

are always present and these are the chief guide to diagnosis. As Unna points out, these cases are apt to extend rapidly, and have a tendency to epithelial hypertrophy. The lesions are apt to be extremely hyperemic and may not show the presence of the lupoma at all. They are sometimes difficult to tell from lupus erythematosus, and histologically are allied to tuberculosis verrucosa cutis.

In the secondary changes to which lupus is prone, corresponding histological variations occur, but they are of little importance beyond the fact that care has to be exercised in order to obtain excised specimens that will contain the lupus tissue. In the verrucous and hypertrophic forms this tissue lies far below the surface of the warty development.

DIAGNOSIS.—In spite of the multiformity of the clinical pictures presented by lupus vulgaris, the essential characteristics of the disease are so marked that a diagnosis in most cases is easily made. A history of the patient reveals almost invariably that the disease dates from childhood and that it has pursued a most chronic course. The examinations of the lesion rarely fail to show at some point the small primary granuloma, the soft consistency of which and its appearance when pressed on with a glass slide are pathognomonic. The diseases most apt to be confounded with lupus are tertiary syphilis, lupus erythematosus, and epithelioma.

From *syphilis* in its tertiary stage a differential diagnosis has often to be made in two quite different cases. The non-ulcerative serpiginous syphilide resembles to a great extent the non-ulcerative form of lupus, and the deep ulcerating syphilide has many of the appearances of an ulcerating lupus. The non-ulcerative syphilide, developing in the form of a subcutaneous gumma, presents tubercles which, while they have much resemblance to the tubercles of an elevated lupus, attain their size much more rapidly, are harder, rounder, and of a copper color. Furthermore, in syphilis we usually have a multiplicity of lesions; in lupus, more often only one. Lupus starts before puberty, while an acquired syphilis belongs to adult life.

In the ulcerative forms of syphilis the ulcer is usually round, its edges are sharply cut and everted, and its discharges more copious than in lupus. This is due to the nature of the neoplasm, in which the softening of the gumma causes a much greater loss of tissue than does the slow necrosis of a lupus lesion, which presents a much more superficial ulcer, whose edges are irregular and non-everted. On the other hand, the lupus scars form at a slower rate, are deeper, and cause more deformity than the syphilitic.

From *rodent ulcer* an ulcerating lupus can be told by the margin of the epithelioma. This is hard, elevated, pearly-white in color. The ulcer is deeper and its floor has no tendency to form healthy skin. Epithelioma begins in advanced life, and its course is usually associated with more or less pain. The lupus ulcer, on the contrary, presents no such margin, is painless, and has a tendency to heal.

Lupus erythematosus is distinguished from lupus vulgaris in that the former begins after puberty and advances by an even, raised, erythematous border and not by the formation of subcutaneous granulomata. It never ulcerates and does not form contracting scars. The peculiar scaliness and the involvement of the sebaceous glands in lupus erythematosus are not seen in lupus vulgaris.

Acne rosacea may at times resemble lupus on account of the tumefaction of the nose, which appears in both diseases, but its history, the intense hardness of the fibrous tissue, and the presence of the dilated capillaries should distinguish it from the disease under consideration.

PROGNOSIS.—The prognosis of lupus vulgaris would not be unfavorable if it were not for the uncertainty as regards recurrence. The destruction and removal of the tuberculous nodules and hypertrophic tissue are not difficult, but it can never be said that the resulting scar does not contain sufficient infective material to cause a fresh outbreak of the disease. Especially is this true of the cicatrix left by lupus maculosus when the nodules are so deeply embedded in the fibrous tissue that they are not visible to the eye. Lupus is not often seen in connection with general or pulmonary tuberculosis, yet cases have been reported in which death has resulted from the spreading of the affection to the lungs or from the development of acute miliary tuberculosis.

TREATMENT.—The treatment of lupus vulgaris may be divided into (1) constitutional and (2) local.

Constitutional Treatment.—The care of the general health, good food, fresh air and sunlight, and a life out of doors will benefit the patient more than the internal administration of remedies. In the past many methods of treatment have been recommended for the tuberculous, and nearly all of them in turn have found a serious stumbling-block in lupus vulgaris. In this disease the superior opportunity for observation allows of a final decision on the question of their efficacy, and the admission must be made that modern dermatology has received little from

the therapeutics of pulmonary tuberculosis that it has not been obliged to condemn. No remedies have any influence on the rate of extension of lupus, nor do they hasten the necrosis and absorption of the lupomata.

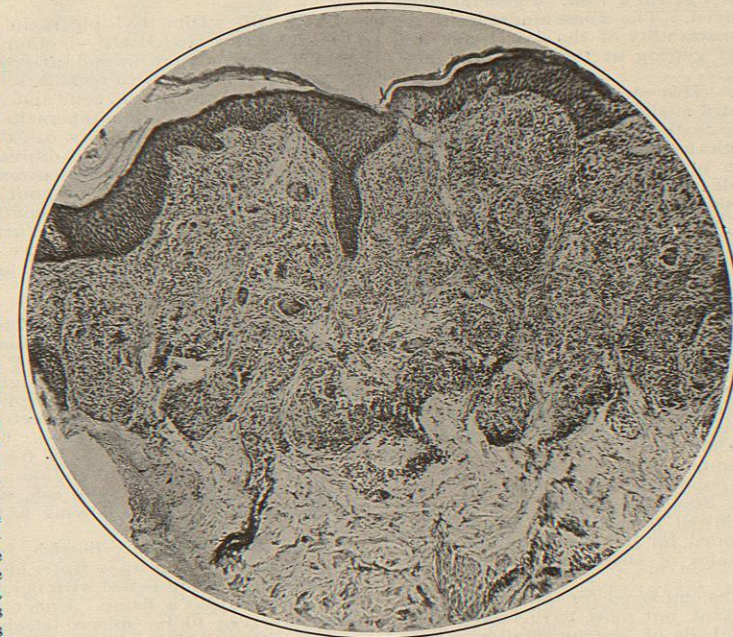


FIG. 3260.—Section of Lupus Vulgaris of the Cheek. The reticulated nature of the neoplasm is evident. Good examples of giant cells. (Fordyce.)

BIBLIOTECA

Only so far as the state of the general health or an impaired nutrition may be benefited are internal medicines indicated. With this sole purpose in view may be tried cod-liver oil, chalybeates, and tonics, care being taken that the deleterious action on digestion does not exceed the benefit derived. Of other remedies recommended, but of doubtful value, may also be mentioned iodide of potassium, iodoform, quinine, arsenic, creosote, and chloride of calcium.

Local Treatment.—This consists in the destruction and removal of the lupomata with as little disfigurement as possible. In making a selection of the most suitable means to this end, the variety of the disease must be taken into careful consideration.

In the case of small lesions the ideal treatment is excision with or without a Thiersch's skin graft. The results, when this method is successful, are most satisfactory, but unfortunately the number of selected cases in which it is applicable is small, and the reports show that recurrences are by no means unknown.

If there is no chance to extirpate the lesion, the best results are obtained either by curetting or by the use of the scarifier. In curetting, as much as possible of the soft tissue is scraped away and usually some caustic is subsequently applied. The lesion is allowed to cicatrize, after which the curetting can again be repeated if it is found necessary. Dr. G. H. Fox has devised a method for removing the nodules, when they are deeply situated, by means of the dental burr. This penetrates the meshes of the scars, and undoubtedly reaches small granulation areas that the dermal curette would not enter. Other instruments have been contrived for the same purpose. Curettagement meets the indications best in case of a rapidly advancing margin, in ulcerated cases, with or without hypertrophic outgrowths, and in cases with recurrence. If large areas are to be treated, a local or general anesthetic should be employed. The worst hindrance to the operation is the impenetrability of the scar tissue and hence the difficulty of getting at the deeply situated lupomata.

Linear Scarification.—This method was proposed by Volkman and afterward modified by Vidal and others. Parallel cuts, about one-tenth of an inch apart, are made by a sharp knife through the lupous tissue. Many special instruments have been invented for scarification, that devised by Vidal himself having two cutting edges. The knife has to be very sharp and is held like a pen, the strokes being rapidly made. The depth to which the cuts penetrate can be easily regulated after a little practice. Free bleeding is encouraged, and when it has been checked a little, other cuts at angles of from 60° to 90° to the first set are made. This operation is not painful and requires no anesthetic. It should be repeated every six to eight days until the desired result is obtained. Here again the operation is not possible in badly sclerosed cases, but is specially applicable in cases showing much vascularity and on the border of a lupous ulcer.

Other methods entailing surgical interference are by cauterization with the thermo-cautery or with the electro-cautery. Besnier, to whom the perfection of the operation with the galvano-cautery is due, has invented a number of special cautery points suited for both superficial and deep application. Small lesions are riddled with punctures and then allowed to heal up. This method is also to be recommended for the destruction of small inaccessible lupomata and of small areas of granulations.

Of the medicinal means employed for the treatment of lupus many are still extant, but most have been superseded by the surer methods of instrumentation. Formerly, caustic applications were extremely popular. Among them the treatment by the solid stick of nitrate of silver still survives. The stick is pushed into the soft tissue and a mechanical as well as caustic effect is produced. This gives good results in small and discrete patches. Vienna paste containing white arsenic and cinnabar is also used to-day. The application is very painful and has to be kept up for two or three days.

The amount of destruction of the lupous tissue is considerable, but the healthy tissue is for the greater part spared.

Another method of directly destroying the lupomata is that recommended by Unna. This consists in preparing small splinters of wood by soaking in a solution of carbolic acid and corrosive sublimate, and then driving them directly into the lupomata, where they are held in place by plasters and allowed to ulcerate out. Pledgets of cotton may be used for the same purpose. Other writers have advised various liquids to be injected into the tissue or sprayed or painted on the surface. With the object of macerating the epidermis and exposing the lupomata, many ointments and other preparations are used. At the head of these probably stands the salicylic-acid plaster. After its use stronger and more destructive applications should be employed.

Lately, there have come to the front in the treatment of lupus two entirely new methods which bid fair to be the treatment of the future. The first, devised by Professor Finsen, of Copenhagen, consists in the concentration of sunlight or the arc light, by a system of lenses, directly on the lupous patches. In this light the heat and red rays are cut off by water chambers, and as far as possible the ultra-violet and chemical rays alone are used. These rays are believed to have powerful bactericidal qualities and the power of penetrating the skin. The second method is now more universally used and consists in the application of the x-rays. Both these methods have been reported as affording excellent results, although they are not invariable. One of the great advantages which they both possess is the small amount of scarring that remains after a cure. The disadvantages are the expense and long time required for treatment.

Oscar H. Holder.

LYCETOL.—Dimethyl piperazin tartrate $[\text{NH}(\text{CH}_2\text{CH}(\text{CH}_3)_2\text{NH} + \text{H}_2\text{C}_4\text{H}_4\text{O}_6)]$ —is obtained by distilling glycerin with ammonium bromide and reducing the dimethyl pyrazin thus formed with metallic sodium. It is a white, odorless powder with acid taste and reaction, and is readily soluble in water. Like piperazin this salt is a solvent for uric acid, and is used in cases of gouty diathesis. Wiltzack reports considerable diuresis, the urine having a low specific gravity, non-occurrence of an otherwise regularly recurring attack of gout, and diminution of gravel when the remedy was continued a long time. Hamonic found it to improve the urine in purulent cystitis. The dose is 1-2 gm. (gr. xv.-xxx.) dissolved in plenty of water, its lemonade-like taste making of it a pleasant drink.

W. A. Bastedo.

LYCOPodium.—*Vegetable Sulphur.* "The spores of *Lycopodium clavatum* L. and of other species of *Lycopodium* (fam. *Lycopodiaceae*)," U. S. P. These plants are evergreen creepers, common throughout the north temperate zone. Their ament-like spikes bear numerous sporangia. These spikes are collected, chiefly in Northern Europe, dried, and threshed. Considerable dirt is inevitable, and this amount is frequently largely increased for purposes of adulteration; hence the necessity for estimating the amount of ash, and for microscopic examination. The following is the official description:

"A fine powder, pale yellowish, very mobile, inodorous, tasteless, floating upon water and not wetted by it, but sinking on being boiled with it, and burning quickly when thrown into a flame. Under the microscope the spores are seen to be spherotetrahedral, the surfaces marked with reticulated ridges, and the edges beset with short projections.

"Lycopodium should be free from pollen, starch, sand, and other impurities, any of which are easily detected by means of the microscope.

"When ignited with free access of air, lycopodium should not leave more than five per cent. of ash."

It contains forty-seven per cent. of fixed oil (Flückiger), and has no other important constituent. It is used only

as a non-adhesive powder for the protection of moist pills from sticking together, and for dusting upon excoriated

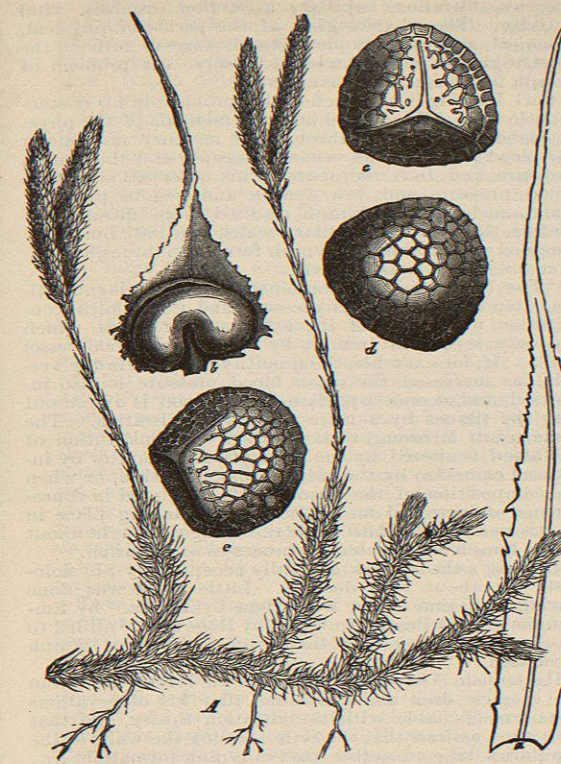


FIG. 3261. — Lycopodium Plant and Spores. A is the plant, something less than natural size; a, one of the leaves, enlarged; b, a scale of the spike with the sporangium at the base, enlarged; c, d, e, different views of the spores. (Luerssen.)

places—to protect the surface and to prevent chafing; its action in both cases is wholly mechanical.

Henry H. Rusby.

LYMPH.—1. DEFINITION.—Lymph is one of the circulating fluids of the body. It is the all-pervading fluid of the body. It has been said that the higher animals as well as the lower are really aquatic, inasmuch as each cell of a reptile, bird, or mammal lives in a liquid medium—the lymph.

Blood comes into contact with the endothelial cells of the blood circulatory system, and with the cells within the spleen pulp—with these cells and with these alone. But these cells comprise a vanishingly small proportion of the cells of the body. All the rest of the cells—and that is, nearly all of the cells of the body—never come into immediate contact with the blood. They receive their food and their respiratory oxygen through the lymph; while the lymph in turn receives these materials for the sustenance of the cells from the blood.

On the other hand, waste matters, which are constantly forming within active cells, are thrown out of the cells into the lymph and make their way directly or indirectly back into the blood, to be carried to some excretory organ.

The lymph is thus the liquid medium of interchange between the living, active cells of the body (endothelium excepted) and the blood.

The way in which this interchange between blood and lymph, and between lymph and cells, takes place will

be discussed under Relation of Lymph to Metabolism (section 5).

2. CLASSIFICATION.—The word lymph is frequently used with a somewhat wider meaning than that given in the definition above. In this wider significance lymph includes not only the lymph in the intercellular spaces but also all liquid, not blood, contained within endothelial-lined cavities or circulating within endothelial-lined vessels. This more general definition includes the fluid contents of the pleural, peritoneal, and pericardial cavities.

It includes the chyle together with the contents of all lymphatics and lymph spaces.

The aqueous humor of the eye, the cerebro-spinal fluid and the synovial fluid, are closely related to lymph, but differ in certain important properties characteristic of lymph and may not be classed with lymph proper.

Lymph may thus be classified as:

I. *Tissue Lymph*—filling the intercellular spaces throughout the body.

II. *Circulating Lymph*—flowing along the lymph radicles and lymphatics, making its way slowly back to the circulatory system, usually via the thoracic duct.

III. *Chyle*—the circulating lymph of the intestinal mucosa and submucosa plus the food-stuffs (mostly fats) absorbed from the lumen of the intestine.

IV. *Serous Lymph*—the contents of the serous cavities.

3. COMPOSITION.—Tissue lymph, circulating lymph, and serous lymph have practically the same composition, as follows:

		Per cent.
Lymph.	Water	95.20
		Proteids..... 3.75
Solids.	Organic.	Corpuscles.....
		Serum globulin.....
		Serum albumin.....
		Extractives..... .10
		Fats.....
		Lectihin.....
		Cholesterin.....
		Sugar, dextrose..... .10
		Sodium chloride..... 0.56
		Sodium carbonate..... .24
Solids.	Inorganic.	Other salts..... .05
		Chlorides, sulphates, phosphates, and carbonates of Na, K, Ca, and Mg.....
	
	
		100.00

The proteids of lymph are contained partly in the corpuscles and partly in solution in the lymph plasma. An important constituent of lymph proteid is the fibrinogen—one of the globulins—which is one of the factors in the formation of the clot when lymph escapes from tissues or vessels. All lymph contains fibrinogen; but serous lymph contains no fibrin ferment and will, therefore, not coagulate spontaneously. The serous lymph contains less proteid (about 2.42 per cent.) than tissue or circulating lymph.

The salts of the lymph are the same qualitatively as those of the blood, differing only in their quantitative relations. The proportion of salts of the lymph is less than that of the blood.

Besides the above-enumerated constituents the tissue and circulating lymph contains small and indeterminate quantities of katabolites, chief of which is urea, which is found in amounts approximating 0.016 per cent.

Chyle differs from other forms of lymph in the large admixture of food-stuffs just absorbed from the alimentary canal. Practically all of the fat is absorbed into the lymphatics of the intestinal mucosa and submucosa. It circulates in these in the form of an emulsion. This gives the lymph, otherwise clear and light yellow, the appearance of milk, and called forth from Asellius,¹ the discoverer of the vessels which contain it, the name *lacteals*.

The amount of fat which the chyle contains will vary naturally with the conditions of the observation. If the observation be made upon a dog about two or three hours after a meal rich in fats the lacteals will be found gorged with a chyle as white as milk and very rich in fats. If, however, the observation be made under condi-