

not rarely in the larger veins in the neighborhood of tuberculous lymph glands, etc. In the latter case the



FIG. 5018.—a, Tuberculous lymph gland with giant cells and caseous foci—large blood-vessels at the periphery; b, veins whose walls are thickened by tuberculous granulation tissue, the inner layers of which show caseation; c, fat tissue. $\times 28$. (Ziegler.)

infection of the vein wall takes place through direct extension or through the lymphatics. In rare cases primary tuberculosis of the intima of veins may take place through the presence of tubercle bacilli in the circulation. Involvement of the veins from neighboring tuberculous processes is much more frequent in the case of the veins than of the arteries, and is one of the most common modes of dissemination of disease throughout the body. Tuberculosis of the veins presents no individual clinical picture, the symptoms being covered up by those of the primary infection. In miliary tuberculosis of hæmatogenous origin the veins throughout the body show numerous miliary tubercles in their walls, both in the intima and in the media, appearing as small gray or yellow nodules projecting into the lumen of the vessel. The earliest stages of these may appear as small collections of leucocytes or as agglutination thrombi resting upon the intima. Epithelioid proliferation of the cells of the intima occurs later, and finally typical tubercles are formed. In the case of extension from neighboring tuberculous foci the veins come to present the picture of a caseating tuberculous phlebitis.

SYPHILIS.—The most frequent changes in the veins ascribed to syphilis are of the nature of an obliterating endophlebitis or a chronic periphlebitis. The small veins of the meninges, brain, liver, and other internal organs are most often affected. In the neighborhood of the affected veins there is usually found a gumma or focus of induration. In the great veins, and particularly in the subcutaneous veins, symptoms of an acute phlebitis occur frequently in the early stages of syphilis, as shown by swelling, redness, and tenderness corresponding to the course of the affected vessel. In the later stages gummatous infiltrations of the vein walls and the neighboring tissues also take place. The proliferation and formation of granulation tissue may begin in the intima, media, or adventitia. Thrombosis may be associated with any of these processes. Sclerotic changes, calcification, and fatty change may follow. The portal vein may show marked changes of this character. Chiari has described a proliferating endophlebitis of the hepatic veins which he regarded as of syphilitic origin. Similar changes have also been found in the veins of the intes-

tinal wall and mesentery associated with multiple strictures of syphilitic nature. In congenital syphilis the veins of the umbilical cord may show a thickening of the intima, due to a cellular proliferation or new formation of connective tissue. A periphlebitis syphilitica neonatorum has also been described. With the exception of the typical gummata which occur but rarely in the vein walls, the venous changes ascribed to syphilis present no distinctive characteristics, and the syphilitic origin in the majority of cases can be regarded as only probable.

ACTINOMYCOSIS.—The veins in the neighborhood of actinomycotic foci are frequently involved in the process, the resulting changes being of the nature of a chronic purulent phlebitis. Rupture of the focus through the intima may lead to a metastasis of the infection.

LEPROSY.—In lepra nodosa and anaesthetica the veins are frequently affected, presenting nodular thickenings. Microscopically the media and adventitia are infiltrated with round cells, the intima is thickened and hyaline, and the vasa

vasorum are thickened. layers. The process is bacillary invasion phlebitis.

PARASITES.—Echinococcus cysts of the liver not infrequently break into the hepatic vein and give rise to metastases in the right heart and lungs. The cysticercus, filaria sanguinis hominis, and distoma hæmatobium are also found in the veins.

FOREIGN BODIES.—Under very rare conditions foreign bodies which have entered the veins may be found attached to the wall of the vessel. One case is reported of the finding of a small pistol bullet in the internal jugular.

NEW GROWTHS.—Hæmangiomas, angiosarcomata, and endotheliomas may be primary in veins, particularly the smallest veins. Primary myomas of veins have also been described. Many of the cases reported as primary tumors

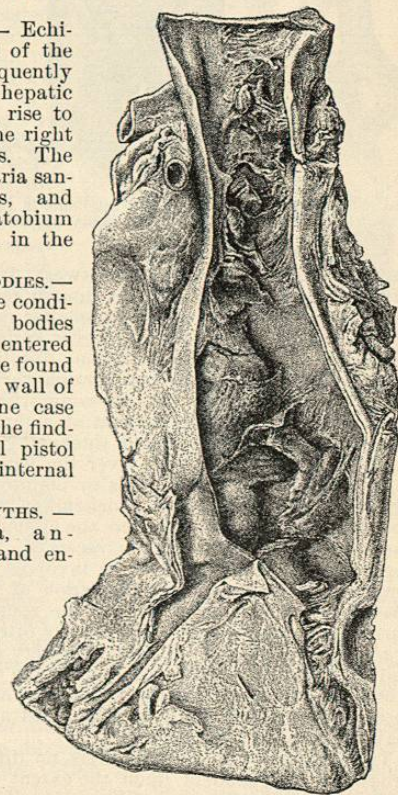


FIG. 5019.—Changes in Inferior Vena Cava due to syphilis. (After Schrötter.)

of veins are of doubtful nature, it being very probable that the vein walls were secondarily involved. In so far as the metastasis of tumors is concerned, the veins play a much more important part than the arteries. The secondary involvement of veins by primary carcinoma and sarcoma of other organs and tissues is of very common occurrence. In the extension of the tumor into the vessel wall rupture of the tumor cells into the lumen is prevented for a long time by the endothelium, which is apparently very resistant to the advancing tumor cells. Large nodules may project into the lumen of the vein, but on microscopical examination the endothelium will be found intact over the growth. Carcinomata break through the walls of large veins more rarely than do sarcomata, because of the plastic influence which the carcinoma cells exert upon the connective-tissue cells of the vessel wall. As the carcinoma cells approach the vein wall the cells of the latter undergo proliferation, and a layer of new tissue is formed between the vein and the tumor. In the case of sarcoma there is but little plastic influence exerted upon the vessel wall, the cells of the tumor being genetically related to those of the vein wall.

In the case of primary malignant tumors of the adrenals, kidneys, testis, etc., large tumor masses not infrequently grow into the veins and may extend into the vena cava. Portions of these may break loose and lodge in the heart or pulmonary arteries. Free tumor emboli may occasionally be found in the right ventricle. Secondary carcinomata of the liver frequently break into the hepatic veins and give rise to metastases in the lungs. In the case of tricuspid insufficiency or violent spasmodic coughing a retrograde transportation of tumor cells may take place (retrograde metastasis). In very vascular tumors the veins are often markedly ectatic.

Aldred Scott Warthin.

VENESECTION. See *Blood-letting*.

VENOM. See *Poisonous Reptiles*, and *Toxins*, etc.

VENTILATION. See *Air*, and *House Sanitation*.

VENTNOR, ISLE OF WIGHT.—The Isle of Wight possesses certain favorable climatic features, both on ac-

count of its geographical position off the south coast of England, and also on account of its peculiar geological formation. It is at Ventnor, however, on the south side of the island, that the conditions are the most favorable for a winter resort, and Ventnor rivals Bournemouth in its reputation for the climatic treatment of pulmonary tuberculosis, both resorts having a royal national hospital or sanatorium for cases of consumption.

In general, the climate of the Isle of Wight is a marine, moist, mild one, cool in summer and mild in winter, with the prevailing winds from the southwest, *i.e.*, from the ocean. At every season of the year one can obtain here a mild tonic sea air.

In the southern portion of the island a great range of chalk downs stretches from east to west, and in the southeastern portion these downs form high, precipitous cliffs constituting the coast line, broken here and there by "chines" or deep indentations. Between the sea and these high cliffs is a narrow strip of coast-land, called the "Undercliff," consisting of irregular terraces of chalk and sandstone, the results of landslips from the cliffs above. This undercliff is from 100 to 150 feet above sea level, and extends for a distance of about six or seven miles. The aspect of the undercliff is, in general, due south. In the rear, to the north, rise the cliffs, the precipitous face of the downs, which are from 400 to 800 feet high, thus affording complete protection from the northerly winds.

Upon the undercliff, and upon a series of rocky terraces formed by the landslips, Ventnor is built, a town of about 6,000 inhabitants, stretching from the beach up the cliff to a height of nearly 500 feet; consequently the streets are very steep, and among the picturesque features of the place are this precipitous steepness and the arrangement of the streets one above another. Indeed, there are but few level stretches, and those are down by the sea.

The soil consists of soft sandstone and chalk, and is fairly absorbent and dry, but it forms readily, in dry weather, a light irritating dust. The vegetation of the undercliff is exceedingly luxuriant and varied, a proof of the mildness of the climate and the protected situation. Spring opens early, and many plants and shrubs blossom



FIG. 5020.—View of Ventnor, Looking Westward.

throughout the winter. "Next to its picturesque situation, the most striking feature of Ventnor is the sea—a great brilliant mirror, reflecting, in fine weather, the light and heat of the sun against the cliff and town" (J. Mitchell Bruce, M.D., "Climates and Baths of Great Britain," 1895). There is a sandy beach affording good bathing, and there are also an esplanade and a pier. Ventnor is well drained by an efficient sewerage system, and is supplied with pure water, though hard from the influence of the chalk. The town is healthy, the death rate being 17.6.

The accompanying chart indicates the various climatic characteristics. In the first place, one observes the great equability of the temperature, not only in the yearly but in the daily range, and the absence of extremes of heat or cold.

CLIMATE OF VENTNOR, ISLE OF WIGHT. LAT. 50° 45' N., LONG. 1° 20' W.

	Jan.	Feb.	March.	May.	July.	Sept.	Nov.	Year.
Temperature (Degrees Fahr.)—								
Average or normal....	41.6°	41.9°	43.1°	53.3°	61.2°	59.1°	47.8°	50.8°
Mean of warmest.....	45.7	46.1	48.6	59.6	67.0	64.6	51.9	56.1
Mean of coldest.....	37.4	37.7	37.6	47.1	55.3	53.7	43.7	45.5
Mean daily range....	8.3	8.4	11.0	12.5	11.7	10.9	8.2	10.6
Humidity.—								
Av. mean relative....	88%	86%	81%	77%	79%	80%	85%	81%
Precipitation.—								
Average in inches....	2.60	2.0	1.78	1.83	2.41	2.58	3.48	28.13
Weather.—								
Amount of sunshine in hours.....	53.0	76.0	126	200	199	175	51	1638
Mean cloud 9 A.M.....	6.8	6.6	5.9	5.5	6.1	5.8	6.7	6.1
Days rain fell.....	16.0	13.0	13	12	14	13	18	164
Wind (Prevailing Direction).....								
Westerly and south-westerly. (Number of days).....	48		57		73			44
Easterly and south-easterly. (Number of days).....	42		35		15			47

The relative humidity is high, as would be expected on the seashore. The rainfall indicates a fairly wet climate, the autumn and winter being the wettest seasons. The winds are strong, and southwesterly gales are prevalent. As the prevailing wind comes from the southwest, it blows mild in winter and cool in summer. Easterly winds are, however, not infrequent, particularly in the late winter and early spring, and are "severe and trying." For England the amount of sunshine is large.

From what has been said above it will be seen that Ventnor possesses many qualities of a valuable health resort. Its situation, its well-drained soil, the mildness of its climate, the influence of the ocean, its excellent sanitary condition, and the opportunities for outdoor exercise, all combine to make it such. The existence of a large consumptive hospital here indicates the usefulness of this resort in the treatment of this disease, and the results which have been obtained are fairly favorable. The place is also recommended for convalescents from acute diseases and operations, for weakly scrofulous children, for persons with laryngeal and bronchial affections, hepatic and renal diseases, for the delicate and aged, for those suffering from atonic and nervous dyspepsia, and for those debilitated from any cause. Those suffering from heart disease will find little opportunity for exercise suited to them on account of the steepness of the streets.

Finally, Ventnor, which has been called "the English Madeira," is a most fascinating seaside resort in summer for the healthy, as the writer can testify to from personal experience. Besides the charm of Ventnor itself, with its wealth of vegetation and the beauty of its ocean view, there are innumerable excursions replete with interest all

over the island; the roads are excellent, and the means of conveyance good and cheap. Ventnor is easily and quickly reached from London by way of Portsmouth, thence by a short steamer journey across the Solent, and again by rail from Ryde. The accommodations are of great variety and excellent. *Edward O. Otis.*

VERATRINE.—(*Veratrina*, U. S., B. P.; *Veratrinum* P. G.) A mixture of alkaloids obtained from the seed of *Asagrea officinalis* (Sch. et Ch.) Lindley (fam. *Liliaceae*).

The bulbous perennial named above, native of Mexico and Central America, was long considered a species of *Veratrum*, whence the alkaloids derived their name. The seeds, which are official in some pharmacopœias, and were formerly so in ours, are called *sabadilla* or, more correctly, *cevadilla* seeds, and are narrowly fusiform, with a flattened membranous top about 1 cm. or less ($\frac{1}{2}$ in.) in length; dark, shining, brown, wrinkled. When powdered, the dust excites violent sneezing. Taste bitter and acrid.

The seeds contain upward of four per cent. of alkaloid, isolated and named *veratrine* by Meissner in 1818, under the supposition that it was a pure alkaloid. It is now known to consist chiefly of two alkaloids, for one of which the name veratrine has been retained, the other being called *veratroidine*. Several others are supposed to be present, but have not been studied.

The mixed alkaloid is thus described by the Pharmacopœia.

A white or grayish-white, amorphous or semi-crystalline powder, odorless, but causing intense irritation and sneezing when even a minute quantity reaches the nasal mucous membrane; having an acrid taste, and leaving a sensation of tingling and numbness on the tongue; permanent in the air.

Very slightly soluble in cold or hot water; soluble in 3 parts of alcohol at 15° C. (59° F.), and very soluble in boiling alcohol; also soluble in 6 parts of ether, and in 2 parts of chloroform.

When heated to 175° C. (347° F.) veratrine melts, forming a light brown liquid. Upon ignition it is consumed, leaving no residue.

An alcoholic solution of veratrine has an alkaline reaction upon litmus paper.

With nitric acid, veratrine forms a yellow solution.

On triturating veratrine with concentrated sulphuric acid, in a glass mortar, the yellow or orange-red solution exhibits, by reflected light, a greenish fluorescence, which becomes more intense upon the addition of more acid, while the liquid is deep red by transmitted light.

On heating a small portion of veratrine with a few cubic centimetres of hydrochloric acid, the liquid will acquire a deep red color.

The isolated and purified veratrine proper ($C_{22}H_{49}NO_9 + H_2O$) occurs in white crystals, melting at 205° C. and soluble in alcohol and ether. Veratridine is an isomer of veratrine, but is not crystalline.

Veratrine is a most poisonous substance, producing violent vomiting and catharsis, followed by intense cardiac depression and acute gastro-enteritis. In ointments, unless very much diluted, it is also irritating, and not free from the danger of being absorbed. In minute doses it is occasionally given (0.0015 to 0.003 = gr. $\frac{1}{60}$ to gr. $\frac{1}{20}$) for chronic rheumatism, neuralgia, etc., but is becoming obsolete. Externally, as liniment, ointment, or oleate, it is more frequently, yet still rarely, in this country, used for the same purposes. Most of all, however, it is employed in the above forms for pediculosis, both in man and in animals, for which purpose it is very efficient; yet it is not so safe, and no more certain, than washing the affected surface with kerosene, or a weak ($\frac{1}{30}$ to $\frac{1}{50}$) solution of corrosive sublimate.

ADMINISTRATION.—The Pharmacopœia authorizes two convenient preparations: the oleate (*Oleatum Veratrinae*), which is a two-per-cent. solution in oleic acid, and an ointment (*Unguentum Veratrinae*) consisting of 4 parts of veratrine, 90 of benzoinated lard, and 6 of olive oil.

Henry H. Rusby.

VERATROL, dimethyl-pyrocatechin, $C_6H_4(OCH_3)_2$, is a clear mobile liquid soluble in alcohol, ether, and the fatty oils. It closely resembles guaiacol (methyl-pyrocatechin), but is more irritating, so that its use is chiefly confined to external application. It has been applied with good results in intercostal neuralgia and epididymitis. Diluted with olive oil it is recommended as an abdominal application in tuberculous peritonitis. *W. A. Bastedo.*

VERATRUM. See *Hellebore*.

VERONAL, diethyl-malonyl-urea, $C(C_2H_5)_2.CO-(CONH)_2$, is a white crystalline powder of faintly bitterish taste, and soluble in 145 parts of cold water and 12 of boiling water.

The hypnotic action of various compounds, such as amylene hydrate and trional, is largely due to the presence of ethyl, so Fischer and von Mering, by the introduction of ethyl groups into various substances, have sought to produce a series of new hypnotics. Of this series the most valuable addition to our sleep-producing armamentarium is veronal. As a pure hypnotic this drug resembles trional, but seems to have greater power. Berent found that even when given in the day-time to walking patients it induced drowsiness and sometimes sleep. Würth treated eighty-four cases of insanity with twenty-one hundred doses averaging 0.5 gm. (gr. viij.) three times a day, and found the drug distinctly sedative in motor and maniacal excitement. Rosenfeld was successful in inducing sleep in hysterical and other nervous patients after bromides, chloral, trional, and warm baths had failed. Tolerance is not readily established, and after the first few nights the dose may be reduced by half. Most clinicians advise not to exceed 1 gm. (gr. xv.) at a dose, but in chronic alcoholism, delirium tremens, dementia, and acute febrile diseases, more has been found necessary. Berent used as much as 3.5 gm. (gr. liij.) without unpleasant after-effects other than heaviness and vertigo. Yet there are numerous reports of heaviness, drowsiness, headache, dizziness, and staggering gait after doses exceeding 1 gm. (gr. xv.). The last-named writer considered 1 gm. (gr. xv.) of veronal the equal of 0.015 gm. (gr. $\frac{1}{60}$) of morphine as a pure hypnotic. Where there is localized pain the drug has no effect. No noteworthy influence is exerted on digestion, respiration, the heart, or the kidneys. A few cases of skin eruption after prolonged use are reported.

Veronal, then, is a sedative to the nervous system, producing after one-half to two hours a sleep resembling the natural. Patients are easily aroused, but soon fall asleep again; when aroused they are in full possession of their faculties. The dose is 0.5–1 gm. (gr. viij.–xv.) in hot milk or in capsule. Roberts Bartholow recommends the combination of gr. x. of veronal with gr. v. of trional. *W. A. Bastedo.*

VERMONT MINERAL SPRINGS.—Windham County, Vermont.
POST-OFFICE.—Newfane. Numerous summer hotels in vicinity.
ACCESS.—Via Brattleboro and Whitehall Railroad to Newfane; thence two and one-half miles northeast to springs.

These springs are located in the town of Brookline, fifteen miles north of Brattleboro. The situation is on Putney Heights, half a mile east of the West River and seven hundred feet above the surface. The scenery in the vicinity is very pleasing. The situation of the springs commands a view of parts of three States, and includes many points of great beauty and attractiveness. The carriage drives are numerous and very pleasant. Visitors will find excellent accommodations in several summer hotels in the vicinity. The springs are two in number, but only one of them has been improved. This spring issues from a small crevice in an enormous ledge of rock. The water is always cold, but never freezes as it flows from the spring. The discharge is about thirty-

two gallons per hour. The company controlling the spring owns a large tract of land surrounding it, and is thus able to protect the water very thoroughly from surface pollution. It has been recently analyzed by Prof. S. P. Sharples, State Assayer of Massachusetts, with the following result:

One United States gallon contains (solids): Iron sulphate, gr. 1.01; calcium sulphate, gr. 0.64; magnesium sulphate, gr. 0.41; sodium sulphate, gr. 0.93; sodium chloride, gr. 0.05; silica, gr. 0.76. Total, 3.80 grains.

This cannot be termed a powerful mineral water, yet it contains iron in sufficient amount to give it useful properties as a ferruginous tonic. Abundant clinical experience goes to show that it has valuable reconstructive properties. It has been found useful in cases of anemia and debility, enfeebled digestion, and anorexia, and in functional disorders of the kidneys. Locally it is recommended for insect bites, erysipelas, conjunctivitis, etc. The water is shipped in pint- and quart-bottle cases. *James K. Crook.*

VERRUCA.—Verrucæ or warts are cutaneous excrescences which consist essentially of circumscribed hypertrophies of the papillary and epidermal layers of the skin. Their clinical characters are rather diverse. Thus, warts are congenital or acquired; they may appear upon any part of the body at any time of life; they are transitory or persistent, single or multiple; though usually small, they may attain a very considerable volume; in shape they may be rounded, flat, or acuminate, sessile, pedunculated, or filiform; their surface may be smooth, rugous, fissured, cauliflower-like; they are soft or corneous, moist or dry; in color they may present the normal hue of the skin or varying degrees of pigmentation.

The present classification of verruca is not satisfactory owing to the fact that our knowledge of essentially differentiating factors is insufficient. Based upon characters which are largely descriptive, a number of varieties are mentioned by authorities as: *verruca acuminata*, *acquisita*, *congenita*, *filiformis*, *glabra*, *perstans*, *caduca*, *senilis*, *digitata*, *dorsi*, *manus et pedis*, *vulgaris*, etc. Although these do not suggest a scientific division, a few of the terms enumerated may be used with advantage in the general consideration of the subject.

Verruca Vulgaris.—This is the type most commonly seen; hence the name. The lesions are hemp-seed- to split-pea-sized, single or multiple, discrete or in groups, rounded or slightly flattened, with a rugous surface which presents to the eye the appearance of numbers of closely set papillæ of variable prominence; these are capped with horny epithelium. The color ranges from skin-pink to a dirty grayish-black. The hands, fingers, and exposed parts are the favorite sites, and young people are far more commonly affected than adults.

Verruca Plana.—This variety is seen typically in the young (*verruca plana juvenilis*) as small, flat, slightly elevated lesions, of round or polygonal outline, and soft, smooth surface. They may be discrete or several may be merged to form more or less irregular plaques. The general appearance is not unlike that of lichen planus, though the color is more yellow than purple. The forehead, temples, cheeks, chin, and hands are the usual locations.

Verruca Senilis.—This form has been designated by some, erroneously, "verruca plana of the aged." It is sometimes seen upon the backs of individuals advanced in years. The lesions are somewhat irregular in outline, of low elevation, papillomatous, pigmented brown, and often covered with a slightly greasy scale. Verrucæ of this type have been called *seborrhæic warts*, and are prone to undergo cancerous degeneration. Similar verrucæ have been observed upon the hands of workers with the x-ray; in these also cancerous changes have been recorded.

Verruca Acuminata.—This type (venereal wart) occurs upon the genitalia and adjacent parts of individuals of both sexes; rarely it is seen elsewhere. Usually an irritant is present in the form of a venereal discharge. The

lesions appear as papillary growths, discrete or grouped to form a cauliflower-like mass. Depending somewhat upon pressure effects they are flat and sessile, or elongated and slender. Their usual location—about the corona glandis in the male, and the labia, introitus vaginae, and anal region in the female—favors the retention of moisture and the maceration of the lesions; the surface, therefore, is usually bright red, and covered with a secretion which is often very offensive; the practical absence of a cornified layer predisposes to slight hemorrhage, so that this secretion is frequently blood-tinged. These warts may appear in situations which are not moist, in which case there is no secretion, and the horny layer covering them becomes much thickened. *Verrucae acuminatae* are sometimes seen during the later months of pregnancy in women innocent of venereal history; they usually disappear after confinement.

ETIOLOGY.—The active causes of acquired *verrucae* are not definitely known. It is certain that warts are the result of the local action of irritants, but the essential elements in these irritating agents are not known; nor are the predisposing factors, which render one skin more susceptible than another, fully understood. A microbial origin is surmised for *verruca vulgaris* and *verruca acuminata*; the former is undoubtedly mildly contagious, certainly for adjacent skin, and probably for the skin of another; while the latter is well known to be auto-inoculable. *Verruca plana* is said by Jadassohn to produce its kind and therefore has a specific cause; this is confirmed by an eminent dermatologist who, in a personal communication to the writer, reports having observed an epidemic of *verruca plana* sweep through a family. The exciting cause of *verruca senilis* is not known, though the progressive degeneration in the skin undoubtedly serves as a predisposing factor. Of the lesions seen upon the hands of x-ray operators the cause is obvious.

PATHOLOGY.—Anatomically, *verrucae* consist essentially of an increased connective-tissue growth as a basis, to which is added an hypertrophy of the papillae and the rete mucosae. These changes are accompanied with an increase in the vascular supply. Often the hypertrophy of the papillae is more apparent than real, the result of the actual increase in the size of the rete pegs. In most *verrucae* the horny layer is hypertrophied, though the keratin transformation is not always complete. In *verruca acuminata* the horny layer is usually very thin, while the papillae and rete are greatly increased. In the senile wart columns of epithelioid cells are found within the papillary layer; and throughout all layers (excepting the corneous) a peculiar infiltration of fat is present.

DIAGNOSIS.—While the various forms of *verruca* are generally recognized without difficulty, it is well to keep in mind certain differentiations. *Lichen planus* has been confused with *verruca plana*; the former is less often seen upon the face, has a more empurpled color, is scaling and infiltrated, and itches, at times intensely. *Moluscum contagiosum* compared with *verruca vulgaris* is recognized by its minute punctum and its depressed centre. The lesions of *xanthoma* are distinctly yellow and would scarcely be mistaken for *verruca*. A distinction is also to be made between *verruca acuminata* of the sessile type and *syphilitic condyloma*; the latter is the papule of syphilis in moist locations, and as such is rarely papillomatous. *Verruca necrogenica* and *tuberculosis verrucosa cutis* may be recognized by their clinical course and by the histological examination of excised portions of the lesions.

TREATMENT.—The internal treatment of *verruca* is of doubtful efficacy. Crocker thinks favorably of the use of magnesium sulphate in small doses, and of dilute nitrohydrochloric acid. Arsenic, so frequently used in skin diseases, is rightly credited with good results in certain varieties, especially *verruca plana*.

The local treatment contemplates the removal of the lesions by curettage, electrolysis, cauterization, or by the application of substances designed to soften or to stimulate the skin. In many instances the use of the curette is most satisfactory; the scraping does not cause

severe pain and the bleeding is usually slight; it is often advantageous to cauterize the oozing base with the silver nitrate crayon. In *verrucae* which are very vascular the curette must be used with caution.

The method of removal by electrolysis is especially adapted to pedunculated forms: the base is transfixed with a needle connected with the positive pole of a battery, and a current of one to two milliampères is passed for about one minute; this is repeated several times, the needle being inserted at different angles through the base. The obliteration of the vascular supply thus induced causes the wart to shrivel and eventually to fall.

Of caustics glacial acetic acid and the silver nitrate crayon are the best; the use of chromic acid, acid nitrate of mercury, or potassium hydroxide is not without danger owing to their powerful caustic action. For softening the horny epithelium preliminary to curetting salicylic acid may be used; it may be applied in a solution with alcohol and ether, or in a collodion mixture. The strength should be about ten per cent., and the application should be confined to the lesion proper.

Verruca plana may be favorably influenced by applications which produce desquamation. For this the following may be used with advantage, in full strength or slightly reduced with water: R Calcis vivæ, 15.00; sulphur. sublimat., 30.00; aquæ, 300.00. M. Boil down to 180 c.c. and filter. Sig.: Vleming's solution.

Verruca senilis yields readily to radiotherapy; comparatively few exposures are required, and the results are most excellent.

PROGNOSIS.—*Verrucae* are usually very amenable to treatment; in fact, many disappear spontaneously, which accounts for the multiplicity of vaunted remedies. Senile warts may develop into epitheliomata; these may be quickly removed by radiotherapy.

Ernest L. McEwer.

VERSION. See *Obstetric Operations*.

VERTIGO.—**DEFINITION.**—A condition characterized by loss of the sense of bodily equilibrium. It is accompanied by subjective dizziness, by partial or complete loss of power to stand erect and to walk in a straight line, and in severe cases by nausea and vomiting.

The sense of equilibrium should be ranked among the special senses. It is but indirectly dependent upon sight, hearing, and touch, and it has, we now believe, a special nerve organ, which is used for this purpose and no other. Any interference with the function of this organ causes vertigo, just as any interference with the eye causes blindness, or with the ear, deafness; in any case the degree of impaired function varying with the intensity of its cause.

The sense organ of equilibrium consists of: (1) a cortical centre or area, apparently located in the cerebellum, and communicating by connecting fibres with various nuclei in the medulla and pons; (2) a nerve trunk, which forms the inner root of the eighth cranial nerve (auditory), passes with it into the internal auditory meatus, and is distributed, under the name of vestibular branch, to the vestibule; (3) a peripheral end organ, consisting of the semicircular canals, the utricle and saccule. These structures contain the peripheral terminations of the nerve, which, generally speaking, consist of hair cells. Briefly, these hair cells are supposed to be acted upon by currents in the endolymph, the currents being caused by changes in position of the head. The three semicircular canals correspond to the three dimensions of space. For further particulars see the article on *Audition*, in Vol. I. of this HANDBOOK.

Symptomatic Vertigo.—In view of the extent and complicated anatomy of the organ, it is not surprising that its functions may be interfered with by many causes other than organic disease of its structure. Disease or injury of neighboring organs is of course particularly liable to cause such interference, and hence vertigo is a common symptom of ear disease. Equally, of course, is vertigo found in various diseases of the brain and spinal cord.

Anything which causes changes in the blood supply of the organ (anæmia, hyperæmia) may inhibit its normal action. Poisoning by certain drugs, or by bacterial toxins, or by auto-intoxications, such as constipation or gout, will do the same.

Of distant troubles causing vertigo, the most frequent are the various disturbances of digestion. In these cases the vertigo is usually slight and transient, and is relieved by measures which cure the indigestion. An acquaintance of the writer, a physician about forty years of age, has frequent attacks of vertigo whenever there is an accumulation of gas in his stomach or intestines. As his digestion is not strong, these attacks are troublesome. In his case the vertigo is severe, and he has even fallen to the floor under its influence. Getting rid of the gas, by mouth or rectum, gives him instant relief. It is probable that his trouble is due to disturbance of the circulation, consequent upon pressure of the distended bowel from below through the diaphragm, interfering with the heart's action. The prompt relief obtained by expulsion of the gas goes to disprove the presence of toxins.

Constipation vertigo, in its slighter forms, is common enough. It often occurs in conjunction with headache. The only effective treatment is the administration of a brisk cathartic.

Gouty vertigo is allied to constipation vertigo, and the distinction between the two conditions is not always clear. Vertigo is seldom seen in typical cases of acute gout. It comes more often in the irregular forms, with migraine, catarrh of the respiratory and digestive mucous membranes, and pain and stiffness in various joints and muscles. It is often severe, and may be the only symptom which calls the patient's attention to his condition. It is caused by uric acid and other waste products of half-burned albumin, which accumulate in the system and act as poisons, probably directly through the tissues. The diagnosis rests upon the presence of other symptoms of gout, upon the condition of the urine, and upon the absence of signs of disease of the internal ear.

Various disturbances of the circulatory system may cause vertigo. The trouble may lie in the blood, the heart, or the vessels. Of the blood diseases, pernicious anæmia is probably the one most frequently attended by vertigo, but it is also seen occasionally in chlorosis. It is probably caused by cerebral anæmia. It is not usually severe or important. The diagnosis depends upon other signs of anæmia, and the treatment is the treatment of the general disease. Certain cases of leukæmia and Hodgkin's disease exhibit vertigo as a symptom. It may be very severe, in which case it is accompanied by signs of severe general cerebral disturbance, and is due to leukæmic lymphadenomata in the skull (Friedreich).

Cardiac vertigo is seen in many forms of heart disease. It is a common and early symptom of fatty degeneration of the heart. It usually comes on in attacks, which vary in severity over a wide range. The vertigo may be very slight, attended with nausea or slight faintness, or it may be more severe, attended with actual syncope, followed by a period of unconsciousness, and resulting in paralysis, loss of memory or intellectual power, or even death. This form of vertigo is caused by cerebral anæmia, and the diagnosis rests upon the presence of other signs of fatty heart, plus the absence of signs of ear trouble. The exact diagnosis of fatty heart is always difficult and may be impossible, but the undoubted evidence of cardiac incompetency, the absence of signs of valvular trouble, and the typical nature of the vertiginous attack, will usually give a clew.

Vertigo also occurs in other forms of heart disease, especially in disease of the aortic valves, either stenosis or insufficiency. Here the giddiness is slight and more or less constant, being much the same in either condition of the valves. The cause is disturbed brain circulation, and the diagnosis is made by examining the heart.

In aortitis and disease of the coronary arteries vertigo is often noted, especially in connection with attacks of angina. There is nothing characteristic about this form, and it is usually overshadowed by the pain, dyspnoea,

sense of impending death, etc., which belong to the attack. In general arteriosclerosis vertigo is sometimes seen, due probably to changes in the cerebral vessels. This variety belongs among the encephalic vertigos.

In certain general systemic infections vertigo is often seen. Notable among these are influenza, typhus and typhoid fever, malaria, and plague. Vertigo in influenza is seen often; it may be severe, but usually does not last many days. Licéaga ("Twentieth Century Practice of Medicine," vol. xv., p. 286) declares that it is "constant and precocious, and appears whenever the patient attempts to sit, to stand, or even to raise his head." In typhoid fever vertigo is seen during the incubation period and at the beginning of convalescence. It occurs probably in about ten per cent. of the cases. At the outset of an attack of *bubonic plague* vertigo is said to be common. All these forms are caused by the toxin of the disease acting upon the brain or its circulation. They are not accompanied by deafness. They are in many cases merely a symptom of exhaustion, and they do not remain permanently after recovery from the disease.

The vertigo which follows the more severe forms of malarial fever, however, is different. It comes on after the disease has lasted for some time, is attended with deafness and tinnitus, and seems due to inflammation in the internal ear. It is rare. It belongs to the pernicious tropical forms, and there is ground for doubting if it be not due to the quinine rather than to the malaria. Ferreri reports two cases.

Certain drugs in toxic doses cause vertigo. Prominent among these are alcohol, aniline and its derivatives, quinine and salicylic acid. Alcohol probably acts by paralyzing the cortical areas in the cerebellum. Aniline acts in the same way. Quinine and salicylic acid, on the other hand, probably act directly upon the internal ear, since poisoning by either of them causes deafness and tinnitus as well as vertigo. Such cases rarely present difficulties of diagnosis.

Vertigo is also seen in certain diseases and disturbances of the central nervous system, both functional and organic. Seasickness comes under this head, being apparently caused by overexertion of the sense organ of equilibrium. The motion of the ship sends the endolymph flowing rapidly through the semicircular canals, agitating the hair cells violently, and thus interfering with their function. All symptoms of seasickness, it is well known, may be produced by rapid rotation of the body, and the fact that measures directed to the nervous system are the only ones that have been found effective in combating this malady, lends support to this view.

Neurasthenic vertigo is not uncommon. The attacks are short and not very severe, but often occasion much alarm. The diagnosis rests upon other symptoms present, and treatment is directed to the neurasthenia.

Epileptic vertigo is seen oftenest in attacks of *petit mal*. It is paroxysmal and brief. The patient feels dizzy, and perhaps falls to the ground, but recovers at once, and the vertigo disappears as the fit passes (Church).

Of the organic degenerative lesions of the general nervous system, vertigo is found often in *tabes dorsalis*. This vertigo is not to be confounded with the regular and constant ataxia. The two are quite distinct, and ordinarily, however extreme the ataxia, the patient does not suffer from subjective vertigo. When this occurs it is paroxysmal, and may be accompanied by vomiting and great prostration. In multiple spinal sclerosis (Church) vertigo often occurs. Here it is sometimes due to destruction of the central organ or the nerve trunk, and may present the type of Ménière's disease. These vertigos are to be diagnosed and treated in connection with the underlying disease which causes them.

Of encephalic diseases any lesion interfering with any part of the sense organ of equilibrium may cause vertigo. It is most common in tumors or abscesses of the cerebellum and pons, in hemorrhage, or more rarely in basilar meningitis. It is constant and severe, often accompanied by nausea and vomiting, but except in connection with