

eral it may be said that the majority of patients recover. When the disease is of a mild character, the course is short, varying from a few days to weeks, seldom more than three, and occasionally terminating with only one crop of spots, but more frequently only after there have been several crops. The duration of the more marked types of the disease, especially those with hemorrhages from mucous membranes, is much more protracted, being rarely less than several weeks, often as many months, and, through the occurrence of relapses, even years. In the worst forms, the patient often dies within a few days from the onset. With the arthritic type, repeated relapses are apt to occur, thus making the convalescence protracted even for months or years. A fatal issue is seldom seen.

**DIAGNOSIS.**—Purpura so often accompanies other diseases that a diagnosis of the primary form may be difficult. One must always consider the possibility of the toxic form following various poisons, as mercury, phosphorus, and mineral acids, as well as the infectious purpura secondary to smallpox, scarlet fever, diphtheria, typhoid, measles, septicaemia, and syphilis.

**Hæmophilæa**, especially in the new-born, in some instances very closely resembles purpura of the hemorrhagic kind; but in the former the presence of hereditary factors, together with the bleeding from the umbilicus, and occasional jaundice, ordinarily suffices to differentiate them.

**Scurvy.**—In this disease we may have extravasation of blood into the subcutaneous tissues and muscles, giving indurated, hemorrhagic spots and patches not unlike purpura, but close attention to the circumstances and previous health will throw much light upon the diagnosis. Furthermore, the swollen and bleeding gums of scorbutus are never found in the latter disease. This disease, unlike purpura, may be endemic or epidemic.

**Primary Anæmia and Leukæmia**, coming on acutely with hemorrhage, must not be forgotten, since only a blood examination in certain cases serves to distinguish them from purpura.

**Pseudoleukæmia** may, in rare cases, present even greater difficulties, and can be certainly diagnosed only in the presence of enlarged spleen and lymph nodes.

**Rheumatism**, when accompanied by a hemorrhagic skin eruption, bears only a superficial resemblance to hemorrhagic purpura. In rheumatism there are, as a rule, higher fever, profuse sweats, much more marked pains in the joints, which move with greater frequency from one joint to another, considerable exudation into the joints, and more common association of cardiac complications.

**Erythema** of the exudative type, if causing ecchymoses, gives a picture suggestive of purpura; but the color of the skin, being due to congestion in the blood-vessels, disappears with pressure, to return when the pressure is removed.

**Malignant Endocarditis** can be readily distinguished by the presence of cardiac lesions.

**TREATMENT.**—For primary purpura, no treatment has given very satisfactory results. Rest in bed for a long period is desirable in all cases, and essential in severe forms, since the prolonged rest seems to lessen the chances of relapse as well as the severity of the attack. Mental activity, excitement, overwork, exposure to cold, and trauma of the skin must be provided against. The sick-room should be cool, the diet light and nutritious, and without stimulants of any kind. Acid drinks may be of advantage. If there is any tendency to constipation, mild cathartics, such as castor oil and cascara, or enemata, may be employed to advantage. Of considerable help are warm baths to which chlorides or carbonates have been added.

Of drugs, turpentine, according to McKenzie, is the most reliable remedy. When the coagulability of the blood is much diminished, Wright recommends the use of calcium chloride in twenty-grain doses, and claims to have seen excellent results following its use. Werlhof claims to have found in sulphuric acid a specific. When the bleeding has been marked, ergot, acetate of lead, tan-

nic acid and gallic acid in a few instances appear to have been of service. Osler and others advise the use of Fowler's solution given to the limit of tolerance. In cases of Schönlein's disease, the salicylate compounds appear beneficial, but give no such results as in rheumatism, and must be used with care. If collapse should occur the usual treatment by stimulants, by the employment of heat, or by injections of decinormal saline solution, should be adopted.

After-care demands a carefully regulated diet and a quiet life in the open air. Tonics may be employed if indicated, also iron and arsenic in the presence of anæmia. With the slightest tendency to a return of the purpuric symptoms, it is imperative that the patient should return to bed.

An examination of the urine should be made from time to time for a considerable period, since albumin has been known to appear even after the lapse of months, and in some cases a chronic nephritis has developed.

Edwin Allen Locke.

**MORPHINE.**—*Morphina* (C<sub>17</sub>H<sub>19</sub>NO<sub>3</sub> + H<sub>2</sub>O = 302.34). An alkaloid obtained from opium.

**ORIGIN.**—Morphine is of great interest as being the first alkaloid ever discovered and probably of more medicinal importance than any other article of the materia medica. Its origin and occurrence are fully discussed under the title *Opium*. Its occurrence in the vegetable kingdom elsewhere than in the poppy capsule is not positively proven, but it is probable that it exists in minute amount in the milk juice of Argemone. Its preparation consists essentially in repeated macerations of the opium in distilled water, by which the morphine salts are dissolved out, filtering the solution, and adding alcohol and ammonia water, by which latter the salts are decomposed and the morphine is precipitated. The resulting crystals contain more or less impurities, consisting of other alkaloids, coloring matter, etc., and require repeated purification processes.

**DESCRIPTION AND TESTS.**—Colorless or white, shining, prismatic crystals, or fine needles, or a crystalline powder, odorless, and having a bitter taste; permanent in the air.

Soluble, at 15° C. (59° F.), in 4,350 parts of water, and in 300 parts of alcohol; in 455 parts of boiling water, and in 36 parts of boiling alcohol; also soluble in 4,000 parts of ether.

When heated to about 75° C. (167° F.), morphine begins to lose its water of crystallization. Heated for some time at 100° C. (212° F.), it becomes anhydrous. At 254° C. (489° F.) it melts, forming a black liquid. Upon ignition, it is consumed without leaving a residue.

Morphine has an alkaline reaction upon litmus paper. When crystals of morphine are sprinkled upon nitric acid (specific gravity 1.250 to 1.300), they will assume an orange-red color, and then produce a reddish solution gradually changing to yellow.

On shaking a small portion of morphine, in a test tube, with 10 c.c. of chlorine water, the latter will acquire a yellowish color. On now carefully pouring a small amount of ammonia water on the surface of the liquid, a brown or reddish-brown zone will form at the line of contact of the two liquids.

If to a neutral one-per-cent. solution of morphine, made by the careful addition of dilute sulphuric acid, a few drops of ferric chloride T. S. be added, a blue color will be produced which is destroyed by acids, alcohol, or heating.

On treating morphine with cold, concentrated sulphuric acid free from nitric acid, the liquid should not at once acquire more than a faintly yellowish tinge (absence of more than traces of *narcotine*, *papaverine*, etc.); and the subsequent addition of a small crystal of potassium permanganate should produce only a greenish, but no violet or purple, color (difference from *strychnine*).

On precipitating a solution of any of the salts of morphine by ammonia water, dissolving the washed precipitate in sodium hydrate T. S., shaking the solution with an equal volume of ether, and evaporating the ethereal solu-

tion, no appreciable residue should remain (absence of *narcotine*, *codeine*, etc.).

On adding 4 c.c. of potassium or sodium hydrate T. S. to 0.2 gm. of morphine, a clear, colorless solution, free from any undissolved residue, should result (absence of, and difference from, *various other alkaloids*).

**ACTIONS AND USES.**—In a general and brief way, morphine may be described as the typical somnifacient and general analgesic, with moderate locally analgesic powers also, a depressor of the motor spinal centres, an inhibitor of the pulse, a paralyser of the respiration, a mild antipyretic, and an inhibitor of general metabolism and of all secretions and excretions excepting the perspiration. The ordinary effects upon man are as follows, and occur in nine-tenths or more of those who take it: A short spell of conscious comfort and good feeling; freedom of thought; bodily and mental calm; a warm, pleasant, slightly numb feeling, especially in the finger tips and toes; absence of hunger; slight dizziness and absent-mindedness; dryish tongue; indifference to slight annoyances and discomforts; diminished pupils; sleepiness, and, if yielded to, sleep. Upon waking, if the dose is an ordinary medical one, more or less un-comfortableness, slight nausea or aversion to food, dry tongue, and the omission of the next regular stool. There is probably an undercurrent of each of the other classes of effects in every case, but in a typical one like the above they are so entirely overshadowed by the brain stupor as to be unnoticed.

The specific effects of morphine may be described as follows:

**Absorption, Circulation, and Elimination.**—Morphine is readily absorbed from the stomach, slightly less quickly from the rectum, more slowly from the vagina, very little from the skin, and almost not at all from the bladder. From the air passages, administered in spray or powder, enough is absorbed for local effect, and but little more; from abraded surfaces and granulations absorption is irregular, and may be too little to be of any benefit, or, on the other hand, too much for safety. From subcutaneous injections it is diffused with great regularity and effectiveness. In man, the usual time of absorption of a medicinal dose is as follows: By the stomach, empty or in active condition, the first symptoms appear in fifteen or twenty minutes, the full effect in, say, an hour; by the rectum, one must allow from one and one-half to twice as long, and about one-third larger dose for the same results; by the vagina, at least twice the time and twice the dose for any general effect; by the skin, only local results can be looked for. Hypodermatically, the first effects are generally felt in from three to five minutes, and the full influence in from fifteen to thirty. In the system it circulates as morphine, and a certain amount of it (what portion is not definitely known and probably varies under different conditions) is so eliminated. It is believed to be chiefly eliminated in the urine, as a result of which poisoning is readily induced when, for any reason, this channel of elimination is inactive. It is now known that much of it is excreted into the stomach and intestines, a varying portion of which is liable to be again absorbed. Advantage is taken of this fact, in opium poisoning, to destroy the morphine, by various methods, as the successive portions thus enter these organs. An appreciable amount is excreted by the liver and appears in the bile, and another small portion may make its appearance in the perspiration. In nursing mothers, morphine is very apt to make its appearance in the milk, and fatal cases of poisoning of infants have thus occurred. The question of the oxidation of morphine in the system, to any appreciable extent, is an open one, though this method of destruction in the stomach, in cases of poisoning, by the use of such agents as potassium permanganate, is thoroughly established. Owing to the action of the drug in checking those excretions upon which its elimination depends, poisoning is especially liable to result, through accumulation in the system, and this highly important fact should ever be borne in mind during its prolonged administration. The doses should

not be brought so close together as to fail in affording sufficient time upon the one hand for elimination and upon the other for tolerance to be established.

**Idiosyncrasy.**—Great variation is observed among individuals as to the effects produced upon them by morphine. In almost all cases, except when large doses are introduced suddenly into the circulation, it is possible to observe a primary stage of excitation before that of depression comes on, and it is in this direction that the differences referred to are most plainly visible. In very sensitive subjects, or those in whom control is less perfect, this primary stage may border on intoxication, being accompanied by a mildly convulsive condition of the spinal centres. In the after-effects of the drug, idiosyncrasy again strongly asserts itself, one subject waking refreshed and with but slight disagreeable sensations, while another suffers from headache, nausea, and general malaise. Itching is a frequent symptom and becomes extreme in some individuals. Again, the intestinal effect differs greatly in different persons, differences which can be understood only through a knowledge of the mechanism of the action of the drug upon this part of the system.

The action of morphine in inducing constipation is the effect of depression of the motor functions; yet it is possible for large doses to paralyze the inhibitory power of the splanchnic nerves, thus permitting increased peristalsis, with a laxative result. Thus has been explained the effect of opium in overcoming the constipation of lead colic, in which condition such inhibition is excessive. The somnifacient effect of opium is to be explained by its direct depressing effect upon the centres, in which the order of effects proceeds regularly from the higher to the lower faculties. It is customary to think of the existence of a primary stage of stimulation as accounting for the early symptoms of exhilaration; but it is doubtful if this be not merely a manifestation of the first stage of depression, affecting the cerebral inhibitory powers. How morphine acts in inducing a powerful and extreme contraction of the pupil is uncertain. Most physiologists are inclined to charge it to stimulation; but it is more in line with its known effects in other directions to regard it as the result of inhibitory depression.

The primary cause of the diminished secretions resulting from the action of morphine is believed to be a depression of the secreting centres.

The action of morphine upon the circulation, and more especially upon the respiration, and in other ways than those mentioned above, is more conveniently considered in connection with the toxicology of the subject.

**Therapeutical Uses.**—Among all the uses of morphine that of relieving pain undoubtedly stands at the head. There is no form of pain which cannot be relieved or wholly removed by its use, nor in which it may not be employed, subject of course to special contraindications. In this line may be cited its use as an anodyne in relieving an irritable cough. Although the modern use of codeine, heroine, etc., has to a great extent taken its place, morphine is still largely used and is of great value in such cases. It also gives great relief in pleurisy, although its employment should here be accompanied by great caution since it favors the formation of adhesions. Many cases of vomiting are relieved by morphine, even when the seat of the irritation is not directly in the stomach.

Morphine is of the greatest value in the treatment of peritonitis and other abdominal inflammations, though opium is here to be preferred, as elsewhere stated.

It is frequently of great value in surgical operations, not only to relieve the patient and afford sleep after the operation, but, with or without other anaesthetics, to deaden sensation as a preliminary thereto.

As a diaphoretic morphine is not a good agent, opium, especially in connection with other drugs, being preferable.

Morphine is a valuable supporter of the system, both in acute cases in overcoming shock, and in the exhaustion of disease, although its depressing effect upon the

heart must here be reckoned with. Even in diseases of the heart itself, great benefit is sometimes to be derived through the rest afforded.

Its use in insomnia is subject to the very great risk of establishing the opium habit. Even when the insomnia is but temporary, the exceedingly pleasant results are liable to lead to its use upon similar future occasions, and the temptation is most insidious.

Other uses of morphine, for which opium itself is more appropriate, will be considered under the latter title.

**Compounds, Preparations, and Doses.**—Morphine is rarely used in the pure state, since one may obtain numerous salts which are far more soluble and absorbable than itself. Its ordinary dose is 0.008 to 0.015 gm. (gr.  $\frac{1}{4}$  to  $\frac{1}{2}$ ). This dose, however, as well as those of its salts, is subject to a degree of variation scarcely equalled in any other drug. Children are far more susceptible than adults, women are distinctly more susceptible than men, and there is a great difference among the latter, depending upon temperament. The effect of the drug is directly counteracted by pain or excitement, and large quantities must frequently be given to overcome the former. Tolerance is quickly established, and under it, or under the influence of habit, the production of medicinal effects demands a great increase in the dose.

The acetate (*Morphine Acetas*— $C_{17}H_{19}NO_3 \cdot C_2H_3O_2 + 3H_2O = 398.12$ ) is white or faintly yellowish, crystalline or powdery, has a faint odor of acetic acid and a bitter taste, is soluble in 2.5 parts of water, 47.6 of alcohol, 1,700 of ether, and 2,100 of chloroform. Upon exposure, it gradually loses its acetic acid and becomes less soluble.

The hydrochlorate (*Morphine Hydrochloras*— $C_{17}H_{19}NO_3 \cdot HCl + 3H_2O = 374.63$ ) occurs in a white feathery silky mass of fine acicular crystals or in minute cubical crystals, which are bitter and permanent, soluble in 24 parts of water, 62 of alcohol, and very little in ether or water chloroform. It is neutral.

The sulphate (*Morphine Sulphas*— $[C_{17}H_{19}NO_3]_2 \cdot H_2SO_4 + 5H_2O = 756.38$ ) presents an appearance similar to that of the hydrochlorate, but dissolves in 21 parts of and 702 of alcohol.

The doses of these salts are about the same as those of morphine, and they are, especially the acetate, because of its high solubility, readily available for hypodermatic use. The official preparations are wholly of the sulphate. The compound morphine powder or Tully's powder (*Pulvis Morphine Compositus*) has a strength of one part of the sulphate of morphine in sixty, the remainder being nineteen of camphor, twenty of powdered liquorice, and twenty of precipitated calcium carbonate. The dose is 0.3 to 1 gm. (gr. v. to xv.). The troches of morphine and ipecac (*Trochisci Morphine et Ipecacuanhe*) each contain 0.0016 gm. (gr.  $\frac{1}{6}$ ) of morphine sulphate, with about three times as much powdered ipecac, mixed with sugar, mucilage of tragacanth, and a little oil of wintergreen to flavor. The dose is one to five troches. The *Liquor Morphine Sulphatis* is made by dissolving thirty-five grains of morphine sulphate in two fluidounces of alcohol and about six fluidounces of distilled water, so that it has a strength of about half a grain of morphine sulphate to the fluidrachm. The dose is fl. ʒ ss. to i. The Magendie's solution is somewhat similar, but contains sixteen grains of morphine sulphate to the fluidounce, or two grains to the fluidrachm, thus four times as strong as the last; the dose is m. v. to xv. There is still another *Liquor Morphine Sulphatis*, of an earlier pharmacopœia, containing one grain to the fluidounce. Because of these wide differences in strength, it is not advisable to prescribe this solution by name without specifying the strength.

Henry H. Rusby.

**MORPHŒA**—(Gr. *μορφή*, form, shape); keloid of Addison; circumscribed scleroderma—is a disease of the skin characterized by the presence of variously sized, round, oval, or band-like patches, violaceous, white, yellowish-white, or brown in color, situated on various parts of the cutaneous surface, without definite arrangement or, less frequently, distributed along the course of some nerve.

These patches vary in size from a small pea to the palm of the hand and even larger, are sharply circumscribed, and are usually surrounded by a pink or lilac-colored border, of variable width, which is composed of minute blood-vessels. They may project slightly above the surrounding normal skin or be on a level with it; they are firm and inelastic to the touch, smooth, and shining, presenting an appearance, when the patches are white, which has been aptly compared to old ivory. In patches which have existed for some time there may be moderate scaling, or the centre may be occupied by a number of small pit-like depressions looking like the dilated mouths of the ducts of sebaceous glands, with which, however, they have no connection. The number of lesions present varies from a single one to a half-dozen or more, but is rarely considerable. While no part of the skin is exempt, the disease shows a predilection for certain regions, the parts most commonly affected being the face, the breasts in women, the arms, and the thighs. When the lesions assume a zosteriform arrangement they occur most frequently over the branches of the fifth pair, in the course of some of the branches of the brachial plexus, over the intercostals, or down the thigh. As a rule, subjective symptoms are rarely marked and are often entirely wanting. There may be slight itching, tingling or burning, and in a small number of cases more or less severe neuralgic pains.

The malady is a chronic one and its course is apt to be extremely irregular. After gradually increasing in size for a time the patches may remain unchanged for months or years, and then slowly and almost imperceptibly the skin may resume its normal condition. On the other hand, the skin may become thin, shrivelled, and scaling, adherent to the parts beneath, assuming, particularly in the case of the band-like patches, the appearance of deep scars. When such an atrophic process occurs in patches situated in the neighborhood of joints motion may be more or less seriously interfered with.

Morphœa is seen much more frequently in women than in men. Age is apparently without influence. Long-continued irritation of the skin, such as may result from the pressure of a garter or the rubbing of the stays, a blow, or an injury to a nerve, have seemed to be the exciting cause in some cases. In the great majority of cases, however, no satisfactory explanation of the occurrence of the disease can be given.

**PATHOLOGY.**—Although the exact nature of the malady is not yet definitely determined, there is much in favor of the view that it is a trophoneurosis. Its frequent occurrence in neurotic subjects, the arrangement of the patches over the course of some nerve, and the neuralgic pains which accompany it in a certain proportion of cases are some of the features which lend probability to the neurotic theory of its origin.

The tissue changes characteristic of the affection are found almost exclusively in the corium, the epidermis being little if at all affected. The papillary layer is markedly flattened, and its blood-vessels are greatly narrowed and even in places obliterated. About the vessels of the deeper parts of the corium there is a round-cell exudate which produces narrowing of their lumen and occasional thrombosis. According to Unna the elastic fibres are unchanged, but there is an hypertrophy of the collagenous tissues. About the margins of the sclerosed areas there are numerous dilated vessels—the result of a collateral hyperemia—which give rise to the peculiar lilac-colored border about the patches. The sebaceous and sweat glands are more or less atrophied, the result of the pressure from the hypertrophied fibrous tissues.

**DIAGNOSIS.**—Well-developed morphœa presents such marked and peculiar features that there is seldom any difficulty in its diagnosis. The smooth, ivory-like patches surrounded by a violet border are quite unlike any other disease of the skin.

In the white patches of vitiligo, which only remotely resemble those of morphœa, there is simple loss of pigment without any structural alteration of the skin.

**PROGNOSIS.**—In cases of moderate extent and severity the prognosis is usually fairly favorable. In the majority of cases, after a duration of some months, or it may be two or three years, the skin gradually resumes its normal aspect. When, however, marked atrophy has taken place with adhesion to the deeper structures, forming scar-like patches, the prognosis is extremely unfavorable.

**TREATMENT.**—Treatment is rather unsatisfactory. Internally such remedies as cod-liver oil, arsenic, quinine, and iron may be administered with the view of improving the patient's general health. Thyroid extract has been given with asserted good results in a small number of cases. Locally, frictions with bland oils and fats are useful, and so also are mild galvanic currents applied, as Crocker suggests, in the neighborhood of, rather than directly to, the patches, to avoid any possible irritant effect. Brocq recommends electrolysis, employed as in the removal of hairs. The needle should be inserted in every portion of the patch, the current used varying from 8 to 15 milliampères, and the needle should be allowed to remain fifteen seconds at each puncture. Between the sittings mercurial plaster is to be applied. Hebra has obtained good results from intramuscular injections of a fifteen-per-cent. alcoholic solution of thiostramin, half a Pravaz syringe of the solution being injected every second day. Milton B. Hartzell.

**MORRISON SPRINGS.**—Jefferson County, Colorado.

**POST-OFFICE.**—Morrison. Hotel recently built.

**ACCESS.**—From Denver via Denver, Gunnison, and Leadville Railroad. Morrison Springs are located fourteen miles southwest from Denver, in the basin of Bear Creek and just within the Rocky Mountain foothills at an altitude of six thousand feet above the sea level. No complete quantitative analysis of the waters seems to have been made, but Dr. W. C. McNeal, of Morrison, furnishes us the following report of a partial qualitative examination:

Sulphureted hydrogen.	Iron.
Calcium bicarbonate.	Magnesium sulphate (forty grains per gallon).
Manganese.	Potassium (trace).
Sulphuric acid (doubtless in combination).	
Arsenious acid (combination).	
Temperature of water, 80° F.	

This incomplete analysis would indicate that the waters possess tonic, laxative, and alterative properties. They are recommended in renal, digestive, skin, and rheumatic affections, and in chronic syphilis. James K. Crook.

**MORTALITY.** See *Vital Statistics*.

**MORVAN'S DISEASE; ANALGIC PANARITIUM.**—This curious and extraordinarily rare disease was first described by Morvan, of Brittany, in 1883. In applying the name analgic panaritiom, or "painless whitlows," Morvan was obviously more influenced by the salient clinical feature of the disease than by any consideration for its underlying pathology. Viewed in the light of the more critical tendencies of recent years, the desirability of retaining it as a clinical entity, to the burden of an already overcrowded neurological nosology, seems more than doubtful.

The opportunities for investigating the disease, even in the services of large hospitals, are so meagre that little or no satisfactory advance has been made in our exact understanding of its genesis and morbid sub-structure. It appears to consist of a syringomyelic condition—or of the associated gliomatosis—plus a peripheral neuritis.

In the few cases in which a microscopic examination of the cord has been made, the connective-tissue overgrowth appeared in the posterior part of the gray matter and in the posterior columns.

It is practically certain that syringomyelia takes its origin in a developmental defect. As the primary morbid condition of the disease under consideration is analogous to that of syringomyelia in all essential details, it seems to the writer much more reasonable to regard the extra feature of Morvan's disease, the peripheral neuritis, of identical origin. This point of view makes the two

Vol. V.—55

morbid processes practically alike in all respects except topography, and the doubt arises as to whether this single feature of dissimilarity is sufficient to establish Morvan's disease on the plane of a clinical entity. Repeated observations of the apparent fortuitousness of the morbid distribution in cases of other developmental defects should tend, by analogy, to reduce the present distinguishing features of syringomyelia and what we now term Morvan's disease to the vanishing point, and such a result is desirable for obvious reasons.

As the clinical features of the two diseases now stand, there is nothing upon which we may rely absolutely for differentiation between them. Both are apt to give the first clinical manifestations of their presence in the first half of adult life, and both are alleged to follow some traumatism or to arise in consequence of abuse of function. How important local traumatism may be in the production of Morvan's disease it is difficult to say, owing to the natural rarity of the affection. It probably has about as much etiologic value, however, as that other frequently alleged causative agent in nervous diseases—exposure to cold and wet.

In Morvan's disease the symptoms begin as a rule in the upper extremities. Of these the most striking are the whitlows, which are usually, though not invariably, painless, owing to the loss of all forms of sensation preceding them. With the whitlows there may be recurring ulcerations on various parts of the fingers. These ulcers are deep and not unlike the perforating variety observed in tabes. They are accompanied by cracks in the skin, and the nails shrivel and split. Although the occurrence of the whitlows is the striking feature of the disease, it is not the most important or serious. As has been said, they occur as a rule subsequently to the abolition of all forms of sensation, but they have important precursors in the form of muscular weakness and wasting in the hands and forearms. Although the trophic mischief is practically limited to the hands, and the muscular wasting does not go above the forearms, the sensory loss may involve the entire arms, parts of the trunk, and even the face. Sufficient vaso-motor derangement to cause lividity and pallor of the skin often precedes and accompanies the nutritional disturbance. An affection of the shoulder-joint has been noted. When the ulcerations of the fingers involve the terminal phalanges, the latter may be entirely destroyed. The electrical irritability of the nerves involved in the affected parts pursues variations, as the disease progresses, similar to those observed in the progressive atrophies of spinal origin, a gradually increasing quantitative loss, followed by inversion of the formula. The feet are rarely the seat of the painless ulceration; although the legs may be weak and the knee-jerks exaggerated, owing probably to the partial implication of the nutritional arteries of the lateral columns in the overgrowth of tissue. The course of the disease is extremely slow, extending over many years. In certain cases it has appeared to be arrested.

In the matter of differential diagnosis there are no particular difficulties except in regard to syringomyelia. Here, in the opinion of the writer, there is no absolute distinction. For certain authorities the retention of tactile sensibility and the absence of the whitlows are sufficient to rule out Morvan's disease in a doubtful case. In Raynaud's disease the vaso-motor disturbance is paramount and the loss of sensibility, when it exists, is not alike in kind or degree. In sclerodactyla there are no sensory loss and no tendency to destructive ulceration of the finger ends. In anesthetic leprosy there are no ulcerations whatever, while there is a tendency to pigmentary deposit in the skin areas involved.

Owing to the nature of the malady, the question of treatment is easily settled. No drugs are specifically indicated. Even symptomatic treatment is of little importance because of the practically painless course which the disease pursues. Iron, arsenic, and strychnine are among the drugs used, but it is more than doubtful if they have exerted other than a general effect.

Joseph William Courtney.