance at a wound about the fingers or hand, often insignificant and unnoticed. The earliest symptom, often overlooked, is a faint red and inflamed streak, perhaps a little tender, extending from the point of infection up the arm; this is caused by an inflammation of the subcutaneous lymphatic channels, up which the infection rapidly extends. Next a large accumulation of serous fluid occurs in the subcutaneous tissues, causing a great distention and swelling of the fingers, hand, forearm, and more or less of the entire upper extremity. This lasts for several days before it subsides, and is accompanied by fever and much pain (from the tension). Sometimes the case proceeds to a general phlegmonous cellulitis, often resolution takes place without suppuration. The treatment consists in disinfection of the original focus of infection if it is discoverable; immersion of the swollen parts in ice water, for hours and even days to mitigate and arrest the process; multiple incisions through the skin if necessary to relieve tension and pain and allow escape of fluid; application of moist antiseptic and sedative applications; tight bandaging to keep the swelling down, etc.

Suppurative Cellulitis (phlegmonous erysipelas, abscess, etc.) is a suppurative inflammation of the connective tissues beneath the skin. It may be diffuse or circumscribed. It may involve an extensive area, with considerable danger to life, or it may be localized and confined to a small region (abscess). The portal of infection may be obvious, or the origin may be quite obscure. The process begins with a simple inflammation, gradually proceeding to suppuration; or in mild and abortive cases the trouble may at no time proceed as far as definite sup-

puration. The treatment, in general, is that of such conditions generally: in the early stages attempts to abort the process and avert suppuration by cold, application of tincture of iodine, and the like; when suppuration is manifestly inevitable it may be encouraged by poultices and warm applications; and as soon as suppuration fairly sets in, free incision and open treatment of the abscess. Suppurative processes in the hand and fingers are apt to run a very slow and protracted course before final recovery, this member not appearing to have rapid and vigorous reactive and reparative power in such conditions.

No part of the hand is exempt from suppurative inflammations or abscesses, but certain regions are so subject to these infections and exhibit such special features that a few special forms of the inflammatory process are plainly distinguishable and require special attention, namely, paronychia, whitlow, palmar abscess.

Boils and carbuncles may occur in this situation, but the hand is not a favorite seat of these lesions.

Paronychia (Infectious).—The ordinary acute paronychia, popularly termed "run-around" or "ring-around," is an inflammation, sometimes running on to suppuration, of the tissues at the sides and root of the nails. It is produced by the various pyogenic bacteria, which gain access at the root of the nail; there are also syphilitic and tuberculous forms of paronychia which are more chronic. The inflammation involves the cutaneous and subcutaneous tissues of the circumungual region, only one finger, as a rule, being affected at a time. At first the ordinary phenomena of inflammation are manifested—redness, pain, tumefaction. The pain and tenderness are not usually severe, but are sufficient to cause considerable annoyance and irritation. Many cases do not go beyond simple inflammation, but others proceed to suppuration, and in severe cases the nails may be cast off, and ulceration may ensue. While usually acute and of short duration, the course of paronychia may sometimes be subacute and prolonged. The inflammation is apt to be more severe and more prolonged in those of generally lowered constitutional condition or with specific taint. Paronychia is a common affection.

In the early stages, with the view of checking further progress of the inflammation and to relieve pain, applications of iodine, cold, emollients, sedatives, or poultices may be employed. To promote suppuration when inevitable, poultices are useful, and when pus formation is established free incision should be practised and the lesion treated like ordinary abscesses. The trouble usually yields readily to treatment. In cases of debility or specific taint constitutional treatment may facilitate healing.

Whitlow, Felon, or Pararitium (panaris), is a localized suppurative inflammation of the tissues of the palmar portions of the digits. Abscess may affect the dorsal tissues, but is much more frequent in the palmar regions of the fingers, where it presents special features. As regards pain, duration of disability, and loss of tissue, whitlow is a condition of no little gravity. Very often there is no perceptible wound by which the infecting bacteria gained entrance. Sometimes the condition arises after a slight bruise, blister, or other traumatism unaccompanied by any solution of continuity of the surface skin, a slight contusion of the tissues probably producing a local lowering of vitality and lessening of resistance that determine the development of infection at the point. A lowered constitutional condition may sometimes be a predisposing cause. Destructive processes in the fingers, often called whitlows, are generated by trophic influences in certain nervous affections, notably syringomyelia, but these have rather a necrotic character than the infectious nature of true whitlows. Any of the phalanges of the finger may be affected, more frequently and often more seriously the distal phalanx. Only one finger is ordinarily involved at a time, and whitlow is a quite common affection.

Three groups of tissues may be involved in the inflammation—the skin and subcutaneous tissues, the periosteum and bone, and the tendons and their sheaths. The

inflammatory process may originate in any of these tissues, but usually extends from one group to another. The course of the disease varies according to which phalanx is affected.

The *distal phalanges* are somewhat more frequently affected than the middle or proximal ones. If the inflammation begins in the superficial tissues the skin shows the signs of inflammation—redness, swelling, pain. If the infective process starts deeper, the skin will not itself be red or inflamed, but the subcutaneous tissues will be oedematous from the inflammatory exudate, and the finger at this point will be tense and swollen and the seat of severe throbbing pain. In the distal phalanges there are no tendons and sheaths to enter into the case, but the subcutaneous fibrous tissues are intimately united with the periosteum, and inflammation of the subcutaneous tissues is almost certain to extend to the periosteum and bone, especially if thorough incision is not early practised. This involvement of the bone in the inflammatory process is what renders whitlow in the distal phalanx a rather serious condition. At first the morbid process is purely of inflammatory nature, but very early suppuration develops. Osteomyelitis sets in, and the phalangeal bone becomes carious and necrotic. The course of the trouble is exceedingly slow and protracted, and weeks often elapse before healing is complete.

The fingers possess quite slight resistance and reactive powers against deep-seated suppurative processes, perhaps from the relative circulatory weakness of these distal members. Pain is marked, often excruciating. The tissues at the height of the process are boggy and infiltrated with serous and purulent fluid, and the inflammation tends to extend proximally. Owing to the frequent deep situation and confinement of the infected area, the inflammation is apt to extend deep and far, causing great destruction of important structures before it will make an opening spontaneously through the skin. Granulation is slow to develop, but when well established the sinus is in a healing condition and on the way to obliteration.

Whitlows involving the *middle or proximal phalanges* are rather less common and generally less serious and protracted than in the distal phalanx. In these situations the tendinous structures are interposed between the subcutaneous tissues and the periosteum and bone, and to a large extent protect the latter from involvement. The escape of the bony structures from inflammation considerably mitigates the severity of the case. The morbid process readily extends along the tendons and tendon sheaths, and from destruction of their tissue or the formation of adhesions may cause considerable permanent disability and impairment of function. Aside from the special conditions offered by the presence of the tendons and the partial protection of the bone, the clinical features of whitlow in the two proximal phalanges are much the same as in the terminal phalanges. The inflammation may begin deep in the tissues, the more superficial structures being oedematous and swollen, and the surface not especially reddened. The infection may extend greatly in the tendon sheaths if an opening is not made in time through the overlying tissues. There is special liability to extension of inflammation along the tendon sheaths of the thumb and little finger into the palm. Pain is severe and healing is slow.

In treatment of whitlows, at their very inception an attempt may be made to abort the inflammation by tincture of iodine, application of cold, or subcutaneous injections of antiseptics like phenol. Such measures will not often be successful, and if the infective process continues to advance, radical treatment should be early adopted. Deep and thorough incision into the inflamed tissues is then necessary. Mere incision through the skin is not sufficient unless the trouble is all superficial; the opening must be carried down into the focus of infection. To secure thorough opening, therefore, in the distal phalanx the incision should be carried down to the periosteum; in the other phalanges incision to the tendinous structures will usually be sufficient. Free expos-