

tured; and the nerve may also be injured in the same manner, causing great pain, which may appear to the patient to be in the foot or ankle. Section of the nerve is not a serious matter, as it does not alter notably the functions of the member.

In the external or peroneal compartment there are but two muscles, the peroneus longus and peroneus brevis (Fig. 3185). These are long and slender, attached strongly to the fibula and to the deep fascia above, and tapering below into rounded tendons, which pass behind the external malleolus. They are supplied by the peroneal nerve, which may be injured by a fracture of the fibula, whence may result a considerable impairment of the functions of the foot, as the outward pointing of the toes is mainly accomplished by these muscles. The head of the fibula is sometimes torn off by the sudden muscular traction of the biceps muscle, and the lesion is usually accompanied by a considerable amount of pain, which may continue during the entire time that the callus is forming. This is due to the close contiguity of the peroneal (external popliteal) nerve.

The posterior compartment of the leg is by far the largest of the three. A strong intermuscular septum divides it transversely into two (Fig. 3182), separating the muscles into superficial and deep groups. The superficial muscles form a well-marked group attached to the tendo Achillis, and therefore act together as a rule. These form the prominence of the calf before mentioned, and consist of the gastrocnemius superficially, under it the soleus, which considerably exceeds it in size, and the insignificant plantaris. Many anatomists describe the gastrocnemius as two muscles, and from this conception arises the French name *les jumeaux*. Combined with the soleus the whole muscular complex is known as the triceps extensor surae. The two heads of the gastrocnemius take origin above the condyles of the femur. It is, therefore, a muscle which controls two joints, and its contraction flexes the

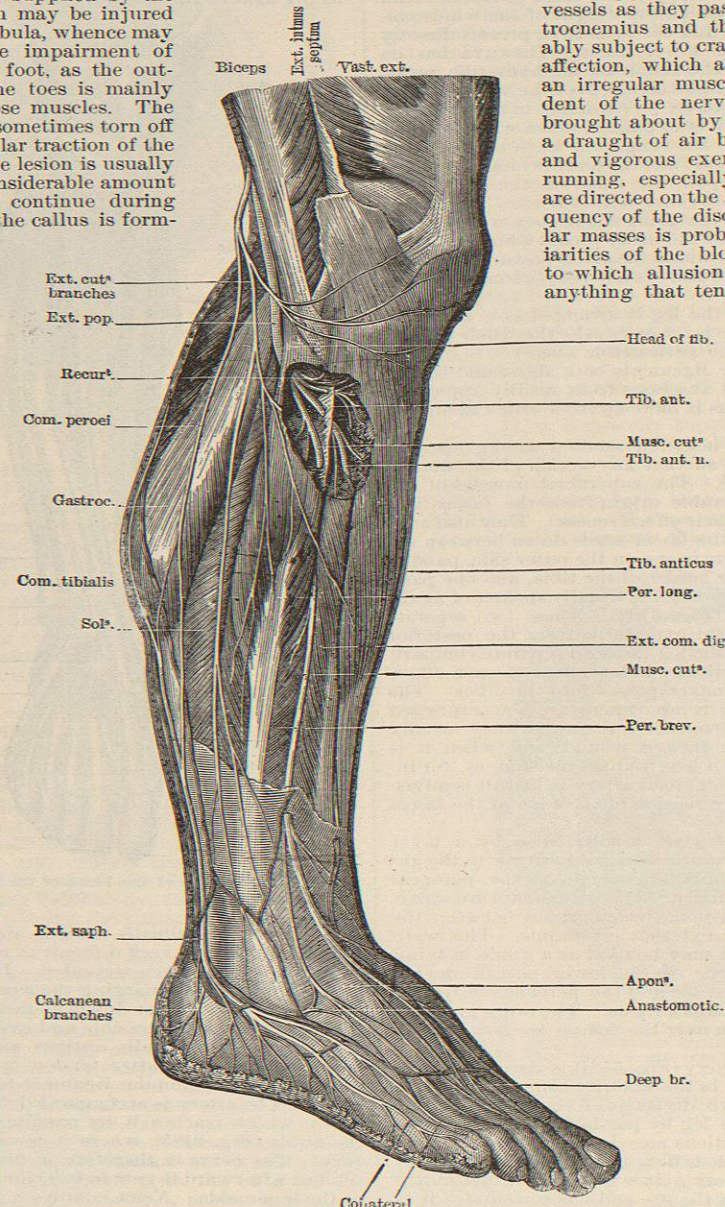


FIG. 3185.—Dissection of Outer Side of Right Leg and Foot, showing branches of Right External Popliteal Nerve.

knee and at the same time extends the foot. When it is affected by rheumatism it may cause spurious ankylosis of the knee-joint. The coexistence of extension of the foot will enable the observer to make a diagnosis. The fibres of either head are arranged in a beautiful penniform manner around a tendon which cannot be completely displayed until the muscle is cut and turned back. Its coadjutor, the soleus, does not pass over the knee-joint, but is attached to the tibia and the fibula, throwing across between the two a fibrous arch of fascia which protects from compression the vessels as they pass under it. The gastrocnemius and the soleus are remarkably subject to cramps. This muscular affection, which appears usually to be an irregular muscular action, independent of the nervous system, may be brought about by slight causes, such as a draught of air blowing on the calves, and vigorous exercise in swimming or running, especially when cold currents are directed on the limb. The greater frequency of the disorder in these muscular masses is probably due to the peculiarities of the blood-supply to the leg, to which allusion has been made, and anything that tends to produce a more active circulation through the muscles, such as kneading or rubbing, will relieve the cramp. It is suggested that both in this case and in others in which massage upon the leg is necessary, some care be taken to apply it along the trunks of the veins and in a direction from the periphery toward the heart. Cramps of these muscles are frequent during pregnancy, and in that case may perhaps be due to pressure either upon the iliac veins or upon the nerve trunks in the pelvic cavity.

The little plantaris (Fig. 3187) is a vestigial muscle, representing a much larger one found in other animals. Its muscular portion is frequently not more than an inch long. It arises above the outer condyle of the femur, and terminates in a slender, threadlike tendon, which passes down along the internal border of the tendo Achillis, and is finally inserted with it into the posterior border of the calcaneum. It is probably of no impor-

portance whatever, though the French surgeons have imagined that its tendon may be ruptured by a sudden action,

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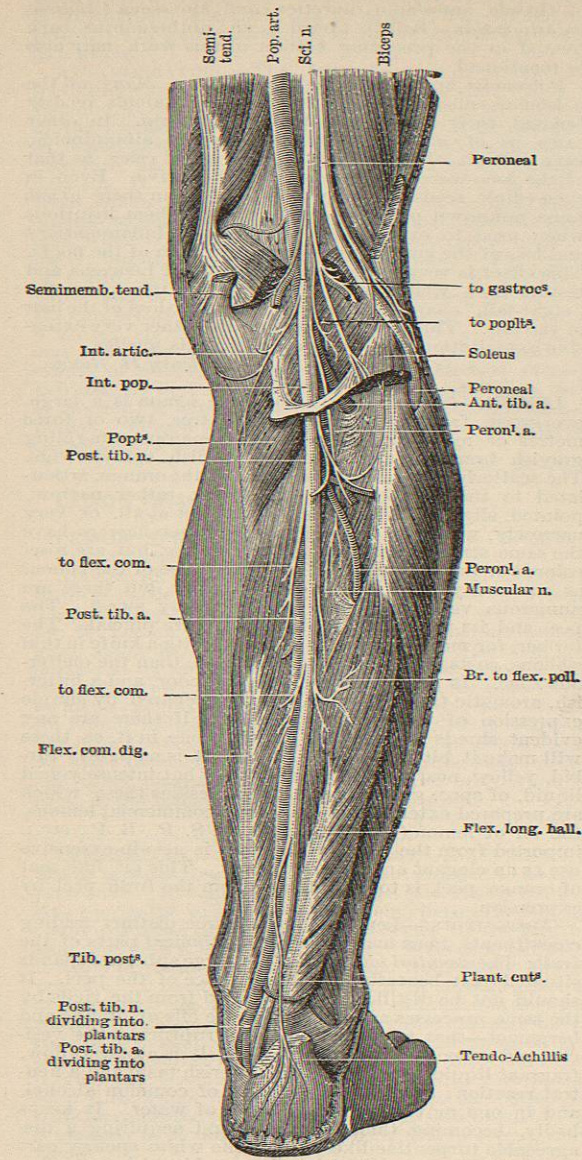


FIG. 3186.—Right Posterior Tibial Nerve and Artery. The internal popliteal nerve is seen passing beneath the fibrous arch of the soleus.

producing the affection known as *coup de fouet*—a sudden stinging pain in the calf. This affection is not rare. In a case within the writer's knowledge it occurred to a lady while dancing. It is more likely that there is a rupture in the large muscular mass of the gastrocnemius and the nerves of supply. It is not clear that the little tendon of the plantaris would cause any pain if it were to rupture, and the lesion has never been demonstrated clinically, so far as the writer is aware.

The tendo Achillis passes down to be inserted upon the tuberosity of the calcaneum. The projection which this makes behind the malleoli determines the length of that arm of the lever. In negroes and others with flat feet this projection is somewhat greater. By this setting back of the tendon two fosse are formed, one on either side, behind the malleoli (Fig. 3183).

Between the triceps surae and the deeper layer are the principal vessels and nerves. The posterior tibial artery (Fig. 3186) is the direct continuation of the popliteal, and receives its name on passing under the fibrous arch of the soleus. It almost immediately gives off the anterior tibial and the peroneal arteries, the rule being, according to Holden, that in amputations one inch below the head of the fibula one artery is divided, two inches two arteries, three inches three arteries. It bifurcates into the plantar arteries at a line drawn from the point of the malleolus to the middle of the heel (Wyeth). If we take a point midway on this line, and draw another line upward through the centre of the calf, we shall have approximately the course of the artery. In the upper part of its course it is so deeply buried under muscular masses that

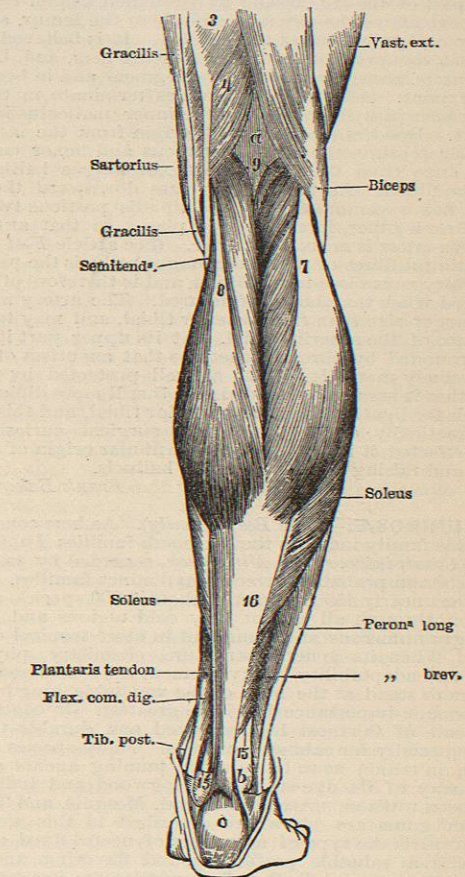


FIG. 3187.—Superficial Muscles of Back of Right Leg. a, Popliteal space; b, extl. malleolus; c, os calcis; 3, semitends.; 4, semimemb.; 7, 8, gastrocs.; 9, plantaris; 15, 15, flex. long. hall.; 16, tendo Achillis.

it is very difficult to reach. On this account it is usual in ligating it not to make the incision directly over the artery, but to avoid cutting the gastrocnemius by com-

mencing only two finger-breadths from the internal edge of the tibia, finding the edge of the gastrocnemius, and pushing it aside. The fibres of the soleus are then carefully divided in the direction of the artery. There is usually a deep aponeurotic tendon inclosed within the fibres of the soleus, having muscular fibres inserted on its anterior and posterior surfaces. When this is reached it serves as a warning to the operator that the artery is not far off. By separating the edges of the incision the vessel may be found, even if not exactly in the direction of the cut. It is very rarely tied here.

Below, where the artery becomes more superficial, there is no difficulty in finding it. In operating anywhere on the inner side of the leg the internal saphenous vein must be avoided. The artery is accompanied throughout by two veins, with frequent cross anastomoses, and by the posterior tibial nerve, which is at first on its inner side, but crosses over to the outer side, below where the peroneal artery is given off. A section of the nerve paralyzes the plantar muscles.

The deep layer of muscles is constituted by the tibialis posticus, the flexor communis, the flexor longus hallucis, and the popliteus. The latter muscle is confined to the upper part of the leg, arising by a rounded tendon from the groove above the external condyle of the femur, and passing obliquely inward to the tibia. It is believed to represent the pronator radii teres of the arm, and, like that muscle, assists in rotating the segment and in bending the joint. All the other muscles terminate in tendons which pass down behind the inner malleolus into the foot. Besides a considerable origin from the intermuscular septum, the tibialis posticus and flexor communis arise from the tibia; the flexor longus hallucis from the fibula. As the tendons pass downward those of the flexor communis and the tibialis posticus twist around each other, interchanging places, so that at the ankle the latter is nearest the bone. (See article *Foot*.)

Within the fibres of the flexor longus hallucis the peroneal artery runs close to the fibula, and is therefore often wounded when that bone is fractured. The artery may be of larger size than the posterior tibial, and may take the place of the anterior tibial. At its upper part it is so surrounded by fibrous structures that aneurism of it is extremely rare. It is also so well protected by the fibula that it is rarely wounded. It is still more difficult to reach for ligation than the posterior tibial, and this is not practically done except as a surgical curiosity. When effected, it is by detaching the fibular origin of the soleus and raising the flexor longus hallucis.

Frank Baker.

LEGUMINOSÆ.—(*The Bean Family*). As here considered, this family includes the three sub-families *Papilionaceae*, *Cesalpiniaceae*, and *Mimosaceae*, regarded by many botanists, and probably correctly, as distinct families. It comprises nearly 450 genera and about 6,000 species, distributed through all except very cold regions and exceedingly numerous and abundant in most tropical districts. When its general structure, chemistry, physiology, and adaptability to environment are considered, it appears to stand at the head of the vegetable kingdom. Its economic importance is of the greatest. It contributes some of the most highly prized and durable timbers, especially for cabinet purposes. Many species are so rich in tannin as to be valuable tanning agents and very many of its dye-stuffs, like logwood and indigo, have been utilized. *Acacia*, *Senegal*, *Mesquit*, and *Tragacanth* gums are elsewhere described in this work. Peanut oil is the type of a number of useful fixed oils. Tonka is a valuable perfuming and flavoring agent. Tamarinds, ingas, and other fleshy fruits are important edible products. Most of the richly albuminous fodders, like clover, alfalfa, lupines, and vetches, are yielded by this family, especially by the first-named sub-family, while peas, beans, lentils, peanuts, soja and fenugreek, in the same group, are equally important as albuminous human foods. Medicinally, the Calabar bean, senna, broom, liquorice, jquirity, araroba, Jamaica dogwood,

balsams of Peru and tolu, copaiba and erythrophleum are mere illustrations of a vast number, and especially of local employment. *Ononis spinosa* L. and other species of *Ononis*, household diuretics, and *Monssena* (*Abizua anthelmintica* [Baill.] Courd.), an anthelmintic bark treated in the preceding edition of this work, may also be mentioned.

Poisonous species are very numerous. Many of the poisonous constituents are glucosides or alkaloids, readily isolated, their activities not at all uniform. In other cases, as of abrus and locust, they are albuminoids, very difficult of isolation. In some noted cases, as that of the loco-weed, they are absolutely elusive. Even in such edible seeds as the pea and the bean there exists some unknown principle which renders them injurious when used to excess, and which causes inflammations and loss of the cutaneous appendages, even of the hoofs. This effect is very noticeable in the case of *Leucaena* and results in a well-marked deformity in the horse, the "cigar-tail," characterized by the complete loss of the hair of the tail. This family is capable of further very extensive exploitation in the interest of materia medica.

Henry H. Rusby.

LEMON.—(See also **CITRUS**). The lemon is a large, evergreen, fragrant shrub or small tree, two or three metres or more in height, with numerous straggling grayish branches and green or reddish spiny twigs. The scattering leaves are, like those of the orange, articulated to the petiole; they are ovate, rather narrow, pointed, slightly serrate, the petioles not at all, or very narrowly, winged. The deliciously sweet flowers have the same structure as those of the orange, but are rose-colored or purplish externally. The juice of the lemon, as commonly known, is excessively sour, but there are numerous varieties which are deliciously sweet. The peel and its volatile oil and the juice are official. The former, for medicinal use, is pared off with a knife in thin ribbons, so as to include but little more than the oleiferous zone. It has a fragrant, pleasant odor, and a bitterish, aromatic taste. Lemon juice is prepared by simple expression of the pulp, and straining if there are any evident shreds of the pulp or partitions in it, as these will make it bitter upon standing. It is a slightly turbid, yellow, nearly odorless, pleasantly but intensely acid liquid, of spec. grav. about 1.030. Besides these, which are prepared extemporaneously from commercial lemons, the oil of lemon (*Oleum Limonis*, U. S. P., B. P., etc.), imported from the south of Europe, is also in extensive use as an elegant and popular flavor. This oil, like that of orange peel, is to be obtained from the fresh peel by expression.

COMPOSITION.—Lemons contain three distinct leading constituents, in as many distinct anatomical parts of the fruit: The *essential oil*, in a zone of large spherical glands situated just beneath the outer surface of the peel. It should not be distilled, but separated from the rinds by the same processes as are used for the oils of orange and bergamot—that is, by in some way rupturing the vesicles and collecting it mechanically. It is a pale-yellow, fragrant liquid, of an aromatic, bitterish taste and a neutral reaction; soluble in two parts of common alcohol, and in one or two thousand parts of water. It keeps badly, becoming thicker by age, and acquiring a disagreeable turpentine-like odor. The white spongy part of the peel and the partitions have a bitterish taste, due to the crystalline neutral substance *hesperidin*, common also to the other fruits of the genus. It is not used in medicine. The pulp owes its acidity to five or six per cent. of, mostly free, *citric acid* (of which lemons, limes, and sour oranges are the principal sources), and to a little *malic acid*.

USES.—Lemons are mostly used as an agreeable and wholesome flavor for food and drink. Their medicinal value is slight, and consists in their antiscorbutic quality, for which the juice (or lime juice) is carried on shipboard, and, on long voyages, is meted out to sailors and passengers. The introduction, however, of steam navigation,

by making voyages short, and of canned meats and vegetables for ocean use, has nearly obliterated scurvy. As a grateful refrigerant drink in fevers, and especially in rheumatism, lemonade has no equal. The oil has the properties of the aromatic oils in general, but is used only as a flavor.

ADMINISTRATION.—The following preparations (not including citric acid or the citrates) are official: Spirit of Lemon (*Spiritus Limonis*, U. S. P., the Essence of Lemon of the kitchen) contains six parts of oil of lemon, four of lemon peel, and enough alcohol to make a hundred; macerate and filter. The Syrup of Lemon (*Syrupus Limonis*, U. S. P.) is made of: lemon juice, 40 parts; fresh lemon peel, 2 parts; sugar, 60 parts; and water enough to make 100 parts. Boil the juice, add the peel, and, when cold, filter, adding water enough to make 40 parts; finally put in and dissolve the sugar. The Syrup of Citric Acid (*Syrupus Acidi Citrici*, U. S. P.) keeps better and is almost invariably substituted for this by the apothecaries. It contains: Citric acid, 8 parts; water, 8 parts; spirit of lemon, 4 parts; syrup, 980 parts; and is a close imitation of the other. The mixture of citrate of potassium (neutral mixture, *Mistura Potassii Citricis*, U. S. P., an old fever mixture not much used at present) is lemon juice neutralized by bicarbonate of potash. Lemon juice is frequently added to the alkaline carbonates to form an effervescent draught.

W. P. Bolles.

LEMON GRASS. See *Andropogon*.

LEMON SPRINGS.—Moore County, North Carolina.

POST-OFFICE.—Lemon Springs.

ACCESS.—Via Seaboard Air Line Railroad to Lemon Springs Station, thence a little over two miles to springs. These springs are named for the former owner, the late Dr. M. Lemon. They are located in a fine, healthy region, about 500 feet above the sea level. The hotel was destroyed by fire a few years since, and the resort is suffering from undue neglect. It is said that the place could be made one of great attractiveness, both for summer and for winter visitors. The waters of Spring No. 1 were analyzed by Professor Ledoux, at that time the State chemist, who detected salts of iron, aluminium, magnesium, and other ingredients in nearly the same proportion as exist in the Buffalo lithia waters of Virginia.

James K. Crook.

LENIGALLOL—pyrogallol tri-acetate—is a white crystalline powder, insoluble in water and claimed to be non-poisonous. In contact with inflamed skin it slowly liberates pyrogallic acid, and where the epidermis is lost the change is quite rapid. It is not affected by the healthy skin, nor does it stain the clothing. With zinc ointment it tends to produce a dark coloration from slight decomposition. Kromayer recommends it in chronic eczema, at first applying lenigallol 20 parts and zinc ointment 80 parts, and later, if necessary, lenigallol 10 and oil of cade 5, or lenigallol 10, oil of cade 10, precipitated sulphur 20, green soap 5, and zinc ointment 150. Rau uses it in chronic eczema after thorough washing with potash soap. He found it useless in acute eczema. Good results are reported in psoriasis and other skin diseases. It is claimed to be unirritating even in fifty-per-cent. ointment.

W. A. Bastedo.

LENIROBIN—the tetra-acetate of chrysarobin—is considered by Kromayer a fair and unirritating substitute for chrysarobin in the milder types of skin disease. Rau uses it in ten-per-cent. chloroform solution or with traumaticin, reporting two cures of keratosis and eighteen of chronic tylosis. It is painful to rhagades.

W. A. Bastedo.

LENTIGO.—(Synonyms: Freckles, Ephelis, Ephelid; Fr., *Taches de rousseur*; Sp., *Pecas*.)

Lentigo is usually described as an eruption of multiple circumscribed, irregular, flat spots, varying in size from

a pin point to that of a lentil, in color running from light greenish-yellow to dark brown or blackish, appearing on that part of the cutaneous surface most exposed to the inclemencies of the weather; the variety that appears on the non-exposed surface is commonly termed "cold freckle." As a rule the lesions are discrete, but sometimes they are so numerous and close together that they seem to run into each other and thus form a patch. Anatomically freckles, according to Cohn, consist of a circumscribed accumulation of pigment in the basal layer of cells of the rete Malpighi and in the papillary layer of the skin.

ETIOLOGY.—We may say that as a rule every one is subject to freckles, but the brunette type is unquestionably less so than the blonde, and those with so-called red hair and delicate skins are the ones most prone to suffer from this disfigurement; nevertheless I have frequently seen mulattoes of both sexes whose faces were literally covered with freckles. At the same time I have observed that the proneness to freckles in the offspring seems to increase in proportion as the white race preponderates in the ancestry of the hybrid. Some families seem more liable to freckle than others, although the exposure to sun, moisture, sea air, etc., may have been the same for all the cases. While it is true, therefore, that the chemically active rays of the sun are the most potent factor in producing this disfigurement, we must conclude that there are other factors whose nature is at present unknown to us. These factors are those responsible for freckles appearing on the least exposed portions of the body, as the buttocks, thighs, genital organs, etc., and for those appearing in people who are practically never exposed to inclemencies of weather.

Varieties.—To the practitioner, the most interesting form of freckle is the one that he is most liable to be called upon to treat, namely, the variety termed lentigo æstivale, or summer freckle. This is the eruption that appears on the faces of city-bred women and children of fair, tender skin, during the summer months, while temporarily residing at the seashore or in the country. Happily, this is the form that is most liable to yield to treatment, and it also has a tendency to disappear spontaneously during the winter months.

The other kind, which we may call true lentigo, is far more difficult to deal with. It may be a racial or family characteristic. This variety appears about the seventh year, persists throughout young adult life, and begins to fade about the thirtieth year. Another variety, one that has a tendency to appear in old age, may be regarded as one of the manifestations of senile atrophy of the skin.

SYMPTOMS.—The eruption of freckles is not accompanied by any subjective or objective symptoms other than the appearance of the lesions. The various symptoms recorded by certain writers as observed in a few cases are in my opinion to be regarded as mere coincidences.

DIAGNOSIS of lentigo is easy, if the situation and shape of the lesions and the history of the case are borne in mind.

PROGNOSIS.—As to the summer variety this is very good, for the lesions tend to fade away during the winter, but they will reappear as soon as the patient is again subjected to the original cause that produced them.

TREATMENT.—From the above it will be seen that the treatment of this trouble is sometimes very satisfactory, while again it may be quite the reverse. Almost all treatment is directed, or has been directed thus far, to a destruction of the epithelium. Among the means directed to this end may be mentioned lotions and salves containing corrosive sublimate or oil of cade; the application of pure carbolic acid to each individual freckle, and electrolysis. Unna employs with good results preparations containing hydrogen peroxide and oxychloride of bismuth. As a prophylactic measure women should wear heavy red or light brown veils while at the seashore.

N. J. Ponce de Léon.