tised, and mothers among certain classes even adopt the pernicious practice of allowing their children to be exposed to contagion, on the ground that they must have whooping-cough some time, and the sooner they have it and are over it the better. This idea should be combated wherever found, for, as we have already seen, the older a child is the better able is he to resist the debilitating effects of the disease, while in infants the danger of a fatal result is considerable. Adults, even if not less susceptible, are less frequently exposed to whooping-cough than young children, and in them the disease generally runs a mild course. If possible, the patient should live and sleep in a room away from the other children of the family, who should not be allowed to visit him or play with him out of doors. The mother or nurse should, if possible, air or change her clothes and wash her hands on leaving the patient to go to the other children. These precautions are certainly worth while if there be a young infant in the family, or a delicate child, or one weakened by sickness.

Parents should be reminded of the evil of taking children suffering from this disease in public conveyances, or to places of public meeting, as churches, shops, where other children may be infected.

Dispensaries and out-patient departments of hospitals often serve to spread the disease, the child with whooping-cough sitting, perhaps for several hours, on benches with other children. Such cases should either be seen and sent off at once, or kept in a separate room.

It is unfortunate that whooping-cough should be especially contagious in the early stages before the diagnosis is made clear by the characteristic whoop. The contagion diminishes during the spasmodic stage and probably ceases before the child has ceased whooping.

Disinfection of the room and its contents, after death or recovery from whooping-cough, should always be practised, although, as before remarked, it is not probable that the poison survives long outside of the body.

Charles W. Townsend.

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WIDAL TEST. See *Typhoid Fever*.

WIESEN. See *Davos*.

WILBUR SPRINGS.—Colusa County, California.

These mineral springs are located thirty miles from Colusa. They are pleasantly situated and have acquired considerable reputation. The waters are hot and sulphureted, and, according to Anderson's analysis, one United States gallon contains (solids): Sodium chloride, gr. 19.75; sodium carbonate, gr. 3.40; sodium sulphate, gr. 26.19; potassium chloride, gr. 0.46; silicates, gr. 6.95; magnesium sulphate, gr. 22.90; magnesium carbonate, gr. 5.10; calcium carbonate, gr. 8.44; calcium sulphate, gr. 20.62; ferrous sulphate, gr. 4.16; alumina, gr. 3.93; potassium iodide, gr. 0.75; organic matter, gr. 1.74. Total solids, 124.39 grains. Sulphureted hydrogen gas, 43.97 cubic inches. A hotel and cottages have been built, and there are also excellent camping facilities.

James K. Crook.

WILDEN SPRING.—Franklin County, Vermont.

POST-OFFICE.—St. Albans. Hotel in St. Albans.

ACCESS.—St. Albans is a prominent railroad station on the Vermont Central Railroad, in the extreme north corner of the State.

St. Albans is a delightful town overlooking Lake Champlain, two miles west. The spring is situated on Edwards Street, south of Lake Street, about ten minutes' walk west of the depot. The water was analyzed by A. A. Hayes, M.D., of Boston, who found the following chemical constituents: Sodium carbonate, magnesium carbonate, calcium carbonate, sodium chloride, potassium sulphate, calcium sulphate, magnesium iodide, iron crenate, sodium silicate. Solid constituents per United States gallon about twenty-four grains.

The water has been considerably resorted to in the past, but so far as we can learn it is not now employed for medicinal purposes.

James K. Crook.

WILHOIT'S SODA SPRINGS.—Clackamus County, Oregon.

POST-OFFICE.—Wilhoit. Hotel.

ACCESS.—From Salem, Marion County, twenty-five miles northeast by wagon road.

These springs are seven in number and flow about seven hundred gallons per hour. An analysis by J. A. Veatch, M.D., in 1869, gave the following results: One United States gallon contains (solids): Sodium carbonate, gr. 87.57; magnesium carbonate, gr. 85.32; calcium carbonate, gr. 32.23; iron carbonate, gr. 6; sodium sulphate, gr. 3.40; magnesium sulphate, gr. 6.45; sodium chloride, gr. 201; iodine, a trace. Total solids, 421.97 grains. Carbonic acid gas, 22.56 cubic inches.

The water, as it flows, is said to have a temperature of 35° F. This is a very valuable water, combining as it does a number of important chemical ingredients. It is not unpleasant to the palate, and, according to Dr. H. Carpenter, it operates on the second day as a laxative and diuretic. It contains a considerable percentage of iron, which gives it tonic and reconstructive properties.

James K. Crook.

WILLOW. See *Salicaceæ*.

WINNIPEG.—This city, the capital of the province of Manitoba, is situated at the junction of the Red River of the North and the Assiniboine, 485 miles south of Lake Winnipeg and 1,424 miles west of Montreal. From the boundary of the United States it is about 60 miles north, North Dakota and Minnesota forming the southern boundary of the province. It is a city of 45,000 inhabitants, the metropolis of all this region, and is constantly growing. It is well laid out with broad streets, and has many public buildings—colleges, handsome churches, a general hospital, banks, etc. It is reached viâ the Canadian Pacific Railroad from the east, or the Northern Pacific from St. Paul.

The province of Manitoba, embracing 73,956 square miles, is a level prairie, about 800 feet above the sea-level, and contains three important lakes: Winnipeg, Manitoba, and Winnipegoosis. Like the neighboring Dakotas and Minnesota, Manitoba is noted for its wheat, which is the staple product. The rivers and lakes abound in fish, and large and small game is plentiful.

The climate of this region is healthy, but the extremes of temperature are great, as is also the annual range. The winters are long and cold. According to Hann ("Handbuch der Klimatologie") the temperature falls almost every winter as low as 40° below zero F., while in summer it may rise to 100° F. Owing to the comparative dryness of the air, however, the cold is said not to be severely felt. The average annual mean temperature of Winnipeg is 33.8° F., which, according to Hinsdale, is lower than that of any other large city in America.

The following table of the monthly and annual temperature and precipitation was kindly furnished by Prof. R. F. Stupart, director of the Meteorological Service, Toronto:

WINNIPEG, MANITOBA.

Table showing	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Average mean highest temperature	5.4°	10.4°	24.6°	46.6°	65.1°	74.5°	78.3°	75.9°	64.7°	50.2°	27.8°	14.6°	78.3°
Average mean lowest temperature	−16.2	−12.6	7.4	25.3	39.0	49.7	53.8	50.5	41.0	29.3	10.0	−5.3	−16.2
Average mean monthly and annual temperature	−5.4	−1.1	16.2	36.0	52.1	62.1	66.1	63.2	52.8	39.7	18.9	4.6	33.8
Average daily range of temperature	21.6	23.0	16.7	21.3	26.1	24.8	24.5	25.4	23.7	20.9	17.8	19.9	....
Absolute highest temperature	40.0	46.0	64.0	90.0	94.0	96.0	98.0	103.0	94.0	85.0	64.0	47.0	103.0
Absolute lowest temperature	−46.0	−46.0	−38.0	−14.0	15.0	21.0	36.0	30.0	19.0	−3.0	−34.0	−53.0	−53.0
Average rainfall in inches	....	....	0.25	1.17	2.15	3.53	3.08	2.63	2.09	1.52	.17	.14	16.73
Average snowfall in inches	8.7	9.4	8.8	4.3	1.3	.3	....	....	....	1.3	9.8	7.6	51.5

The average daily maximum temperature for July is 78.3° F., and the minimum, 53.8° F. The annual range of temperature is from 130° to 140° F. The average total annual precipitation for Manitoba is 17.43 inches, but of this 12.87 inches falls in the six months from April 1st to October 1st. The mean relative humidity is about seventy-five per cent. The wind velocity is very considerable, averaging about eleven miles per hour, the prevailing direction being from the north and northwest.

The most notable features, then, of the climate of this region are the great extremes of temperature, the great daily and monthly ranges, and the excessive cold of winter. From the fact, however, that spring rapidly advances during the latter part of April, and that the day temperatures in summer are high, with a good deal of sunshine, the wheat matures quickly. There is no malaria, and, as has been said, the climate is a wholesome one for the robust, and immigration is rapidly filling up this great fertile region.

Edward O. Otis.

WINTERGREEN.—(*Gaultheria;* Checkerberry; Boxberry; Partridge-berry; Tea-berry, etc.)

The dried leaves of *Gaultheria procumbens* L. (fam. *Ericaceæ*). This plant is a little evergreen undershrub, with slender, weak, creeping or subterranean stems, and at intervals ascending or erect; branches from two to four inches high, each bearing three or four leaves and a few axillary, nodding flowers; leaves oval or obovate, thick, leathery, almost entire, bright-green and shining above, paler beneath, with slightly revolute margins, fragrant when crushed, and pleasantly aromatic to the taste. Flowers small, calyx five-toothed, enclosing the small capsule, becoming fleshy as it ripens, and forming the principal portion of the pleasant-flavored fruit. Corolla ovoid, five-toothed; stamens, ten; pistil, one, with five-celled ovary; pod, five-celled, many-seeded, surrounded by the juicy calyx. The berry, which is edible and occasionally found in the markets, is about a fourth of an inch in diameter, pink or red in color, of a sweetish, aromatic, birch-like taste.

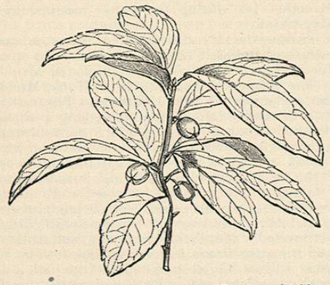

FIG. 5037.—Wintergreen; Leaves and Berries. (Baillon.)

Gaultheria is a native of North America, growing in dry woods and plains. It is in many parts of the United States very abundant, carpeting the ground under trees and bushes, and is collected in large quantities both for use, dried, and for immediate distillation. All parts are aromatic, the leaves and stems astringent as well, and owe their value to an essential oil (*Oleum Gaultheriæ*, U. S. P.) of birch-like flavor, consisting mostly of *methyl salicylate*, with about one-tenth of a peculiar hydrocarbon, *gaultherilene*. Oil of wintergreen is "a colorless, yellow or reddish liquid (according to age), of a peculiar strong and aromatic odor, a sweetish, warm, and aromatic taste, and a slightly acid reaction. Specific gravity about 1.180. It is readily soluble in alcohol."

Like sassafras, cinnamon, and other pleasant aromatics, wintergreen is very largely used as a flavor, and enters into several official preparations for that purpose. Its relation to salicylic acid has led to its employment in rheumatism. The discussion is very animated as to whether oil of wintergreen, oil of birch, and pure methyl salicylate are identical in physiological action. By many the natural oil of wintergreen is preferred to either of the others. Dose of the leaves, 1–4 gm. (gr. xv.–lx.); of the oil, from five to twenty drops.

Preparations: Of the oil, spirit (*Spiritus Gaultheriæ*, U. S. P.) 0.05 in alcohol.

W. P. Bolles.

WITCHHAZEL.—(*Hamamelis*, U. S. P.) The dried leaves of *Hamamelis Virginiana* L. (fam. *Hamamelidaceæ*). The plant yielding this drug is a tall, slender, straggling shrub growing commonly, in moist woods, over a large part of the United States. Its flowers are small, in little, sessile, axillary clusters, and appear late in the autumn. They persist through most of the winter, the fruit from them ripening in the following summer. Calyx four-parted; corolla of four long, narrow, strap-shaped, yellow petals; stamens, eight, short; pistil, one, with two styles; and a two-celled, two-ovuled ovary.

The leaves should be collected in the autumn. They are stoutly and very shortly petioled, the blade 7–15 cm. (3–6 in.) long and nearly as broad or occasionally even broader, highly inequilateral, oval, with a very oblique, slightly cordate base, and usually a very short obtusish point at the summit, the margin coarsely sinuate; thickish, dull green and with obscure venation above, paler or brownish-green, with a satiny lustre and very prominent

principal veins underneath, nearly smooth, the few hairs of the lower surface having much thickened walls and a very small lumen; odor rather faint, characteristic; taste astringent, slightly aromatic, bitter.

A number of analyses of this plant have been made without discovering anything to explain its reputed vir-

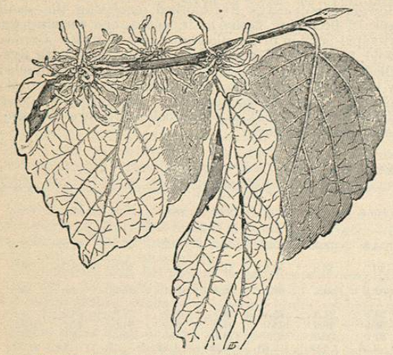

FIG. 5038.—Witchhazel; Flowering Branch. (Baillon.)

tues. It is not poisonous in any quantity. There is some *tannin*, and an infinitesimal amount of *essential oil;* enough to give smell and taste to a distillate, but scarcely enough to isolate.

It is an old remedy of the Indians, and is said to have been introduced to our notice by them; but its present popularity as a wash for bruises and wounds in household practice is of very modern growth.

For twenty years or so it has been, in this country, the most widely used domestic vulnerary, taking the place in the popular estimation of arnica, which had held sway for a generation before. It is usually employed in the form of a distillate, made by distilling a very weak mixture of alcohol and water (six-per-cent. alcohol). It has an odor and faint taste derived from the drug, but not enough oil or extract to be estimated in any other way. The odor is pleasant and suggestive of liniment, and the preparation is on the whole a fair evaporating lotion. A fluid extract (*Extractum Hamamelidis Fluidum*) is official, and contains, besides the fragrant principles, considerable

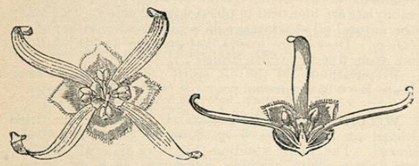

FIG. 5039.—Witchhazel; Flowers. (Baillon.)

tannin, which the distilled preparation of course does not. It may be diluted for washes, vaginal douches, etc. Witchhazel at present is rarely given internally.

The bark is similarly employed, and much of the distillate is said to be prepared from it. It is regarded by many as being superior to the leaves.

Henry H. Rusby.

WITTER'S MINERAL SPRING.—Lake County, California.

These springs are pleasantly located about one mile east of Pearson's Springs, five miles from Upper Lake, and three miles from Blue Lake. The altitude is 1,800 feet. The resort is a growing one, and is very picturesquely located, having excellent views of the lakes, valleys, and mountains in the vicinity. There are a good hotel, several cottages, and fine bathing facilities for hot and cold mineral baths. The springs are all cold and flow about sixty gallons an hour. There are cold soda and iron springs, and cold sulphur springs. The principal spring is composed as follows: One United States gallon contains (solids): Sodium chloride, gr. 17.42; sodium carbonate, gr. 5.96; sodium sulphate, gr. 11.50; potassium carbonate, gr. 3.15; magnesium carbonate, gr. 7.10; magnesium sulphate, gr. 20.62; ferrous carbonate, gr. 1.17; manganese carbonate, gr. 0.86; alumina, gr. 1.65; borates, gr. 0.42; silica, gr. 6.33; organic matter, gr. 0.76; total solids, 76.94 grains. Carbonic acid gas, 7.65 cub. in.; sulphureted hydrogen, 5.25 cub. in. Temperature of water, 59.3° F.

This spring has received the very emphatic if not euphonious title of Dead Shot Spring, having reference to the action of the water on the diseases for which it is recommended. The water is said to be highly efficacious in liver, kidney, and bowel disorders.

James K. Crook.

WOLFER'S MINERAL SPRING.—Marion County, Oregon.

POST-OFFICE.—Hubbard. Hotels.

ACCESS.—Viâ Southern Pacific Railroad to Hubbard, thirty-one miles from Portland and twenty miles from Salem. The spring is within five minutes' walk of the depot.

This spring is mentioned as "Lehman's Spring" in the Geological Reports for 1895. Hubbard is situated in the Willamette valley, in the midst of a fine fruit and garden country. The spring (artesian) is located on the hillside, at a level of 212 feet above the sea. It is surrounded by an arbor of wild willows, and forces its way to a height of four feet above the surface, forming a beautiful fountain. It yields about six thousand gallons of water per hour. There are beautiful grounds about the springs, well adapted for outdoor sports, picnics, etc. According to a partial analysis by Professor Fisk, the water contains: Calcium carbonate, magnesium carbonate, sodium chloride, potassium chloride, iron oxide, silica, and alumina. The water is said to possess valuable properties as a tonic and laxative. *James K. Crook.*

WOOD-TICK. See *Arachnida.*

WOOL-SORTERS' DISEASE. See *Anthrax*, and *Occupation, Hygiene of.*

WOOTAN WELLS.—Robertson County, Texas.

POST-OFFICE.—Wootan Wells. Hotel and cottages.

ACCESS.—Viâ Houston and Texas Central Railroad to Wootan Junction; thence two miles to springs. Street cars meet all trains, day and night, from about April 1st to November 1st; during the winter months there are only day trains.

The location is 145 miles north of Houston, and 125 miles south of Dallas. These wells are located on a picturesque eminence about 500 feet above the level of the gulf. The first well was dug in 1877 by Mr. F. M. Wootan, an emigrant from Alabama. The water was found to be useful for cooking or washing purposes, so Mr. Wootan rented the farm on which the well was situated to a neighbor, whose health was bad and who also had a puny wife and children. They found it necessary to use the "bad" water for drinking purposes, and the sickly family all got well and remained well. This was the beginning of a health resort which has now become widely and favorably known. Persons with means became interested. More wells were dug, and at this time about all the attractions of any first-class interior watering place will be found here. These include a large, well-arranged brick hotel, with abundant bathing facilities, an opera house, archery court, croquet grounds, beautiful groves, camp grounds, etc. The place is naturally well adapted for good drainage, and no pains

are spared by the management to keep the surroundings in a sanitary condition. The resort is open the year round. Analyses of the different wells show very little difference in their chemical ingredients. Following are specimen analyses of two of the wells, the first by Prof. Charles F. Chandler, of New York, and the second by Dr. W. M. Mew, chemist of the United States Naval Department, Washington, D. C.:

Well No. 1.—One United States gallon contains (solids): Chlorides, gr. 23.34; magnesium, gr. 13.11; calcium, gr. 25.21; iron protoxide, gr. 1.20; iron sesquioxide, gr. 0.69; aluminum sesquioxide, gr. 1.22; manganese oxide, gr. 0.54; sulphates, gr. 59.67; silica, gr. 3.28; organic and volatile matter, gr. 9.62. Total solids, 137.88 grains.

Well No. 4.—One United States gallon contains (solids): Chlorides, gr. 36.36; magnesium, gr. 22.75; calcium, gr. 28.18; iron sesquioxide, gr. 13.06; aluminum sesquioxide, gr. 3.45; manganese oxide, gr. 0.57; sulphates, gr. 86.41; sodium, gr. 18.10; silica, gr. 4.69. Total solids, 213.57 grains.

These waters show about the same general characteristics, No. 4 being somewhat richer in mineral ingredients, especially in iron, than No. 1. It will be observed that the chemists have not worked out in full the combinations of the various elements present. There can be no doubt, however, that the most important compounds contained in the waters are the sulphates of magnesia and soda, and probably the sulphate of iron. These ingredients should impart, in the proportions here probably present, mild cathartic properties, and, in No. 4 especially, the effects of a strong ferruginous tonic and blood restorer. The waters are highly prized by Texas physicians in the treatment of the various forms of nephritis and in diabetes and rheumatism. They are of undoubted efficacy in some cases of dyspepsia and in catarrhal jaundice and other disorders of the liver and alimentary tract. The water is used commercially, and is shipped to various parts of the United States. *James K. Crook.*

WORMSEED, AMERICAN.—(*Chenopodium*, U. S. P.; *Ansérine vermifuge*, Codex Med.) The dried ripe fruit of *Chenopodium ambrosioides* L. or of *C. anthelminticum* L. (fam. *Chenopodiaceæ*).

The first-named species is the old-fashioned garden plant *Mexican tea* or *Ambrosia*, native of tropical America; the second appears to be of European nativity. Both are common weeds in the Eastern United States, growing along roadsides, about wharves, lumber yards, etc., and are of a sprawling and ascending habit, reaching a height of two or three feet. They have a strong, heavy odor, disagreeable to most people. The fruits, generally called "seeds," are nearly $\frac{1}{12}$ of an inch (2 mm.) in diameter, depressed, globular, glandular, dull-greenish or brownish, the integuments friable, containing a lenticular, obtusely edged, glossy, black seed. This seed has a peculiar, somewhat terebinthinate odor, and a bitterish, pungent taste.

The fruits contain one or two per cent. of a rather disagreeable, minty, essential oil, which represents it medicinally. This oil is usually distilled from the entire herb. It is a thin, and, when fresh, colorless liquid of aromatic odor and bitterish taste; specific gravity, 0.920.

Like most aromatic herbs, chenopodium, in small doses, is a stomachic tonic; in large doses it is irritating and nauseating. The property for which it is mostly prized is, however, its poisonous action upon intestinal worms, particularly upon the lumbrici. From five to fifteen drops of the oil in emulsion or on sugar is the usual range of doses. Oil of Chenopodium is a very powerful poison in overdoses. The symptoms are chiefly referable to intestinal irritation and cerebral congestion. There are drowsiness, great thirst, abdominal pain, perhaps with vomiting, intense sensitiveness to light and sound, but with indistinctness, aphasia of both kinds, stupor, coma, and death. The treatment is stomach evacuation, purging, with watery stools, free administration of water, enemata, brandy, and external heat.

W. P. Bolles.

WORMSEED, LEVANT.—(*Santonica*, U. S. P.; *Flores Cinæ*, P. G.; *Flores Artemisiæ, Semen Contra, S. Sanctum.*) The dried unexpanded flower-heads of *Artemisia pauciflora* (Ledeb.) Weber (fam. *Compositæ*). Although the plant yielding these flower-heads is well known, there is great difference of opinion among botanists as to its specific reference. By many it is regarded as a variety of *A. maritima* L. of Southern Europe. The German Pharmacopœia still refers the drug to *A. Cina* Berg. The drug is collected in the Turkestan deserts, and most of it, and the best, is at once consumed there in the manufacture of santonin, the percentage of santonica exported being steadily on the decrease. Several related and similar, but hairy products have occasionally been imported from India and Africa, and chenopodium is occasionally sold for it. The drug is also subject, through imperfect cleaning, to the presence of pieces of branchlets and leaves, and dirt of various kinds; yet it is usually clean and of fine quality. It deteriorates readily on being kept, especially if not carefully protected in a closed and dark container. In proportion as the greenish-gray tinge has changed to a brown, it may be regarded as having thus deteriorated. The drug is thus described:

A yellowish-green (at length greenish-brown) somewhat glossy, mobile mass; having a strong and peculiar, somewhat camphoraceous odor and an aromatic and bitter taste; heads 2–4 mm. ($\frac{1}{10}$–$\frac{1}{5}$ in.) long, oblong-ovoid, slightly flattened, obtuse, consisting of an involucre of about twelve to eighteen closely imbricated, glandular scales with broad midribs, enclosing four or five rudimentary florets.

With gum, a little resin, and ordinary plant constituents, three specific bodies exist in santonica. Its one and one-half to two per cent. of volatile oil consists chiefly of cineol, and is somewhat like oil of eucalyptus in properties. Santonin, of which there is usually not more than two per cent., as the drug occurs here, is the active anthelmintic agent and is described under that title. A small and variable amount of artemisin occurs, obviously resulting from the oxidation of santonin.

Although santonica possesses, in correspondingly lower degree, the anthelmintic properties of santonin, the latter alone is used for that purpose. As an aromatic bitter, santonica is occasionally used in doses of 0.3–2 gm. (gr. v.–xxx.). There is no official preparation.

Henry H. Rusby.

WORMSEED, POISONING BY. — *Chenopodium ambrosioides* L.; and *C. anthelminticum* Gray, which are possibly only varieties of one species, contain a volatile oil which has a strong, disagreeable odor, and decided vermifuge properties. It is most abundant in the seeds. It is somewhat analogous in composition to oil of turpentine. By keeping it undergoes oxidation, and probably other changes. The seeds of the plant are used as a remedy for intestinal round worms and are often given to children as a domestic remedy. Little harm appears to result from this practice, but the use of the oil itself has led to fatal results in several cases. One of the earliest of the American cases to be fully reported was that by Dr. Brown in the *Maryland Medical Journal* in 1878. A man, aged thirty-one years, was supposed to have taken over an ounce of the oil, purposely substituted by him for castor oil. He suffered from nausea, later with severe vomiting, dizziness, buzzing in the ears, diminished sensitiveness to some sounds and hypersensitiveness to other sounds. Still later, marked aphasia and confusion of ideas occurred. He died five days after the material was thought to have been taken. He was, however, a confirmed self-drugger, and deceived the attending physician throughout the whole history of his illness, denying that he had taken the oil, though the odor of it was unmistakable. Another case was that of a child, aged two years, to whom was given one teaspoonful of the oil. The immediate symptoms were deep sleep, clammy skin, and muscular weakness. Brandy and milk were given. The patient became restless and was quieted with bromides. She became somewhat bet-

ter, but then became worse, could not stand up or walk alone, and vomited material which had the odor of the oil. Her hearing was for a while affected. She recovered.

In another case a boy, aged three years, was given a teaspoonful of the oil. He vomited and then went into a stupor. The pupils were small but equal; pulse, respiration, and temperature normal. Salt water was given as an emetic, then one grain of calomel, and repeated doses of castor oil. He became worse, developing deep stupor and twitching of the arms, and died. In another case a man, aged sixty-three years, died after taking, in divided doses during the course of a single day, one ounce of the oil. No direct antidotal treatment was employed. He was comatose.

The disturbance of hearing noticed in several of the cases is a remarkable feature, but has not been explained. It must be borne in mind that in some of the cases the amount taken and the exact nature of the material were not established. From the reports it appears that the oil is actively toxic, and that caution should be given in works on materia medica concerning its use. Very little is said upon this question in the standard works. Its effects seem to be both as an intestinal irritant and as a neurotic poison. The odor will probably afford the best means of making a diagnosis. No characteristic post-mortem changes are recorded.

Treatment will be difficult. Early and free evacuation of the stomach and bowels is important. Strong coffee might be useful. Irritating emetics are contraindicated.

Henry Leffmann.

WORMWOOD.—(*Absinthium*, Vermouth.) "The leaves and tops of *Artemisia Absinthium* L. (family *Compositæ*)," U. S. P. A half-shrubby plant, with numerous erect stems two to four feet high, grayish silky throughout. The leaves are nearly equally gray on both sides, twice or thrice pinnatifid, the divisions oblong and obtuse, the larger ones three or four times as long as broad. The small heads are short-peduncled, solitary, and cernuous in the axils of leafy bracts, and the floriferous branches are panicled. The characters of flowers and fruit will be found described under *Artemisia*. The odor is strongly aromatic and the flavor very bitter.

The plant is native to Asia and perhaps Europe, and has become extensively naturalized in nearly all temperate countries, and even in the tropics, at high altitudes.

The activity of absinthium depends upon the two constituents: *absinthol*, which constitutes the most of its one per cent. of volatile oil, and *absinthin*, a bitter glucoside, soluble in both alcohol and water. In its volatile oil occurs also the blue oil of chamomile flowers. Oil of wormwood is an important commercial article, being largely in demand in France for the manufacture of the alcoholic beverage *absinthe*. Tannin, resin, and succinic acid also occur in this drug. Absinthium is an aromatic bitter, acting like chamomile, especially as a gastric tonic. It is also mildly antiperiodic and anthelmintic. The oil has specific nervine properties, a dose of half an ounce having caused alarming symptoms, with convulsions and insensibility. An absinthe habit is formed by the continued use of the liquor, the victims suffering from neuralgia, muscular tremors, epilepsy, and impaired intellect. Observations have established the fact that these effects are due to the absinthium and not to the alcohol. The dose of the herb is 1-4 gm. (ʒ ¼–i.); of the oil, ♏ i.–iij. Large quantities of the oil would undoubtedly prove fatally poisonous.

Henry H. Rusby.

WRIST, JOINTS OF THE.—The skeleton of the wrist, being a series of small bones essentially similar in character, may be considered as a whole, and we may hence conceive a superior radiocarpal or wrist-joint proper, between the bones of the forearm and the carpus, and an inferior or carpometacarpal joint, between the carpus and the metacarpus. Again, we may consider separately the two rows of carpal bones, and regard the somewhat irregular union between them as an intracarpal or mediocarpal joint. Finally, we may consider each bone as a separate unit and its union with each of those which it touches as so many carpal joints of a secondary degree.

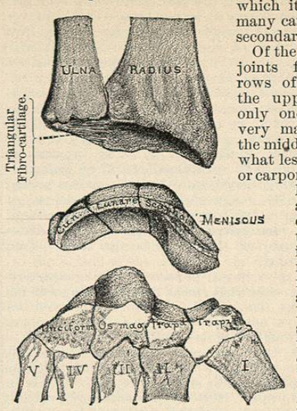

FIG. 5040.—The Wrist-joints.

Of the three transverse joints formed by the rows of carpal bones, the upper one is the only one that has any very marked mobility, the middle one has somewhat less, and the lower or carpometacarpal joint has the least of all. It is, indeed, instructive and logical in regarding the movements to follow the plan adopted by Meyer, and consider the lower row of bones as combined for practical purposes with the metacarpal bones with which they articulate and the upper row as an articular integer or meniscus which is the essential interposed element between the forearm and the hand. Viewing the form of the surfaces, the articulation between the meniscus and the forearm is a pommel or ellipsoidal joint. Movement is necessarily freest in the direction of the axes of the

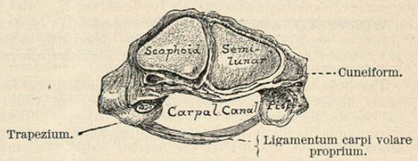

FIG. 5041.—The Carpal Canal.

ellipsoid, but still a certain amount of rotation is possible. The surfaces involved are those of the triangular cartilage and the radius above, and the scaphoid, semilunar, and cuneiform below. The ulna does not enter into the articulation, nor does the pisiform bone. Many comparative anatomists are of the opinion that the triangular

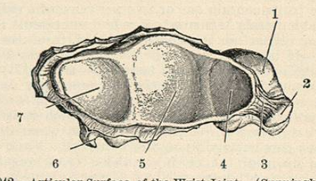

FIG. 5042.—Articular Surface of the Wrist-Joint. (Cunningham.) 1, Head of ulna; 2, styloid process of ulna; 3, apex of triangular fibro-cartilage; 4, triangular fibro-cartilage; 5, surface of semilunar bone; 6, groove for tendon of extensor longus pollicis muscle; 7, surface for scaphoid bone.

fibro-cartilage represents a carpal element which in its complete form long ago vanished from the mammalian carpus and that the pisiform bone is another vestige of the same kind. Certain facts of abnormal variation seem to support this view and to show that the pentadactylate

form of the human hand is not the primitive form, firmly fixed though it now is, but that a seven-digit hand was probably the original mammalian type. Odd cases of supernumerary wrist-bones and fingers, which are occasionally seen, are, according to this view, instances of atavism.

The midcarpal joint is of a mixed character, having, like the midtarsal joint of the foot, a wavy outline, the comparatively large, convex upper surfaces of the os magnum and unciform bones making together a sort of ball-like head which fits into the hollow socket made by the under surfaces of the combined scaphoid, semilunar, and cuneiform bones; while a comparatively small surface of the scaphoid articulates with the trapezium and trapezoid to make a curve in the opposite direction. This assists considerably in twisting movements of the hand, such as pronation and supination, which are very necessary to that nicety in the management of tools which characterizes the hand of man. The hand of the ape is by no means so delicately adjusted in this particular.

It has been well pointed out by Professor Humphrey, in his classical treatise on the "Human Skeleton," that the wrist owes the security of its joints, not so much to the interlocking shape of the joint surfaces, or to the strength of its ligaments, as to the strong tendons which pass over it, tend to protect it, and render it at the same time flexible. A short examination of the lower end of the radius will show that its dorsal aspect is deeply grooved for the extensor tendons which pass in every direction over the back of the hand. They are bound closely down in their grooves by a strong band of fascia called the posterior annular ligament, which thus becomes, as it were, one of the most powerful protecting ligaments of the radiocarpal joint. In a similar manner the anterior surface of the wrist is hollowed out by a deep archway, the carpal canal, so called because it is spread over by strong bands of fascia which confine the flexor tendons in a sort of subway.

English anatomists group these bands together indiscriminately as the anterior annular ligament, but there can readily be distinguished two bands—a superficial one, to which the name of annular ligament may properly be applied, as it is a process of the deep fascia of the

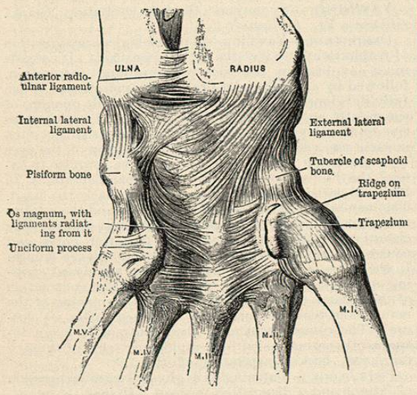

FIG. 5043.—Ligaments on Anterior Aspect of Radiocarpal, Carpal, and Carpometacarpal Joints. (Cunningham.)

arm which passes over the tendon of the palmaris longus and the ulnar vessels and nerve, being continuous with the posterior annular ligament at either side; the second is more independent, partaking more of the nature of a ligament, and therefore properly designated as the ligamentum carpi volare proprium. It is a strong, firm band, attached on either side to the carpal eminences—that is to say, the pisiform and unciform bones on the

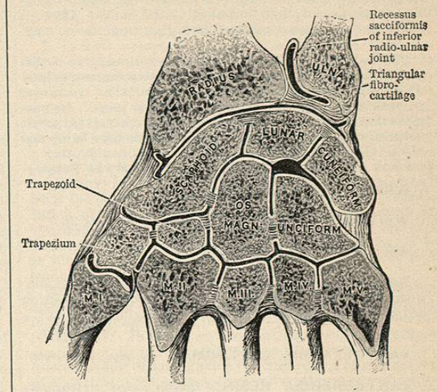

FIG. 5044.—Coronal Section through the Radiocarpal, Carpal, Carpometacarpal, and Intermetacarpal Joints, to show Joint Cavities and Interosseous Ligaments (diagrammatic). (Cunningham.)

inner side and the tubercle of the scaphoid and the ridge of the trapezium on the outer side. It passes *under* the tendon of the palmaris longus and the ulnar vessels and nerve. Beneath it pass the great flexor tendons and the median nerve, confined by several strong sheaths which blend with each other and send fascial processes to the ligament above and the attachments of the special bones below. It is to this arrangement, combined with pronation, that we owe the surprising flexibility which characterizes the wrist, a flexibility which permits the extraordinary twists so famous in the pitching of a ball, the handling of a tennis racket, and the parrying of the thrust of a foil.

Viewing the wrist-joint with reference to its synovial cavities, we find that the radiocarpal joint has its own cavity, the midcarpal and carpometacarpal having a common cavity, there being excluded two bones, the pisiform and the metacarpal bone of the thumb, each of which has its own special articulation—the first with the cuneiform, the second with the trapezium.

The intrinsic ligaments of the carpus are of two classes: one being external strengthening bands, the others internal, interosseous, serving as close interties to keep the whole system firm. On the palmar surface a somewhat irregular mass of fibres, stretching from the bones of the forearm to the metacarpal bones, has received the name of the ligamentum carpi volare profundum.

Separate portions of this have received different names. Thus the arcuate ligament is that portion which passes downward and inward from the radius to the cuneiform bone; the straight ligament (ligamentum carpi rectum) is a rounded fasciculus that passes from the styloid process of the ulna to the semilunar and cuneiform bones, and the funiculus ligamentosus a similar one extending from the same to the cuneiform and pisiform bones. Bands from the pisiform bone to the unciform and to the fifth metacarpal (ligamentum piso-hamatum, ligamentum piso-metacarpeum) are regarded as extensions of the insertion of the flexor carpi ulnaris. A series of short bands connecting the os magnum with the contiguous bones is known as the radiate ligament. Finally, the most distal band, connecting the bases of the metacarpal bones, is known as the deep transverse ligament. All these divisions seem hardly necessary.

The investment on the dorsal surface is not usually so complete. The strengthening bands are mainly two—the rhomboid ligament, passing downward and inward from the lower end of the radius to the cuneiform and unciform bones, and the transverse dorsal ligament, extending from the scaphoid outward to the same. There is also a dorsal radiate ligament diverging from the os magnum.

The only other joint requiring especial mention is that of the metacarpal bone of the thumb with the trapezium. This is an excellent example of the joint by reciprocal reception, sometimes termed the saddle-joint. Its motions are freest in two directions, which correspond to the motions of adduction and abduction on the one hand, and of the various adjustments of opposition on the other.

Frank Baker.

WRIST-DROP. See *Lead Palsy.*

WRITERS' CRAMP. See *Hands and Fingers, etc.*

WRY-NECK. See *Torticollis.*

XANOL is sodium caffeine salicylate, a diuretic of considerable power, with very little of the caffeine effect on heart and nervous system. Dose, 0.3–1 gm. (gr. v.–xv.).

W. A. Bastedo.

XANTHELASMA, XANTHOMA. See *Eye, Tumors of.*

XANTHORRHŒA RESIN.—*Resina lutea; Acaroides Gum* or *Resin; Botany Bay Gum* or *Resin.* By these names are designated several closely related solid balsams, obtained in Australia from species of *Xanthorrhœa* (fam. *Liliaceæ*).

The resinous sap exudes spontaneously, and hardens upon the stem in tears or masses. Two principal varieties of the "gum" are distinguished: the red, in deep red lumps or fragments resembling lumpy specimens of dragon's blood, having a weak odor of benzoin, and a spicy cinnamon-like taste; the yellow, in orange-yellow pieces or tears, having a strong benzoin odor.

The balsam contains, besides some bassorin and uninteresting ingredients, a large proportion of *cinnamic acid* and some *benzoic acid.* When it is decomposed with melted potash, parabenzoic and protocatechuic acids, pyrocatechin and resorcin are formed. In nitric acid the balsam dissolves readily, and yields abundance of picric acid, together with oxalic and nitrobenzoic acids.

The *xanthorrhœa* resins have long been used in Australia as a remedy for gastric troubles, intestinal catarrhs, diarrhœas, etc., and are occasionally prescribed in this country for similar conditions; but their principal uses are in the arts as a source of picric acid, and in the manufacture of lacs and varnishes.

Dose, from 0.5 to 1 gm. (gr. viij. ad xvi.). It may be given in alcoholic solution.

W. P. Bolles.

XANTHOXYLUM. See *Ash, Prickly.*

XERODERMA. See *Ichthyosis.*

XEROFORM. See *Tribromphenol bismuth.*

XEROSTOMIA. See *Parotid Gland, Diseases of.*

X-RAYS. See *Roentgen Rays, etc.*

XYLOL.—A hydrocarbon, or mixture of isomeric hydrocarbons of the composition $C_6H_4(CH_3)_2$, occurs as a constituent of coal-tar, and is known as *xylol* or *xylene.* This substance is principally *metaxylene* (*metadimethylbenzene*), with a certain proportion of *paraxylene* (*paradimethylbenzene*), and possibly some other hydrocarbons. Pure metaxylene can be obtained by special processes. Xylol is a thin, colorless fluid of a faint odor, reminding somewhat of that of benzene, and of a burning taste. It is insoluble in water, but soluble in alcohol. Medicinally, xylol has been used in the treatment of smallpox, and had at one time an ephemeral, but undeserved, reputation as a remedy for the disease. It was administered internally in doses of from ten to fifteen drops, in emulsion, and was also applied locally to the throat. It is now obsolete as a medicine.

Edward Curtis.

YADKIN MINERAL SPRINGS.—Stanley County, North Carolina.

Post-Office.—Palmersville. Boarding-houses.

Access.—Viâ Southern Railroad to New London, thence six miles by private conveyance to springs.

This resort is charmingly located in a wild and picturesque region penetrated by the Yadkin River, and covered by the Oconsechee Range of mountains. Like the usual North Carolina mountain climate, the atmospheric conditions prevailing in this section are eminently conducive to good health and longevity. The rainfall at the springs is about fifty-three inches annually, and is quite uniformly distributed through the seasons. There is no hotel, but during the season, from May to November, accommodations may be obtained at a reasonable rate in a number of private boarding-houses. The springs are two in number, a chalybeate spring yielding sixty gallons of water per hour, and a sulphur spring flowing at the rate of one hundred and eighty gallons per hour. No qualitative analysis is available. Much beautiful scenery is found in the neighborhood of the springs; the falls of the Yadkin River, the Narrows, and the "Devil's Den," a great cave in the hills, being the most prominent.

James K. Crook.

YARROW.—*Achillea, Milfoil. Achillea* L. (fam. *Compositæ*) is a genus of more than one hundred species, several of which, from ancient times, have been used in domestic and professional medicine. The most important of these is *A. millefolium* L., the herb of which is used. It is a perennial plant, indigenous to Asia and Europe and largely naturalized (or perhaps native) in North America. Its active principles are a very small amount of a volatile oil, and the bitter glucoside *achillein.* Aconitic acid also occurs, with considerable tannin, a little gum and resin. The drug is to be classed as an ordinary aromatic bitter, somewhat like chamomile. The dose varies from 0.3 to 2 gm. (gr. v. to xxx.).

Henry H. Rusby.

YAWNING.—(Synonyms: Gaping, Oscitation; Germ., *Gähnen;* Fr., *Bâillement.*)

Definition.—Yawning is a physiological modification of respiration by which the act is intensified. It consists in an involuntary, forcible, and profound inspiration, followed by a pause and a prolonged expiration. When fully developed, it is accompanied by a wide opening of the mouth, an elevation of the velum palati, and depression of the larynx, a roaring sound, and usually a click in each ear, a flow of saliva, and a suffusion of the eyes with tears, and a more or less imperative impulse to extend the limbs, especially the arms (pandiculation), to bow and twist the trunk, and to throw back the head. The inspiratory act is frequently audible, and the expiration usually acquires a distinct blowing sound. The elevation of the palate closes the posterior nares and causes the air to be admitted wholly through the mouth. In the same way the Eustachian tubes are closed, causing momentary obtunding of hearing. The contraction of the palatal muscles often precedes the opening of the mouth, and tends to persist for a moment after its closure. The commencement of their contraction is not infrequently accompanied by a rapid succession of three or four short, broken inspiratory efforts.

Physiology.—Yawning is a physiological expression of fatigue and a disposition to sleep. It may, however, arise from a retardation of the respiration, or from any influence which will impair the oxygenation of the blood. It is frequently, therefore, a product of melancholy, languor, ennui, torpor, or debility, or of the malaise which precedes the onset of disease. It is liable to follow prolonged abstraction of mind or concentration of thought. It is sometimes the result of feeble or laborious digestion,

of gastralgia, or of other disorder of the digestive organs; or it may occur in response to a demand for increased activity of circulation. It may be sympathetic. To some individuals it is habitual, occurring without fatigue, and being but the outgrowth of the lassitude or indolence of their natures. It may sometimes be attributed to the possession of an inferior degree of intelligence, a slothful, inactive, effeminate, timid, or lustful disposition incapable alike of vigorous mental exertion or of prolonged physical activity.

That yawning may be the response to a demand for increased activity of oxygenation in the lungs is demonstrated by placing an animal in an irrespirable atmosphere. Repeated yawning occurs shortly before the animal succumbs to asphyxia. The phenomenon is therefore usually explained on the supposition that it is due to a stimulus transmitted from the central nervous system in response to a peripheral impression, in most cases arising, in part at least, from the respiratory apparatus. Longet has attributed it to the accumulation of too great a quantity of venous blood in the right side of the heart, whence the peripheral impression is supposed to proceed. From whatever source we derive the peripheral impression, however, the act is generally admitted to be reflex in character. Of the reflex nature of the stimulus which produces the muscle contractions in the extremities, there can be no doubt; for it is a matter of repeated observation that the hand which, owing to paralysis, has been for years beyond control of the will, and has become firmly contracted by post-paralytic rigidity of its flexor muscles, will often become distended during yawning. It is evident here that the stimulus can emanate only from the spinal centres.

The mechanism of yawning is the same as that of normal respiration; the same muscles are called into action, but their movements are more extended. (See *Respiration,* Vol. VI.) The diaphragm, the scaleni, the sterno-cleido-mastoids, the clavicular portions of the trapezii, the lesser pectorals, the subclaviculars, the external intercostals, the serrati magni, the rhomboids—in fact, all the muscles which normally act as direct or as auxiliary forces in the full expansion of the chest, take part in the inspiratory movement; and all the muscles of forced expiration are called into action in the expiratory stage. In the fully developed yawn there is the action also of the muscles of the face, the depressors of the lower jaw, the dilators of the nostrils and upper lip, the orbiculares palpebrarum, the zygomatics, and of the depressors of the hyoid bone and larynx, and finally of the muscles of the back in the bowing of the trunk, and of the extensors of the extremities when stretching occurs.

Yawning is involuntary. It begins without the sanction of the will, and, once begun, it cannot be arrested. In this it resembles sighing, sneezing, hiccough, and other modifications of respiration, without, however, possessing their full spasmodic quality. Yet the will is not entirely deprived of influence over it; for a yawn may be often in a measure concealed by a forcible effort at closure of the jaws, and the mouth may be closed before the yawn has subsided. It may be imitated, but no amount of effort will induce it unless a sufficient cause for it exist. As Carpenter says, "this act may be performed by the will, though not completely; and is one that is particularly excited by an involuntary tendency to imitation, as every one must have experienced who has ever been in company with a set of yawners."

After yawning there is usually a momentary pause in the respiratory movements, followed by normal, tranquil breathing. The forced respiration has not only supplied the blood with its needed oxygen, but, aided by the muscular contractions, has removed venous engorgement and accelerated the systemic circulation. At the same time, a moment's relaxation has been given to the fatigued body, and a sense of relief is usually afforded.

Symptomatology.—The value of yawning as a symptom has been at different times very differently estimated. Hippocrates recognized it as a precursor of a fever, particularly of intermittent fever. From its frequency and intensity he prognosticated the severity and duration of the disease. Yawning, with suffusion of the eyes and pandiculation, was in early times among the most valued factors in the diagnosis of the eruptive fevers. Occurring during parturition, it was an evil omen. Roederer, in 1759, believed that he had observed a death from it. The yawning of the infant was also a cause for solicitude.

It is now comparatively seldom, however, that we think of yawning as more than an indication of fatigue and a precursor of sleep, or of lassitude and a lazy disposition. But that it may denote a diseased state of the system is a well-recognized fact. As indicative of fatigue, it may be a symptom of profound mental or physical exhaustion. It may, in fact, of itself constitute a morbid condition of spasmodic nature and of grave import. It is not infrequently indicative of a deficient oxygenation of the blood, especially when it is associated with the dyspnœa which results from the lung consolidation of fibrinous pneumonia, the lung compression of hydrothorax or pneumothorax, or after profuse and exhausting hemorrhages. In the latter connection, it is at times a valuable factor in the diagnosis of concealed hemorrhage.

Modern experience has but confirmed the observations of the ancients with regard to the occurrence of yawning in the prodromal stage of fevers, particularly of the intermittents. In these, as also in such neurotic affections as epilepsy, hysteria, catalepsy, and somnambulism, frequent gaping often signifies the immediate supervention of a seizure. When it occurs during the course of a disease it not seldom indicates the approach of resolution or of a crisis. It is so frequently observed during parturition, however, as a consequence merely of fatigue, that no great significance is now attached to it.

As a symptom of feeble or suppressed menstruation in anæmic young girls, it is probably in most instances a manifestation of hysteria, so often a complication of this disorder. It is probable also that many of the reported cases of spasmodic yawning have been of hysterical origin. Nevertheless, cases have been reported in which yawning of a spasmodic character developed without hysteria, and resembled whooping-cough, spasmodic laughing, crying, sneezing, etc. Of a reflex nature, the affection may be indicative of various disorders of the central nervous system, particularly of cerebral anæmia, of circulatory disturbances in the medulla oblongata, or it may occur in the wake of cerebral hemorrhage. It also shows a predilection for individuals who, from necessity, are confined to small, closely crowded work-rooms, and for convalescents from neuralgic affections, especially cardialgia and hemicrania.

To the surgeon yawning is of interest chiefly on account of its occasionally producing luxation of the lower jaw. The mechanism of this accident is considered under *Dislocations,* in Vol. III.

James M. French.

YAWS is a chronic, highly contagious disease, probably caused by a micro-organism, confined to certain tropical countries, and characterized by a peculiar cutaneous eruption which goes through the stages of squamæ, papules, and tubercles; it is accompanied by a variable (but generally slight) amount of constitutional disturbance, and tends to recovery.

Synonyms.—Yaws is the common name given to this disease in the British colonies and by the negroes from West Africa. Sauvages, in 1759, suggested *frambæsia* as the scientific name, from the resemblance of the split tubercle to a raspberry (*framboise*); though Rat thinks that the characteristic tubercle is more like the top of a pickled cauliflower than a raspberry. Charlouis, in 1881, proposed *polypapilloma tropicum;* and later, Nicholls has suggested *granuloma tropicum* as a more correct and scientific designation. And it is to be regretted that one or other of these two names has not found universal acceptance. Different places, too, have furnished different names for this disease, the chief of which are as follows: In the French West Indies it is called *pian;* in Brazil and the Spanish and Portuguese possessions, *bubas,*