

MAGNESIA SPRING.

ONE UNITED STATES GALLON CONTAINS:

| Solids. | Grains. |
|----------------------------|---------|
| Calcium sulphate..... | 0.11 |
| Magnesium chloride..... | .56 |
| Calcium chloride..... | 1.30 |
| Sodium chloride..... | 1.23 |
| Iron bicarbonate..... | Trace. |
| Manganese bicarbonate..... | .41 |
| Calcium bicarbonate..... | .02 |
| Sodium bicarbonate..... | 1.43 |
| Potassium bicarbonate..... | .21 |
| Calcium phosphate..... | Trace. |
| Alumina..... | Trace. |
| Silicic acid..... | .91 |
| Nitrous acid..... | Trace. |
| Carbonic acid (free)..... | .66 |
| Total..... | 6.86 |

This water is somewhat aperient in full doses. It also possesses reconstructive and tonic properties.

PURE SPRING.

| Solids. | Grains. |
|--|---------|
| Calcium sulphate..... | 0.04 |
| Calcium carbonate..... | .35 |
| Magnesium carbonate..... | .24 |
| Iron carbonate..... | .02 |
| Sodium carbonate..... | .12 |
| Potassium carbonate..... | .08 |
| Sodium chloride..... | .16 |
| Silica..... | .25 |
| Phosphoric acid..... | Trace. |
| Manganese oxide..... | Trace. |
| Total..... | 1.26 |
| Carbonic acid (free and partially combined)..... | 1.40 |

This spring is entirely free from organic matter. It emerges in considerable volume from a group of crushed strata formed almost exclusively of silicious elements. It is but slightly mineralized, however, and may be referred to the indifferent group of waters.

James K. Crook.

CRETINISM. See Goitre.

CROCKER SPRINGS. — (Formerly White Creek Springs.) Davidson County, Tennessee.

Post-Office.—Cole Building, Nashville, care of A. G. Goodlet.

Hotel destroyed by fire, but there are accommodations for a few visitors.

This resort is situated 12 miles west of Nashville, at the foot of a high plateau running north from the Cumberland River to the Kentucky line. The altitude is about 600 feet above the sea level. The surrounding country is broken, the springs being situated between high hills. The large hotel was destroyed by fire some years since, so that the present accommodations are not what may usually be expected at first-class watering-places. There are, however, several comfortable buildings for the reception of guests. Adjoining the springs is a tract of 200 acres, containing fine orchards of apple, pear, and peach trees, etc. The prevailing meteorological conditions are clear weather and sunny days, with an atmosphere free from malarial or miasmatic influences. Two springs are in use, one known as the "Black Sulphur," temperature 58° F.; and the other as the "Red Sulphur," temperature 56° F. The following analysis was made many years ago (1841) by Dr. Troost, analytical chemist:

ONE UNITED STATES GALLON CONTAINS:

| Solids. | Grains. |
|---------------------------|---------------|
| Calcium carbonate..... | 35.42 |
| Sodium sulphate..... | 13.20 |
| Calcium sulphate..... | 19.64 |
| Magnesium sulphate..... | 19.32 |
| Sodium hyposulphate..... | 6.50 |
| Total..... | 94.08 |
| Gases. | Cubic inches. |
| Carbonic acid..... | 37.99 |
| Sulphureted hydrogen..... | 40.25 |

These waters have been well known in Tennessee for their beneficial effects in hepatic congestion, indigestion, Bright's disease, and the uric-acid diathesis.

Within two or three hundred yards of the building is a cold limestone spring which flows from a cave having a remarkably low temperature. The cave is utilized as a natural cold-storage house.

James K. Crook.

CROCKETT ARSENIC-LITHIA SPRINGS.—Montgomery County, Virginia.

Post-Office.—Shawsville. Hotel.
Access.—Via Norfolk & Western Railroad to Shawsville, thence 7 miles to springs by carriage.

This resort is located in the Alleghany Mountains, 3 miles from the Alleghany Springs. The elevation is 2,000 feet above the sea level, and the atmosphere pure, bracing, and delightful. The hotel is a new and substantial structure of artistic design, with a veranda encircling the main building, and is fitted up with modern conveniences. Ample provision has been made for the entertainment of guests. There are bowling alleys, lawn tennis courts, and croquet grounds. Walks, drives, fishing, and hunting are also enjoyed, while many find pleasure in rambling through the woods to the famous falls, where a bold and sparkling stream leaps for hundreds of feet from rocks and precipices, forming cascades and sprays of great beauty. The scenery about the resort is romantic and picturesque and affords ever varying features to charm the visitor's eye. The waters of the Crockett Springs are close to thermal, having a temperature of 70° F. in the coldest winter months. The following analysis was made a few years since by Prof. Henry Froehling:

ONE UNITED STATES GALLON CONTAINS:

| Solids. | Grains. |
|---|---------|
| Magnesium carbonate..... | 1.18 |
| Calcium carbonate..... | 5.90 |
| Strontium carbonate..... | .09 |
| Lithium carbonate..... | .07 |
| Magnesium sulphate..... | 3.04 |
| Calcium sulphate..... | 2.25 |
| Potassium sulphate..... | 1.25 |
| Iron sulphate..... | .04 |
| Sodium sulphate..... | 1.86 |
| Sodium chloride..... | 1.23 |
| Sodium bromide..... | .01 |
| Sodium arsenate..... | .02 |
| Aluminum silicate..... | .12 |
| Silicic acid..... | 1.29 |
| Barium carbonate, copper carbonate, lead carbonate, zinc carbonate, manganese carbonate, sodium iodide, aluminum phosphate, and ammonium nitrate..... | Traces. |
| Total..... | 18.35 |
| Carbonic anhydride combined with monocarbonates to form bicarbonate..... | 3.23 |
| Total..... | 21.58 |

This water is more distinguished for the variety than for the quantity of its mineral ingredients, yet some of its constituents, though minute in quantity, undoubtedly impart to the water an appreciable therapeutic value. It is said that the well-known physiological effects of arsenic, for example, may be readily produced by taking the water in large quantities. In practice the water has been shown to act as an eliminating agent, a nerve sedative, a nerve and blood tonic, and also as an alterative. It has been found particularly valuable in the chronic types of skin disease, especially those characterized by scaly eruptions. In those varied conditions in which arsenic is useful the water meets the indications perhaps more promptly, with more permanent results, and with less constitutional and local irritation, than do the artificial preparations of arsenic. The hotel is amply supplied with bathing facilities at any temperature, and good results have followed the conjoint use of the baths and the internal administration of the water. An office has been fitted up for the resident physician by the management, with the latest and most improved electrical apparatus and other appliances for the treatment of chronic diseases. The water is used commercially.

James K. Crook.

CROTON OIL.—OLEUM TIGLII. OLEUM CROTONIS.

"A fixed oil expressed from the seed of *Croton Tiglium* L. (fam. *Euphorbiaceae*)" (U. S. P.). This species of croton is a small, slender-branched tree, native of China, but very largely cultivated in India, and abounding in the East India Islands. The fruit is a three-celled, three-seeded capsule. The seeds are about 1 cm. long, oblong, rounded on the back, slightly flattened on the face on each side of the median line, where the raised raphe is to be seen running from end to end. Color of seeds yellowish-brown, black where the outer layer is scraped off, not shining. Testa brittle. Embryo large, albumen oily. In structure and shape they are very much like castor-oil seeds. They are much more uniform in size than the latter, larger than the smallest, smaller than the largest. Taste at first oily, then acrid.

The seeds are used in Java for poisoning fish. They are also largely used in Hindoo medicine, but it is directed that the membrane (tegmen) as well as the testa, and also the embryo, shall be first removed. Besides the oil, they contain *crotonin*, a highly poisonous toxalbumin, similar to the ricin of castor-oil seeds. The yield of croton oil is about one-fourth to one-third the weight of the seeds. It can be removed with ether or other solvents, though the official requirement is that it be expressed.

Both the seeds and oil are imported from Bombay, Cochin, etc.; the oil is also expressed in Great Britain from seeds imported from the East.

The oil is thus described:
"A pale yellow or brownish-yellow, somewhat viscid, and slightly fluorescent liquid, having a slight, fatty odor, and a mild, oily, afterward acrid and burning taste (*great caution is necessary in tasting*)."

"When applied to the skin, it produces rubefaction or a pustular eruption."

"Specific gravity: 0.940 to 0.960 at 15° C. (59° F.)."

"It reddens blue litmus paper moistened with alcohol."

"When fresh, it is soluble in about 60 parts of alcohol, the solubility increasing by age."

"It is freely soluble in ether, chloroform, carbon disulphide, and in fixed or volatile oils."

"When gently heated with twice its volume of absolute alcohol, it forms a clear solution from which the oil usually separates on cooling."

"If to 2 c.c. of the oil 1 c.c. of fuming nitric acid and 1 c.c. of water be added, and the mixture vigorously shaken, it should not solidify, either completely or partially, after standing for one or two days (absence of *other non-drying oils*)."

COMPOSITION.—This is one of the most complex of fixed oils in composition, and notwithstanding the very extensive study to which it has been subjected, our conclusions are yet far from satisfactory. It dissolves in an equal amount of alcohol, but if this volume of alcohol is increased a portion is insoluble. It is again soluble in 60 parts of alcohol. As the oil becomes older its solubility in alcohol increases, and, *pari passu*, its irritating properties increase. The most important fact, practically, is that it consists chiefly of a glyceride of crotonoleic acid. This body is purgative, whether in its own state or, as most likely, only through the gradual setting free of the acid in the intestine, is not certainly known. The acid is freely soluble in alcohol, and can thus be removed from croton oil, which always contains some in a free state. It is extremely irritating to the skin and mucous membrane, and it is its gradual formation by decomposition on keeping which renders the older oil more vesicant and more violently drastic. This acid is in a general way similar to ricinoleic acid of castor oil, but is much more active. Glycerides of several other acids, fixed and volatile, have been reported. It is believed that irritating properties reside in some one or more of these volatile constituents, as employees in the factories who do not come into contact with the oil suffer from cutaneous irritation.

ACTION AND USES.—From the above, it will be seen that croton oil is (1) a vesicatory and (2) a drastic purgative. Upon the skin, a drop to each twenty or thirty

square inches produces violent irritation, usually an acute eczematous eruption of numerous closely aggregated blisters, becoming, if the result is intense enough, pustular and scabby. The eruption is usually limited to the region to which the application is made, but in extremely susceptible patients a general vesication of nearly the whole body may follow a limited application. It has been a moderately common mode of counter-irritation in bronchitis and other diseases, but is now only rarely used. It has also been used as a parasiticide in obstinate cases. Absorption and purgation have frequently followed its external application.

As a quick purgative, where the most rapid and complete emptying of the bowels is required, in "congestive" and other apoplexies, in injuries to the head, in uræmic conditions, in short, whenever an intense derivative action to the bowels is required, croton oil was for a long time at the head of the list; its rapidity and the smallness of its dose being great advantages. With the multiplication of purgatives, however, the objectionable features of this oil have led to a steady decline in its use. This is now more generally confined to cases absolutely requiring a powerful local action upon the intestine, such as lead colic or seasickness, or to those in which other purgatives cannot be readily administered, as to those individuals who are in a state of insensibility, or to insane patients. Here the dose can be made effective by simply dropping it upon the back of the tongue. The purgative action of this drug is essentially an irritative one, accompanied by griping pain, and often followed by much inflammation. There is increase of watery secretion and also of motion, and any abdominal or rectal irritation or inflammation is markedly increased. It also irritates the uterus, and is abortifacient. These effects may be moderated by washing it with a little alcohol, and thus removing the free crotonoleic acid. The dose is ʒi . to ʒj , and should not be repeated.

Poisonous symptoms are commonly those of great abdominal inflammation, followed by depression or collapse. In some cases, when purging has not occurred, great depression and progressive blunting of the vital powers have been observed, as is common in the lower animals.

Henry H. Rusby.

CROUP.—Croup is an acute inflammation of the larynx, characterized by the formation of a pseudo-membrane. The principal symptom from which the disease derives its name is a peculiar crowing cough. A similar cough is also found in severe cases of acute laryngitis in children and in laryngismus stridulus; consequently these last two diseases are frequently included under the heading of "croup," although in them there is no formation of a false membrane in the larynx.

ETIOLOGY.—In the great majority of cases the false membrane is due to the action of the Klebs-Löffler bacilli, thereby making croup one of the manifestations of diphtheria, that is, of laryngeal diphtheria (see *Diphtheria*).

The idea prevalent some years ago, that much of the croup was idiopathic and non-diphtheritic in its character, in the last decade has been shown to be false and it is now an established fact that a very large percentage of these cases are diphtheritic.

Billings, after careful bacteriological investigation of two hundred and eighty-six cases of membranous laryngitis, found Klebs-Löffler bacilli in eighty per cent. of them; streptococci and diplococci were the bacteria found in the remaining twenty per cent. of the cases.

Non-diphtheritic membranous laryngitis, or false croup, as it is often called, may result from blows upon the larynx, from the inhalation of hot steam and smoke, or from the introduction into the larynx of caustic alkalies or acids.

PATHOLOGY.—In the early stages the laryngeal mucous membrane is hyperæmic, while later there is a round-cell infiltration into the epithelial and subepithelial layers, followed by a transudation of lymph into these infiltrated regions. The lymph coagulates, and the action of the toxins developed by the bacilli produces a coagulation

necrosis of the cells, first of the epithelial layer, subsequently of the subepithelial, and this necrosis of the cells results in the so-called false membrane. At first this membrane is firmly bound to the underlying tissues by the fibrin and the coagulated lymph, so that any attempt forcibly to remove the membrane results in hemorrhage. The subsequent changes are those of still further necrosis of these areas, a line of demarcation being formed where the cells undergo liquefaction and the fibrin breaks up. By such a melting process the membrane is gradually exfoliated; or else at some point it curls up and then, in a violent fit of coughing, is torn off and expelled as a single mass.

The color of the exudate at first is a dirty gray, but where the infection is very severe, involving the larger blood-vessels deep down in the subepithelial layer, a condition allied to gangrene supervenes and the exudate may be dark green or even black.

The places where the exudation is commonly found are the ventricular bands or false vocal cords, the true vocal cords, the posterior wall of the larynx, the trachea, and in severe cases, even the bronchi.

SYMPTOMS.—The symptoms of croup usually are superimposed upon those of diphtheria, and it is rare that a patient has the laryngeal type at the onset of the disease. It will be found, as a rule, that the patient has had sore throat, nausea, perhaps vomiting, a slight rise in temperature, and a pulse somewhat accelerated for two or three days before the first evidence of laryngeal involvement is observed. There does not seem to be any definite relation between the severity or the mildness of the diphtheritic process and the tendency to involvement of the larynx. The mildest forms of pharyngeal diphtheria are sometimes complicated with croup, and the severest forms of faucial diphtheria are found without this complication.

The first indication of the involvement of the larynx that is likely to be observed is a hoarseness of the voice. This may persist for a few hours or even for a day or two before it will be observed that the patient has some difficulty in breathing; this difficulty is usually more marked during inspiration than it is during the expiratory stage. Once the dyspnea manifests itself it is usually steadily progressive, sometimes at an alarming rate, and the cough becomes of a peculiar crowing character with numerous short expiratory coughs followed by one long, crowing inspiratory effort, the "croup," which gives the name to the disease. These paroxysms at first may not be very severe nor more frequent than once in every three or four hours; they soon, however, become more frequent and more severe. During each paroxysm the face becomes first deeply congested and later cyanotic. The paroxysms leave the patient quite exhausted. It is not uncommon for him to fall into a profound sleep in the intervals between the paroxysms, during which time the breathing is labored. As the laryngeal obstruction and the paroxysms become more severe the patient frequently has convulsions, during which the urine and feces may be involuntarily voided. Death occurs most frequently either from exhaustion, from asphyxia, or from heart failure. In one of the severe paroxysms when it would seem as if the end were about to come, it occasionally happens that the membrane, a cast of the larynx, will be expelled at the end of the paroxysm. The patient then falls into a quiet sleep, the breathing becomes normal or nearly so, and recovery takes place. In exceptional cases, in which the membrane is moderate in amount and the paroxysms are not too severe, and the patient has a considerable amount of vitality, the membrane may gradually melt away, the paroxysms by degrees becoming less and less severe, and recovery taking place in this gradual manner.

The examination of the upper air passages in a patient suffering from croup almost invariably reveals evidences of membrane formation either on the tonsils, the pillars of the fauces, or the posterior pharyngeal wall, or in the nasal cavities or the nasopharynx.

Bacteriological examination as to the character of this exudate furnishes us with a clew as to the probable nature

of the bacilli connected with the membrane formation in the larynx.

DIAGNOSIS.—Croup may be mistaken for acute laryngitis, for laryngismus stridulus, or for œdema glottidis.

Croup is to be distinguished from the acute form of laryngitis by the facts that the latter disease is usually associated with an acute bronchitis, that the attacks are most frequent at night time, that the paroxysms are not so severe as in true croup, and that the child is usually free from all croupy symptoms during the day, only to be affected again the following night. It will often be found that every attack of acute laryngitis and bronchitis is accompanied by some croupy cough and that antispasmodics and emetics give rapid relief from the croupy symptoms of acute laryngitis while ordinarily not affecting the paroxysms of true croup.

Laryngismus Stridulus is a spasmodic contraction of the adductors of the vocal cords, occurring in children of an exceedingly nervous temperament who have otherwise been perfectly well and free from all evidences of laryngitis. The attack comes on suddenly at night. The mother being awakened by a long, crowing inspiration of the child, rushes to the bed and usually finds the little one tossing about, the face congested, the arms wildly thrown about, the knees drawn up, and the urine and feces often involuntarily voided. And then, when to all appearances it is about to die from suffocation, the child takes a deep inspiration, the body relaxes, the cyanosis disappears, and the child falls into a quiet sleep without any further spasmodic breathing. The child suffers neither from hoarseness nor from cough on the following day.

œdema Glottidis is an affection of the larynx due to œdematous infiltration into the tissues above the vocal cords, and may be either acute, as in erysipelas, peritonsillar abscess, and wounds of the larynx, or more chronic as in tuberculosis, syphilis, and malignant disease of the larynx. It is far more common in adults than in children, is rather sudden in its onset in the acute variety, and the dyspnea is inspiratory in character. Furthermore, the voice is usually not affected, whereas in croup progressive hoarseness and aphonia may be expected. The temperature will be little or much elevated, according to the disease which œdema of the larynx complicates; and finally a laryngoscopic examination will reveal enormously swollen, œdematously infiltrated epiglottis, aryepiglottic folds, and ventricular bands. In acute laryngitis, in laryngismus stridulus, or in œdema glottidis there will be no evidences in the throat of any membranous exudate, as will usually be the case in true croup.

PROGNOSIS.—Croup is one of the most fatal diseases of childhood. The mortality will range anywhere from fifteen per cent. in epidemics of a mild form of diphtheria, to eighty per cent. in the severer types. The younger the patient, the greater, as a general rule, is the mortality rate. The earlier the larynx is involved in a case of faucial diphtheria, the more severe the disease and less favorable the prognosis, as a usual thing. When the trachea as well as the larynx is extensively implicated in the membrane formation the prognosis is exceedingly grave. When laryngeal diphtheria complicates measles, scarlet fever, whooping-cough, or any of the exanthemata, and when it occurs in rachitic or other poorly nourished children, the prognosis is exceedingly unfavorable.

TREATMENT.—The treatment of croup may be divided into the prophylactic, the hygienic, the constitutional, and the local.

1. **Prophylactic.**—Every child suffering from croup, even though the inspection of the fauces and bacteriological examination of the buccal cavity and its secretion may not reveal the presence of the Klebs-Löffler bacilli, should be carefully isolated. Small squares of cheesecloth should be employed in place of handkerchiefs for wiping the nose and catching any of the buccal secretion. These pieces of cloth should be immediately burned, or when this is impossible, they should be placed in a porcelain receptacle in which there is kept a solution of bichloride of mercury, 1 to 1,000. All clothing and bedding

material should be washed out in a bichloride solution of the same strength, and when this is impracticable, as in the case of mattresses, blankets, and similar articles, they should be sent away to some disinfecting plant where they may be carefully disinfected with formalin gas, superheated steam, or superheated air. The room in which the patient is to remain should be stripped of all curtains, carpets, and upholstered furniture, pictures, etc., which may be the means of retaining the germs and communicating them to others.

2. **Hygienic.**—The temperature of the room should be kept constantly at 75° F., and it is desirable that the air in the room be kept rather moist by means of a kettle of water kept boiling within it.

The diet should be of the most nourishing variety, preferably fluid. Milk in some form, either plain or diluted with lime water or Vichy; koumyss, matzoon, or buttermilk may alternate with the above for sake of variety. The white of an egg beaten up in half a glass of water may also be given in place of any of the above.

The room should be carefully ventilated from time to time, great care being taken that no draught shall strike the patient during the process.

3. **Constitutional.**—Since the introduction of antitoxin in 1894, for the treatment of diphtheria, and its almost universal employment with beneficial results and a great lowering of the mortality rate of diphtheria, especially the laryngeal type, or croup, we feel constrained to place this remedy at the head of the list. To be of the greatest service the antitoxin should be administered as early as possible in the course of the disease. We have, however, seen most beneficial results follow its employment even as late as the fifth day of the disease. In a case of moderate severity 1,500 units should be administered hypodermatically when the physician is first called to see the patient. If at the end of twenty-four hours there is not some improvement, the same amount should again be administered. In the severe types of the disease 2,000 to 3,000 units may be given at the first injection. While it is desirable that a regular antitoxin syringe be employed, an ordinary hypodermic syringe properly sterilized will answer the purpose.

It is always well to administer calomel as a purgative at the onset of the disease, and for this purpose gr. $\frac{1}{10}$ triturates of calomel should be administered, one every half hour until eight are taken. If at the end of the next six hours there has been no stool, it is desirable to give a saline laxative, such as citrate of magnesia (a tumblerful), in order to hasten the action of the calomel.

The administration of emetics, as ipecac, tartar emetic and the like, which were so much prescribed in former years for the purpose of loosening the membrane and enabling it to be expelled in the process of vomiting, almost never accomplishes this purpose and only serves to weaken the child and so prevent recovery.

Many physicians administer internally gr. $\frac{1}{10}$ of bichloride of mercury three times a day, claiming thereby that the action of the mercury tends to limit the formation of the membrane. I can see no objection to this method of treatment, but since the advent of antitoxin the latter has superseded the mercurial treatment.

4. **Local.**—The local treatment should consist in placing the child under a tent improvised by a sheet or blanket stretched over the bed. A piece of rubber hose attached to the spout of a tea kettle containing boiling water should lead under the tent and at a distance of six or eight inches from the patient's face, so that the escaping steam may not scald the patient. The inhalation of this hot, moist air will undoubtedly assist in the separation of the membrane and hasten exfoliation.

In mild cases the above constitutional and this local treatment may be all that will be necessary to carry the patient past the period when obstruction to respiration is most marked, and to avert the danger of impending asphyxiation; but in severe cases in which the exudate is very thick and the space in the larynx through which the patient can breathe is exceedingly narrowed; in which dyspnea becomes very great and the breathing exces-

sively labored; in which there is a noticeable degree of sinking-in of the soft parts above the clavicles; and in which, finally, an examination of the chest reveals imperfect expansion of the lungs, as shown by the feeble respiratory murmur, especially at the bases of the lungs posteriorly, it then becomes necessary to devise some means of furnishing the patient with an increased supply of air. Formerly tracheotomy was the only means that the physician had at his command for accomplishing this purpose; at the present time, however, owing to the very valuable service rendered to humanity by the late Joseph O'Dwyer of New York City, the intubation tubes have almost completely replaced the tracheotomy tubes as a means of affording an increased amount of air to the suffocating child.

Intubation should not be delayed until the child becomes cyanotic or exhausted from severe dyspnea. (For method of intubating, see *Intubation*.)

The tube should be worn for a period of from two to seven days, according to the length of time that has elapsed from the onset of the croupy symptoms to the time of intubation. When intubation is done on the first or second day after involvement of the larynx the tube should be left in for five or six days; when intubation is performed on the fifth or sixth day of laryngeal diphtheria, it may be only necessary to leave the tube *in situ* for two or three days.

Great care should be taken in feeding the patient, liquids alone being employed. I have found it most practical to feed the child from a teaspoon, the nurse holding the child on her lap face upward and having the head markedly extended backward, the head thus being much lower than the rest of the body.

Occasionally intubation may not afford the needed relief, owing possibly to the physician's inability to introduce the intubation tube, or more likely to the pushing down of the membrane in front of the lower end of the tube. In such cases tracheotomy is imperative.

Cornelius G. Coakley.

CRUCIFERÆ.—(*The Mustard Family.*) A family of more than two hundred genera and probably fifteen hundred species, growing mostly in warm-temperate regions and widely distributed, many of them as common weeds. The family is of great economic importance, yielding the important food plants: cabbage, turnip, cauliflower, kale, sprouts, broccoli, and cresses of various sorts, and the important fixed oils of mustard, rape, and colza. The important medicinal constituents are a series of glucosides similar to sinigrin, which in decomposing yield volatile principles of which the volatile oil of mustard is the type, consisting of aromatic compounds similar to those of onion and garlic. The counter-irritant and antiscorbutic properties of these oils will be described under *Mustard* and *Horseradish*. Quite a number of species, by virtue of these constituents, have been used as vulneraries. Such are the Shepherd's Purse (*Bursa Bursa-pastoris* [L.] Britton), and various species of *Lepidium*, *Barbarea*, *Sisymbrium*, and *Brassica*. They apparently possess a germicidal and disinfectant power, and at the same time stimulate healing of the tissues. They are from time to time recommended in the medical press as new remedies for application to wounds and unhealthy sores.

Henry H. Rusby.

CRUM MINERAL SPRINGS.—Mahoning County, Ohio. POST-OFFICE.—Girard.

ACCESS.—Street railroad passes within one mile and a quarter of the springs.

These springs are located within 4 miles of Youngstown, Mahoning County, and about a mile and a half from Mineral Ridge, Trumbull County. No hotel has yet been built, but the water has been used commercially for the past seven years. The surroundings are said to be very attractive and well adapted for a summer resort.

The springs are four in number; only one, however, is in use. The following analysis was made by S. W. McKeown, analytical chemist:

| ONE UNITED STATES GALLON CONTAINS: | |
|------------------------------------|---------|
| Solids. | Grains. |
| Calcium carbonate..... | 5.31 |
| Magnesium carbonate..... | 1.80 |
| Iron carbonate..... | .59 |
| Sodium carbonate..... | .14 |
| Magnesium sulphate..... | 1.17 |
| Sodium chloride..... | .48 |
| Silica..... | .29 |
| Total..... | 9.78 |

This analysis shows a combination of very useful ingredients. They give the water the properties of a ferruginous tonic, a mild diuretic, an antacid, and in large doses, a light laxative. The water is useful in disordered states of the stomach and in functional affections of the liver and bowels. Its continuous use tends to overcome chronic constipation.

James K. Crook.

CRURIN.—Quinoline-bismuth-sulphocyanate. This is a coarsely granular, yellowish-red powder of pungent odor, insoluble in water, alcohol, or ether. It is decomposed on prolonged exposure to cold water and on boiling with dilute acids or alkalis. Steiner made extensive use of it in ulcers, especially those of syphilitic origin, by dusting the ulcer twice daily and covering with a protective dressing. It sometimes causes at first a burning pain, which is soon followed, however, by a feeling of warmth and comfort. If too irritating it may be diluted with starch. If the ulcers are old and have thickened edges, a wet dressing of aluminum acetate will soften them. Steiner found that both syphilitic and non-syphilitic ulcers healed completely in from ten days to six weeks, under the use of this remedy. W. A. Bastedo.

CRYING is an involuntary disturbance of respiration accompanied by relaxation of the facial and jaw muscles and lachrymation; it is usually an expression of strong emotion, such as grief, fear, anger, or pain. The inspiration is short and deep, sometimes spasmodic in character; the expiration is prolonged; the glottis is narrowed and an inarticulate sound is usually produced. The eyes are generally closed, and the angles of the mouth are depressed.

Crying is the only language of the new-born babe, its only means of expressing its desires, discomfort, or dissatisfaction with its surroundings. The first welcome cry expands the lungs and probably assists in establishing the normal course of the circulation. The lustiness of it is taken as a measure of the infant's vigor. The cry of the infant differs, however, to some extent from that of the adult, in the facial expression, in the absence of tears, and in the sound produced. The eyes are closed, the mouth is widely opened, the chin often quivers. With the development of the lachrymal and salivary glands, however, we have, by the third or fourth month, a flow of tears and often drivelling.

Physiology.—In crying the diaphragm is suddenly deeply depressed, causing full inspiration. The action is involuntary and is so quick that the other respiratory muscles probably take little or no part in it. The ascent of the diaphragm may be uniform or interrupted, and the air is forced through a partially closed glottis, producing a steady or a broken, inarticulate sound, varying, as a rule, with the character of the lamentation. The inspiration is sometimes also intonated (the "reprise"). The contraction of the laryngeal muscles sometimes becomes clonic and painful in the prolonged crying of deep distress. The circulation is accelerated; the face and even the entire integument of the young infant may become engorged with blood. Although the act is involuntary, it may be closely simulated, and it may be voluntarily arrested. The nervous mechanism of crying is not fully understood. It is closely related to that of laughing, so closely, in fact, that in children and hysterical adults either may quickly give place to the other. Crying may be inaudible when, from embarrassed respiration as in the weakness of marasmus, syphilis, rachitis, or pneumonia, the infant cannot produce the sound, or when, on account of pain, it suppresses it, as in pleurisy.

The deepest grief is often expressed in silence, the face buried in the hands, perhaps, while the tears refuse to flow. Tearless crying in an infant more than four months old is regarded as an unfavorable symptom.

Significance of Crying.—Much may be learned of an infant's condition by observing its expression and its actions while crying, as well as from the character of the act itself, but it is going a step too far to say that the location of the disease can always be determined from the cry. Persistent crying always indicates the existence of something abnormal. It may denote hunger, as the mother is apt to believe; it is probably just as often a sign of thirst. If, however, the infant refuses to take the breast, this element is ruled out, providing there be no other cause for refusal, such as obstruction of the nostrils or disease of the mouth or throat. The cry of hunger is fretful, and is generally interrupted by vigorous sucking of the fingers or hunting for the breast, but the discomfort induced by overfeeding is manifested in the same manner. Nursing relieves hunger, but stops the cry of overfeeding only for the moment. In pain about the head the brows are generally knit and the hands are often raised to the region of the pain. In earache the cry is most persistent, and the hands may be held to the side of the head or thrust into the mouth, as is often the case also in disease of the mouth or throat. The sudden, sharp, hydrocephalic cry is characteristic of cerebral disease, but only in the presence of other symptoms. In painful diseases of the chest the cry is not loud, as a rule; it is more frequently moaning in character, or each expiration may be slightly intonated. When coughing is accompanied or followed by crying it arouses suspicion that the bronchitis has reached the smaller tubes and that catarrhal pneumonia is imminent. The absence of crying is often of greater significance. The cry of weakness is low in tone, and has more the character of whining or moaning; it is often indicative of marasmus, atelectasis, or of hereditary syphilis when it has also a nasal tone. A hoarse cry denotes a catarrhal condition of the larynx which may be due to "cold," syphilis, diphtheria, or pseudo-croup. The "croupy" cry, with corresponding cough, signifies a dry or inflamed condition of the vocal cords or a spasmodic closure of the glottis as in laryngismus stridulus. In abdominal pain the crying is usually accompanied by squirming movements of the body and by drawing up of the legs or kicking. It ceases with the evacuation of the bowels in catarrh of the small intestine, but accompanies and follows it in colitis or dysentery. Laying the infant upon its abdomen stops it, not by relieving the pain, but by so impeding the respiration that it cannot cry. When continuous crying is unaccompanied by other symptoms of illness, errors may often be avoided by the removal of all clothing in order to exclude such causes as the pricking of a pin, inflammation about the umbilicus, or a recently developed hernia, dislocation, or fracture. The infant with rheumatism or pleurisy, and not infrequently the rachitic child, cries with pain when it is picked up; pressure upon different regions in succession will generally locate the tenderness.

In older children the manner of crying is often an index to the emotion expressed. In the cry of fear, for example, the eyes remain open and the orbits are turned toward the source of danger; the lips and often the entire face become pale; the outcry is short and loud. The cry of anger is also loud, but the lower lip protrudes in a pout, and the face becomes livid. The peevish cry of the spoiled child is accompanied by peeping eyes, a scarcity of tears, and whining often breaking into a staccato movement. The cry of pain corresponds to the character of the pain and varies from a sudden violent scream to a whine more like that of peevishness. In anger or pain the breath is often held until the face becomes cyanotic and the veins become distended. Convulsions have followed such paroxysms, and death has been attributed to them in a few instances. Such results would probably more frequently follow were it not for the anatomical peculiarities of the infant's circulation which permit the distention of superficial vessels and the

more rapid flow of venous blood from the cranium. Finally, crying often becomes a habit with over-indulged children. Even young infants learn it and cry not merely for food or drink, but to be carried, to be rocked, for the light, or apparently for no other purpose than to attract attention. It is easily cured by persistent and total disregard of it on the part of the nurse.

Crying has also its significance in the adult, but much depends upon the emotional nature of the individual. Some persons maintain a stoical indifference to the most trying circumstances, while others are moved to tears by the merest trifles. The latter class are especially susceptible to the influence of suggestion. Crying frequently occurs in intoxication by alcohol and other stimulants, especially in advanced dysomania. In the morphine habitué when frequent, it is sometimes indicative of the approach of imbecility. The weeping of the hysterical woman is characteristic in the depth of grief expressed, in the violence of the outcry, or its dramatic pathos, and especially in its sudden change to an equally violent fit of laughter. Crying is often a symptom of neurasthenia. In paralytic dementia and other forms of emotional insanity a tendency to weep is sometimes one of the earliest symptoms, and in the closing period of the disease it may often be induced by the most trivial circumstances, the asking of a question, or a mere glance at the patient. Many other diseases not necessarily involving the mind are attended by so great depression of spirit as to render it of frequent occurrence. Not infrequently, however, temporary improvement seems to follow a good fit of crying just as it often follows hearty laughter.

James M. French.

CUBA.—Cuba was discovered by Columbus on October 28th, 1492, and was called by him Juana, in honor of Prince Juan, son of Ferdinand and Isabella. Its present name is that by which it was known among the natives at the time of the discovery.

GEOGRAPHY.—The island of Cuba is very long and narrow, and lies between the 74° and 84° of west longitude and the 19° and 23° of north latitude. Its average breadth is about 80 miles. Nowhere is it more than 100 miles wide, and in the longitude of Havana it is less than 20 miles from sea to sea. Its length is about eight times its average breadth. Its extreme length, measured along a curved line following its centre, from Cape Maisi, in the east, to Cape San Antonio, in the west, is about 730 miles. The area of Cuba, including its adjacent keys and islands, is estimated at 45,000 square miles, a little less than that of the State of New York. The coast is very extensive, nearly 2,000 miles, and is surrounded by numerous small islands and reefs. In most places the coast rises abruptly from the sea. The principal exception is found in the great Zapata swamp on the south central coast. A number of good harbors indent the shore. The natural drainage of the island, as a whole, is excellent. The highest part of Cuba is a range of mountains known as the Sierra Maestra, bordering the southeast coast from Cape Maisi to Cape Cruz. The highest peaks of this range are the Pico de Turquino, 7,670 feet, the highest point in the island; Gran Pedra, 5,200 feet; Yunque, and Ojo del Toro, 3,000 feet above the level of the sea. From this range there extends very nearly through the centre of the island a general ridge, or range of hills, of greater or less elevation. In the extreme western part of the island, this ridge again attains considerable height in the Pan de Guajabon, which is 2,530 feet above the sea. The island is divided by this ridge into two general watersheds, one draining toward the north and the other toward the south. About one-fourth the total area is estimated as mountainous, three-fifths as rolling plains, valleys, and arable slopes, the rest swamps. According to Humboldt, the general "face of the interior of the island is gently undulating, like that of England, and not more than 280 to 380 feet above the level of the sea." The rivers are numerous but short. Minerals are probably abundant, but of the metals, only copper, and, of late years, iron have been

mined profitably. Coal of good quality abounds, and petroleum springs are found in some parts. Mineral springs of local celebrity exist in the different provinces. Those of San Diego, in Pinar del Rio, and at Madruga, the Saratoga of Cuba, southwest of Matanzas, are most frequented. The water of the latter contains iron, sulphur, magnesia, and potassa.

FLORA.—The flora is tropical and abundant, and the soil is fertile. Extensive forests, so dense as to be almost impenetrable, exist. About 13,000,000 acres of uncleared forest yet remain. Mahogany, lignum vitae, and other hard woods are plentiful. Coco-wood out of which reed instruments are made, and *Cedrela odorata* used for cigar boxes and linings of cabinet work, abound. Numerous varieties of palms, the most common and useful of the Cuban woods, are found. The fruits are those common to the tropics. Sugar-cane, tobacco, coffee, sweet potatoes, Indian corn, and rice are cultivated extensively. The first two are the staple products. Cattle raising is said to be profitable in the highlands.

FAUNA.—Only a few mammals are known to be indigenous. None are large. Wild dogs and cats, sprung from the domestic animals, are numerous. Of the indigenous, the agouti, a rodent of the size of the domestic rabbit, is plentiful. The agouti is peculiar and common to all the West Indies. Another peculiar animal is an insectivore, the solenodon. Venomous reptiles there are none. There is a large snake of the boa variety called the maja, but it does not molest man. Crocodiles are found in the Isle of Pines, off the south coast. Insects are abundant in number and variety. Many arachnids are also found; but their bites, though painful, are said not to be dangerous. The rivers are well supplied with fish. Oysters and other shellfish are plentiful, but the quality is inferior. The peculiar marine mammal, the manatee, is found in the shallower waters along the coast. The birds are numerous, the parrot is the most conspicuous.

CLIMATE.—The climate of Cuba has the general characteristics of all tropical islands: *i. e.*, high and equable temperature and humidity, and abundant rainfall. Its particular situation in the north tropical zone brings it within the region of the northeast trade winds. As elsewhere in the tropics, the year is divided into a hotter and wet season and a cooler and dry season, corresponding, north of the equator, with the northern and southern declinations of the sun. In all tropical regions, the heat and the rainfall are both greater the nearer the sun is to the vertical, or, in other words, they follow the sun. Local departures from these general characters are to be found, caused largely or entirely by differences in altitude, exposure and slope of the surface, and position with respect to the prevailing winds of the zone. From its geographical position and its configuration, Cuba undoubtedly presents many of these local variations. Unfortunately, however, the meteorological statistics available are too few and meagre to give other than a very imperfect idea of the local climates of the island.

Temperature.—Cuba lies between the sea-level isotherms of 77° and 80° F. The average temperature of Havana is 77° F. The highest temperature recorded at Havana is 100.6° F., and the lowest 49.6° F. At Guanabacoa on the coast, 5 miles east of Havana, the temperature for one year was 76.8° F., and at Matanzas, on the coast, 50 miles east of Havana, the mean temperature, two years' record, was 78° F., and the highest and lowest temperatures were 93° F. and 51° F. respectively. On the south coast, at Firmeza, 16 miles east of Santiago de Cuba, and 500 feet above sea level, the average temperature for ten years was 79.8° F. At Santiago the average temperature, determined from very incomplete records, is about 80° F. The highest temperature recorded in July, 1899, was 90.3° F., and the lowest in January of the same year was 67.5° F. At Cienfuegos the average temperature for eleven months was 76° F., and the highest and lowest were 94° and 49° F. respectively. A visitor to Trinidad de Cuba stated that during a winter spent there the temperature did not go above 84° F.