and they believe that these objects are relics of the Leichardt expedition, which nearly half a century ago was swallowed up in the desert, and to this day nothing has been heard of its fate.

REMARKS ON RHUS TOXICODENDRON.

By LOUIS F. FRANK, M.D.

ABOUT two months ago my attention was drawn to an article written by Mr. Bernhard Ziehn, the well-known musician of Chicago, likewise an authority on botany, in which the earnest consideration of the city authorities was called to the fact of the existence and flourishing of the *Rhus toxicodendron* in the various parks of Chicago, advocating radical measures against the alarming condition.

In Lincoln Park, in the neighborhood of populated streets, Mr. Ziehn localized seven wild ivy plants, one of them with at least twenty roots encircling an oak tree, thirty feet in height, sending its shoots to the very top of the tree. In Washington Park, near its northern entrance, he found a tree, twelve feet in height, loaded with the poisonous fruit, and a shrub with a trunk the size of an arm. A similar condition of affairs was discovered in the Jefferson, Union, Garfield and Douglass Parks of Chicago, and in all places north of Chicago toward Evanston. The agricultural department at Washington, learning of the efforts of Mr. Ziehn, requested him to continue the same and keep it informed as to the progress made. Moreover, as Mr. Ziehn during a visit to Milwaukee discovered the plant in "The Ravine" and other places in Lake Park, he asked my co-operation in the matter, which I, convinced of the importance of the subject, decided to bring before the profession. Not a year has passed but I have been called upon to treat a number of cases of dermatitis caused by one or other variety of the *Rhus* species, and no doubt it has been not an unfrequent occurrence in the experience of the general practitioner.

Dr. White, of Boston, in a review of three hundred and sixty cases of dermatitis treated in his clinic during the past two years, has found thirty, or nearly ten per cent. of them, to have been caused by the so-called wild ivy.

It is well known that the vegetable kingdom furnishes many substances which, when in contact with the skin, occasion irritation and more or less severe inflammation. According to the virulence or concentration of the poison and the susceptibility of the skin, the lesion will be erythematous, vesicular, pustular, or bullous in character. Among these plants may be mentioned nettle, mezereum, arnica, common parsnip, witch hazel, hop, horn beam, and, above all, the species *Rhus toxicodendron* and *Rhus venenata*, a genus of the common sumac. The former, *Rhus toxicodendron*, by earlier botanists and more properly called *Rhus radicans* (Fig. 1), is a vine of very common occurrence, running over stone fences and along the borders of woods, in ravines or climbing on to trees to a considerable height and attaching itself to these surfaces by lateral rootlets. It is popularly known as poison ivy, poison vine, poison oak, mercury, and is found abundantly throughout the United States east of the Great Plains, and in the arid regions of the West, with the exception of California. It is generally a climbing vine, but if no support is at hand, it either trails along the ground or sends up short vertical shoots. With the exception of one near Western relative, which is almost as poisonous, there are no other plants which resemble it closely, excepting the non-poisonous box elder, and this only in its seedling stage. The Virginia creeper, also non-poisonous, is sometimes mistaken for

FIG. 1.—POISON IVY (*RHUS RADICANS*).

the poison ivy, but is easily distinguished by its having five instead of three leaflets.

The second variety, *Rhus vernix*, or poison sumac (Fig. 2), also commonly known as poison dogwood, poison ash and poison elder, is found growing in swamps from Florida to Canada and westward to the Mississippi Valley. It is a shrub or small tree, six to eighteen feet in height, with long pinnate leaves, having from seven to thirteen smoothly polished leaflets.

The third variety, of near resemblance to the first named *Rhus radicans*, is known as *Rhus diversiloba*, or poison oak (Fig. 3), and is found only throughout the Pacific coast from Lower California to Canada and northward. The leaves differ in size as well as in shape from those of the poison ivy.

The first and second varieties, therefore, *Rhus radicans* or *toxicodendron* and *Rhus vernix*, are of special

interest to us, as the same are indigenous to Wisconsin.

It has generally been accepted up to to-day that the poisonous irritant in the various species of the *Rhus* family was due to an active principle, consisting in a volatile acid, called toxicodendric acid. This was found in 1865 by John M. Maisch, of Philadelphia, and is to-day regarded in the United States Dispensatory as the active principle of *Rhus*. During the last three years, however, Dr. Franz Pfaff, of the pharmacological laboratory of the Harvard Medical School, has made a series of very interesting analyses and experiments, which not only criticize the imperfect manner and non-scientific results of Maisch's investigations, but also seem to prove that the principle is not a volatile acid, as thus far recognized, but consists of an oil, for which Pfaff proposes the name toxicodendrol. This poisonous oil has been found in all parts of the plant—in the stems, branches, roots, leaves and fruit

FIG. 2.—POISON SUMAC (*RHUS VERNIX*).

—its amount, however, varying, the fruit containing 3.6 per cent., the leaves 3.3 per cent. and the stems and branches only 1.6 per cent. The oil is easily soluble in alcohol, ether, benzol, chloroform, etc., but is insoluble in water. The effect of the isolated oil upon the human skin is described in the second number, 1897, of *The Journal of Experimental Medicine*, the experiments producing a clear, clinical picture of a dermatitis venenata.

I communicated with Dr. Pfaff, and he kindly forwarded to me a specimen of the toxicodendrol in its crude state, which was extracted from a fresh lot of *Rhus venenata* and had not yet been tested. He informs me that the pure oil is of a pale yellow color, exceedingly poisonous—to such an extent that the smallest quantity of the oil, unable to be detected by the unaided eye, would cause all the characteristic lesions of wild ivy poisoning. It seems to me that the specimen sent to me is incapable of producing a dermatitis, as I have applied it thoroughly on my arm on two different occasions, likewise on the forearm of my druggist, without inflammatory result. Possibly neither of us is susceptible to the poison, and further experiments are necessary to prove its efficiency. However, the free purified toxicodendrol has in Dr. Pfaff's hands never failed to produce an irritant action.

The active principle, according to Dr. Pfaff, being a non-volatile substance, the question arises as to the commonly accepted idea that poisoning may occur without actual contact with the poisonous plants. Pfaff disputes this view, believing that actual contact with the poisonous oil is essential to produce the skin lesions, rendered extremely easy by the great activity of the poison and the latent period of development. None of the hundreds of persons that passed through his laboratory during the time that these plants were handled were poisoned unless they came into actual contact with the plant or the free oil. Nevertheless, the popular opinion prevails that the actual touching of the plant is not necessary to produce the eruptions; that the emanations at night time are particularly dangerous; and it has been maintained that persons may be poisoned by the exhalations into the room while the wood is burning in the fire.

I have read of several reports of cases in which the poisoning was produced by a peculiar Japanese lacquer, made from the *Rhus vernicifera*, not only in those actually engaged in lacquer work, but in those who live or sleep in rooms in which fresh lacquered goods are drying. Especially children, after a night's rest in a room in which a newly purchased chest of drawers has been placed, exhibit symptoms of poisoning the next morning.

The question is still an open one, and scientific experiments must be resorted to in order to decide it satisfactorily. Personally, I am inclined to believe that a great many of the above cited cases are of the "hearsay" order and cannot be accepted as undoubted evidence. The poison of *Rhus toxicodendron* may be communicated by direct contact with parts of the plant, or indirectly from one person affected to the other. The former method includes the great majority of all cases. The following two cases may illustrate the manner in which one person may communicate the poison to another.

The first is described in an article written by Dr. White,* reporting a fatal result in consequence of the poison. "A servant boy, being insusceptible to ivy poisoning, had been employed in pulling up all the vines of that plant found growing in the grounds about the house. When his task was finished, he was made to wash his hands thoroughly with hot water and soap and afterward with vinegar. In the afternoon he was allowed to take the six year old child of the family to a pond for a bath. Having stripped the child, he im-

mersed him, holding him with his hands under the armpits, and afterward rubbed his back with his open palm. After three days deep ulcers formed under the armpits and every part touched by the hands showed the characteristic marks of wild ivy poisoning."

Another case, reported by Dr. Cantrell,* shows how the poison was conveyed to the umbilical region of a female patient of the Philadelphia Hospital, a vesicular and bullous eruption having a radius of five inches, oedematous and covered with a yellowish brown discharge, appearing three days after confinement. Upon inquiry it was learned that on the day of birth the attending nurse, taking a stroll through an adjacent cemetery, had gathered some leaves, bringing a number back with her. The ivy poison was in all probability conveyed to the patient during the time of dressing, although the hands of the nurse had been previously washed several times with soap and water. Her hands at that time showing no signs of infection, became affected two days later, at about the same time the eruption appeared on the abdomen of the patient.

A third case is mentioned by Dr. Busey,† in which a family, consisting of both parents and an infant, was affected at the same time, the mother having a severe attack quite general over the whole body, the husband a similar eruption on both hands and the infant a slight one about the mouth and chin. A week previous to the appearance of the eruption the husband and wife had passed an afternoon at a picnic and he had fastened his horse to a bush covered with a vine, the character of which he had not observed. The wife did not approach the plant and the child had been left at home.

Dr. J. B. Walker‡ reports the fourth case I have found in the literature of poisoning by indirect contact. "A lady spent the night with her sister, whose husband was obliged to be absent on business. The husband had been poisoned about the head and neck with ivy a few days before leaving home. The pillow case on which he slept was not changed, and his sister-in-law, using it, became poisoned about the face and neck in consequence thereof."

The disease usually begins on the hands, the inner surfaces of the digits being first affected, whence it spreads on the dorsal and later on the palmar surfaces. From the hands it is usually communicated to the face and the genitalia, and may from there come in contact with the entire body. The eruption generally appears in an erythematous form, accompanied by vesicles, pustules and even abscesses, and it is attended with more or less oedema, swelling, heat and itching. The serous infiltration may be so great as to occasion great disfigurement, especially of the hands, arms and genitalia. The vesicles are usually small and often develop into pustules, which may rupture, the discharge drying into yellowish crusts.

The remedies that have been recommended for the treatment of *Rhus* poisoning are almost as numerous as those for eczema. Among the domestic remedies vinegar and solutions of saleratus and carbonate of sodium are widely and highly esteemed. I noticed a glowing account of the efficiency and virtue of buttermilk and pounded crabs in Japan as a remedial agent. Among the medicinal remedies the following have been advocated: Astringent lotion of acetate of lead, sulphate of zinc, alkaline solution of lime water, ammonia and hyposulphite of sodium, decoctions of white and black oak bark, Virginia snake root, chestnut leaves, solutions of the fluid extract of *grindelia robusta*, calomel (black wash) and sublimate, emulsion of bromine, dusting powders and an array of ointments.

The use of dusting powders, oxide of zinc, starch, magnesia, talcum, etc., I cannot recommend as practicable. Certainly, they produce a rapid cessation of the serous discharge and a drying up of the same, but mingled with the pathological and normal secretions of the skin a layer of putrefying, decomposing crusts is

FIG. 3.—POISON OAK (*RHUS DIVERSILOBA*).

formed, which tends to increase the inflammation. The same may be said of applications of ointment or plasters, as fats in the acute stages of a dermatitis are often not well borne; ointments of lead are especially bad, whereas Lassar's salicylic paste rarely is found to irritate the lesion. The treatment of any toxic dermatitis must be carried out on the same basis as that of eczema in its acute or subacute state, and the essential principle which ought to guide us in its successful treatment is antiseptic and aseptis. We know that a local infection has taken place; the poison has been absorbed by the skin, causing a pathological lesion, which is attended

* Medical News, 1891.

† American Journal of the Medical Sciences, vol. xvii.

‡ Medical News, 1891.

* New York Medical Journal, 1878.

by inflammation and its sequelæ—exudations, crusts and scales. These disease products are usually still more contaminated by external irritants, as salves, oils and infected dressings. Plainly there seems but one thing to do: to follow out the principles of modern surgery, viz., to remove all products of infection and render the diseased part aseptic, and naturally the first indication is a cleansing bath with soap and water. And, strange as it may seem, what has been imperative in surgery has hitherto been but reluctantly followed in dermatology, the statement of Pindar, "Water is truly the best," being ignored. It is a popular notion, for instance, that infants affected with intertrigo and its sequelæ, dermatitis and eczema, must be prohibited from bathing, and strangely enough this view is shared and supported by many physicians. It is hard to believe that any one can sanction the presence of effete material consisting of the products of the perspiratory and sudoriparous glands, in the process of decomposition, to remain and act as inflammatory irritants. Basing on this simple and rational theoretical view, I have treated in the above manner all cases of dermatitis incited by external irritants, with far better success than by my former methods following the routine treatment. The bath is followed by applications of soothing antiseptic emulsions containing calamine, glycerin, and lime water, and so forth.

Having concluded the clinical aspect of the subject, it remains for me to speak of the importance of the prophylactic and legal measures to be taken in order to counteract and eradicate the harmful disease-producing plant. Although the name wild ivy is familiar to almost everyone, the plant is so little recognized, as a rule, that contagion takes place when it might be easily avoided if the plant were better known. In this connection also I wish to mention the necessity of knowing and recognizing all poisonous plants indigenous to our soil, such as the datura stramonium, hyoscyamus, digitalis, lobelia, solanum nigrum, conium, aconite, hellebore, ricinus, clematis, colchicum, the buttercup, water hemlock, daffodil, narcissus and varieties of fungi.

This important knowledge should be imparted in our schools, and I well remember seeing during my stay in Germany charts in the schoolroom, illustrating in color the various poisonous plants of that section of the country, in order to familiarize the children with their characteristic appearances. Furthermore, the teachers would accompany their classes into the woods and meadows, calling their attention to the species and properties of plants by intuitive instruction.

The number of deaths which occur every year from incautious eating of poisonous plants, as described in a report of the agricultural department, is very large. The victims are usually children, who pluck and eat all sorts of attractive looking berries and other parts of plants. A special commission was appointed about three years ago by the bureau of agriculture to investigate poisonous plants and enlighten the public as to their danger.

According to a government report on health, 1884, a peculiar disease in children, characterized by extreme weakness, vomiting, fall in bodily temperature, dry tongue and constipation, is said to be prevalent in some Western States, which is supposed to be produced by cows affected with the "trembles," caused by feeding on wild ivy.

In my efforts of investigating this subject as to its legal aspect I was very kindly assisted by Dr. U. O. B. Wingate, secretary of the Wisconsin State board of health, and I take this occasion to thank him for the interest he has shown. There exists at present in this State a law amended at the last session of the legislature, known as chapter 82, 1897, pertaining to noxious weeds, not, however, naming the Rhus plant in particular. Dr. Wingate, in order to ascertain whether such law would include the plant in question, kindly furnished me with the opinion of the attorney-general as to the law on this point, viz.:

"Relative to the destruction of noxious weeds, it is my judgment that any person has the right to destroy the weeds designated as noxious, when found in public parks and other public places.

"The law provides that the persons in control of lands shall be given notice of the presence thereon of noxious weeds, and they must be destroyed within a certain specified time thereafter, or the persons so notified shall be subject to penalty.

"Notwithstanding this provision, it seems to me that the poisonous weeds which may be found and whose presence may be a menace to public health, as indicated by your letter, may be destroyed by any person, for the reason that they would be deemed by law to be public nuisances, and as such subject to immediate abatement by any person knowing their character. The reason for the destruction of these by persons having knowledge of their character is to prevent the destruction of vegetation which is not noxious in its character, and those who destroy noxious weeds must be careful and not injure surrounding vegetation, for by so doing they would render themselves liable.

"It certainly is within the province of a board of health forthwith to destroy, or order destroyed, such weeds as may be dangerous to the public health, and this right it has in its general right to take such measures and use such precautions as may be necessary to protect the health of the people."

The information above given makes any commentary unnecessary and clearly places all right of jurisdiction in the hands of the authorities on health. Active measures taken in this respect and a publication of such facts cannot fail to be of invaluable service to the many thousand persons who are brought into almost daily contact with the plants, and cannot be too highly recommended and demanded.—Medical Record.

The growth of the New Zealand frozen meat trade to Great Britain is strikingly shown in the official statistics for the six months ended December 31 last. In the half year ended June 30, the total shipments were 43,593,102 pounds of mutton and 2,129,140 pounds of beef; but for the last half year the totals were 60,030,521 pounds of mutton and 6,111,184 pounds of beef. The sixteen principal refrigerating stores within the metropolitan area are capable of holding 1,114,000 carcasses of sheep, and those in the provinces, of which Liverpool, Glasgow, Manchester, Bristol and Hull are the most important, have a capacity equal to 975,000 carcasses, while the stores in course of erection will provide for an additional 435,000 carcasses.

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