

stantly flows in and out. There are arrangements for douches with massage attached to each bath, and also independent apparatus for douches of various forms. There are inhalation rooms; facilities for gargling, irrigation, and pulverization; baths and douches of water charged with carbonic acid gas; hydro-electric baths; a large public swimming bath; and a gymnasium.

The chief drinking fountain is from the Eugénie Spring, and is situated in a pleasant park. The water is very agreeable to drink. There are two casinos with music, concerts, balls, and theatrical performances. "The excursions," says Yeo (*loc. cit.*), "are numerous, varied, and interesting; for no more remarkable country to the geologist, the naturalist, and the archæologist can be found than this great mountainous district of extinct volcanoes, old mediæval towns, historic churches, and Roman and even earlier remains."

The accommodations are abundant, good, and of reasonable price. Although open throughout the year, the season is from the 15th of May to the 15th of October.

Royat is about nine hours distant from Paris via Clermont-Ferrand, which is fifteen minutes distant from Royat.

The disorders for which these waters are of value are chiefly arthritic and anæmic affections. Rheumatism; gout associated with anæmia; skin diseases, such as eczema, acne, and pityriasis; chronic laryngitis and bronchitis; bronchial asthma; neuralgia; sciatica; atonic dyspepsia; various uterine affections; gouty glycosuria; biliary and renal lithiasis; neurasthenia; and various forms of anæmia are all treated here. The contraindications are organic cardiac affections, a tendency to hemorrhage, organic affections of the central nervous system, scrofula, and other tuberculous affections.

For the after-treatment the seaside for a short time is recommended, except in joint and bronchial affections, for which a winter in the south of France is preferred.

Not far from Royat is Durtol, 1,705 feet high, where is a sanatorium, opened in 1898.

For a further consideration of this resort, as well as others in France, the reader is referred to "Stations Hydro-Minérales, Climatériques, et Maritimes de la France," Paris, 1900. *Eduard O. Otis.*

RUBBER.—*Elastica*, U. S. P. *Caoutchouc*, Fr. Cod.; *India rubber*, *Gum elastic*, etc. The concrete milk juice of several species of *Hevea*, Aubl. (fam. *Euphorbiaceae*), known in commerce as *Para rubber*.

From a commercial standpoint, the substance bearing the above names is derived from a large number of milky-juiced plants, growing in the tropics of both the Old and the New World, these plants belonging to many and distantly related families, but more especially, in the order named, to the *Euphorbiaceae*, *Urticaceae*, *Apocynaceae*, and *Asclepiadaceae*. Besides these, which yield rubber on a commercial scale, the substance caoutchouc occurs in small amounts in a very large number of milk juices.

The rubbers from these different botanical sources naturally differ widely in appearance and quality. Some of them—perhaps more because of the manner in which the milk juices are treated than because of natural differences in the latter, they being often mixed with ashes, soap, and other substances, and allowed to ferment in holes in the ground—are quite unfit for official use. Others, though clean, and not, strictly speaking, objectionable, are inferior from the standpoint of deficiency in their useful properties. *Para rubber* has been selected for official purposes because of its cleanliness, purity as caoutchouc, high elasticity, durability, and ready solubility in appropriate liquids.

ORIGIN.—The plants yielding *Para rubber* are large trees, frequently exceeding a hundred feet in height and five or six feet in diameter, growing in the valleys of the Amazon and its tributaries. The basin of the Madeira and its tributaries produces the largest amount. Though mostly exported via *Para*, whence the name, much of the same grade comes out through the west coast of South America. The milk juice is obtained by gently tapping

the outer and middle bark layers with a sharp pick and catching the exudation in small cups attached to the trees. The milk is then gathered and carried to the smoking stations, where it is coagulated in successive layers upon a flat wooden paddle, by being held in the smoke of smothered fires, special articles being preferred for this fuel. When a suitable quantity has been gathered upon the paddle, an incision is made at the upper end of the mass, called a *bolacho* or "bottle," to permit of its being slipped off from the end of the paddle. It then possesses a flat form, a whitish color, and smooth surface, and may weigh from a few up to seventy-five pounds, or even more. The product of the upper tributaries is usually in *bolachos* of about twenty-five pounds, the larger *bolachos* coming mostly from the lower Madeira. The rubber soon begins to turn yellow, then brown, and ultimately black, first upon the surface and then gradually toward the interior, the complete process of darkening requiring several years. At the same time it loses water, and of course weight. It may be exported in the original *bolachos*, but owing to the danger of adulterants in the form of sand, stones, etc., it is now mostly cut into small pieces in *Para*.

DESCRIPTION.—The following is the official description of *elastica*:

In cakes, balls, or hollow, bottle-shaped pieces, externally brown to brownish-black, internally brownish or of lighter tint; very elastic; insoluble in water, diluted acids, or diluted solutions of alkalis; soluble in chloroform, carbon disulphide, oil of turpentine, benzoin, and benzol. When heated to about 125° C. (257° F.) it melts, remaining soft and adhesive after cooling. Odor faint, peculiar; nearly tasteless.

COMPOSITION.—The percentage of caoutchouc in *India rubber* varies with the amount of water which the substance has lost. In its original liquid condition there is said to be about thirty-two per cent. of this hydrocarbon (C₂₀H₃₂). With caoutchouc exist a little wax, a free acid, and some proteid matter. There is a little free carbon, which results from the smoking process.

PROPERTIES AND USES.—On continued exposure to the atmosphere, rubber undergoes changes which render it brittle and weak, and this may be prevented by keeping it under water, which preserves it by inducing superficial fatty changes. *Vulcanized rubber* is produced by combining the original rubber with sulphur, under the influence of heat, by various processes. It still retains its elasticity, but becomes harder and is no longer soluble in the same liquids as before. *Hard rubber* or *ebonite* may be obtained by combining rubber with various other substances than sulphur.

Strictly speaking, rubber has no medicinal properties, since it is insoluble in all the fluids of the body. The original milk, being drunk by mistake, has invariably coagulated into an insoluble mass in the stomach, the result being fatal in the absence of surgical treatment. Its uses are wholly mechanical. The most important is as a mass for plasters. Such a mass possesses very good qualities, although experiments seem to indicate that the effect of the incorporated medicinal substance is somewhat less than when combined with the official plaster mass. Rubber-mass adhesive plasters for surgical dressings, Esmarch's and other elastic bandages and wrappings, orthopedic appliances, nipples, syringes (hard and soft), pessaries, artificial teeth, specula, catheters, etc., represent important uses of rubber, which require only enumeration. Articles of rubber, either hard or soft, should be kept in a closed box or drawer, and occasionally used or washed to prevent their becoming too dry and brittle. Silver instruments should never be kept in the same enclosure with them. Soft rubber is spoiled after a short time by oils and fats, and eventually hardens in spite of precautions.

By dissolving rubber in appropriate liquids, with or without the addition of other adhesives, various forms of cement or glue can be obtained, and impervious coverings can be produced by applying such substances and permitting evaporation. *Henry H. Rusby.*

RUBELLA. See *Roetheln*.

RUBIDIUM AND AMMONIUM BROMIDE.—A double salt having the chemical formula RbBr,3NH₄Br. It is a white or yellowish-white crystalline powder, soluble in water, and possessed of a cooling and saline taste.

This salt has been proposed as a more suitable means of administering bromine than the ordinary ammonium, potassium, or sodium salts. Laufenauer (*Therap. Monatsch.*, August, 1889), reasoning from the fact that lithium bromide is more powerful than ammonium bromide, the sodium salt more so than the lithium, and the potassium salt still more powerful, was led to believe that the more strongly electro-positive the salt, and the higher its atomic weight, the greater its power in disease. As rubidium is powerfully electro-positive and has a high atomic weight, the bromide of rubidium and ammonium was prepared, and in a series of experiments was found to prove more satisfactory than the other bromides in epilepsy and other conditions in which bromides are indicated.

Further use of the drug has proved its efficacy, but has not shown any decided advantage over other bromides. It, however, has not the depressing effects of the potassium salts, and may be given where the more common compound has to be discontinued. As an anti-epileptic remedy, it is given in doses of sixty to ninety grains in divided portions. As a hypnotic and sedative, sixty grains may be given in a single dose.

Rubidium bromide and *rubidium iodide* have also been prepared, but their therapeutic value has not been established. *Beaumont Small.*

RUBINAT MINERAL SPRINGS.—Province of Lerida, Spain. These springs, which supply the well-known waters of the Rubinat group, are located at a high elevation in the Pyrenees, near the village of Rubinat. We are informed that some of the springs have been known from time immemorial, and were resorted to in the Middle Ages by pilgrims from all over the kingdom. In recent years the waters have come into commercial use, and those of some of the springs are exported in large quantities to the American markets. Among the better known waters of the group are the Rubinat-Condal, Rubinat-Serre, and Rubinat-Llorach, all of which are extensively sold in the United States. Following are analyses of the first two:

Rubinac Condal.—One United States gallon contains:* Sodium sulphate, gr. 5,407.34; potassium sulphate, gr. 13.22; magnesium sulphate, gr. 183.97; calcium sulphate, gr. 109.44; sodium chloride, gr. 115.94; silica, alumina, ferric oxide, gr. 2.08; loss, gr. 0.98. Total, 5,832.97 grains.

Rubinac Serre.—One United States gallon contains:* Sodium sulphate, gr. 4,695.97; magnesium sulphate, gr. 135.54; calcium sulphate, gr. 79.57; calcium bicarbonate, gr. 29.40; sodium chloride, gr. 262.23; potassium silicate, gr. 36.83. Total, 5,239.54 grains.

These analyses show very potent waters of the sulphated saline group. They owe their purgative properties chiefly to the presence of the sulphate of sodium in large quantities, although both contain considerable sulphate of magnesia. They act as very efficient saline cathartics and are indicated in conditions where such remedies are useful. The dose varies from one to eight or nine ounces, according to the indications, and the water is best taken in the morning, on rising. According to the author's observation these waters are not so likely to cause griping as are some of the stronger bitter waters. *James K. Crook.*

RUE.—*Ruta.*—The leaves of *Ruta graveolens* L. (fam. *Rutaceae*).

This is a perennial herbaceous or partly woody plant, two or three feet in height. It has pale green, cylindrical, branching stems, alternate, smooth, light green,

* Converted from grams per litre.

glandular dotted leaves, which usually dry yellowish; the lower twice or three times pinnate and long petioled, the intermediate once or twice pinnate, the uppermost simple and sessile; divisions wedge-shaped, rounded, or blunt at the extremity.

Flowers yellowish, in a terminal corymb, with the parts in fours or fives; stamens twice as many; sepals small, pointed; petals large (one-half inch long), rounded and hooded at the ends, narrow below. Fruit a dry, dehiscent capsule, containing numerous angular, blackish seeds. Rue is a native of Southern Europe, the Levant, etc., and is also cultivated. It has a strong disagreeable odor, and a bitter, sharp taste.

The aromatic properties of rue are due to about one-fourth of one per cent. or less of a peculiar, very light volatile oil, usually more or less yellowish in color, and of an extremely powerful and disagreeable odor. Its bitterness is due to the crystalline yellow glucoside *rutin* (C₂₂H₃₀O₂₂), also known as *rutinic acid*, and said to be contained also in buchu, capers, and some other drugs. Considerable quercetin and sugar also occur.

ACTION AND USES.—Rue is one of the most ancient of drugs. Its action appears to be that of the volatile oil, differing chiefly in its lesser intensity. Taken internally, in small doses, it is stomachic, laxative, and stimulant to the secretions, especially to those of the intestine and kidneys. In somewhat larger doses it is a powerful anti-spasmodic. It also acts as an emmenagogue, and is in overdoses an irritant intestinal and renal poison and an abortifacient. Among the ancients it was used for its aphrodisiac properties. The dose of the drug ranges from ten to twenty grains, and it is best given in the form of a twenty-per-cent. tincture, made with diluted alcohol, dose fifteen to sixty minims.

Oil of rue was official in the United States Pharmacopœia of 1870 and 1880. It possesses all the above-named properties of rue in a greatly intensified degree. It is a powerful counter-irritant, capable of producing vesication similar to that from croton oil. It is a well-known and dangerous abortifacient, and is capable of acting as a fatal irritant-narcotic intestinal poison. It is not often given internally at the present time. The dose is from two to five minims. *Henry H. Rusby.*

RUMINATION IN MAN. See *Stomach, Diseases of the*.

RUPIA. See *Syphilis*.

RUSSEL'S BODIES. See *Carcinoma*.

RUTLAND, MASSACHUSETTS.—Rutland, Mass., situated in almost the geographical centre of Massachusetts, fifty-four miles from Boston, is the seat of the "Massachusetts State Sanatorium" for pulmonary tuberculosis, the first institution of the kind established in the United States, having been opened for patients October 1st, 1898.

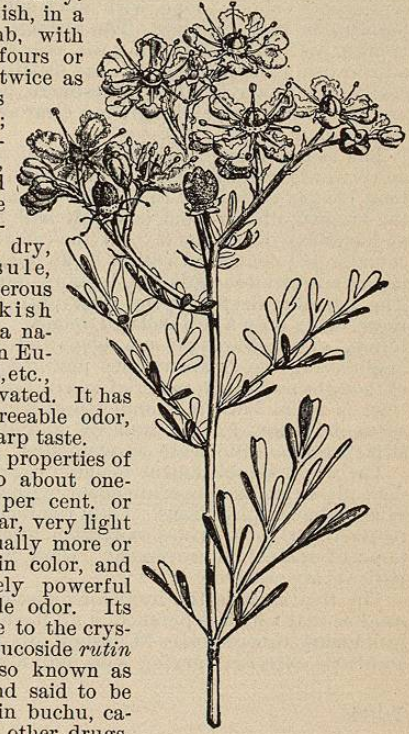


FIG. 4138.—Flowering Branch of Rue. (Baillon.)

The site occupied by the sanatorium and its grounds consists of about two hundred and fifty acres of land, at an elevation of 1,160 feet, protected on the northwest by a wooded hill rising 100 feet higher. The climate is that of inland New England modified by the elevation. The winters are cold and long, with much snow, and the temperature is very variable. The average annual rainfall is high, and although, taking the year through, there is a good deal of sunshine, there are usually not many successive sunny days. The atmosphere, however, is pure and free from dust, and there is a clear sweep of country round about.

The sanatorium buildings consist of a series of one-story wards radiating toward the south, connected by a long convex corridor. In the rear toward the north are the kitchen, dining-room, assembly hall, heating, electric and laundry departments. At the centre of the curved corridor and connected with it by an open passageway is the administration building, looking toward the south. The patients sleep, for the most part, in open wards, there being only a few isolated rooms. At the southern termini of the wards are sun rooms and piazzas. In the neighboring woods are various picturesque camps made of boughs and other material where much of the daytime is spent both in summer and winter. There are accommodations for two hundred and fifty patients and still further additions are contemplated. (Plate LI.)

The whole establishment is under the charge of a resident physician and superintendent, with two visiting and several house physicians. Only the incipient cases are received, or those whose condition offers a reasonable hope of radical improvement. Both male and female patients are received.

The treatment is the hygienic-dietetic, essentially the same as that which is pursued in all modern sanatoria for pulmonary tuberculosis: "Constant life in the open air; judicious exercise, varying with individual cases, in con-

junction with the 'rest cure'; and a properly regulated diet of nutritious food" (Bowditch, Sixth Annual Report, 1902). It is a part of the regulations that patients must spend at least eight hours out of doors daily, unless excused by the physician; and that all windows are to be opened and closed by the nurse or attendant only. When there is a driving storm, and in winter when the patients are getting up or going to bed, the windows of the wards are closed, but at other times they are constantly kept open. "Medicines are used as little as possible."

Male patients, whose condition will permit it without injury, are utilized in light work upon the farm connected with the institution. Most patients are obliged to furnish \$4 a week toward their board, which is somewhat less than half of the actual expense.

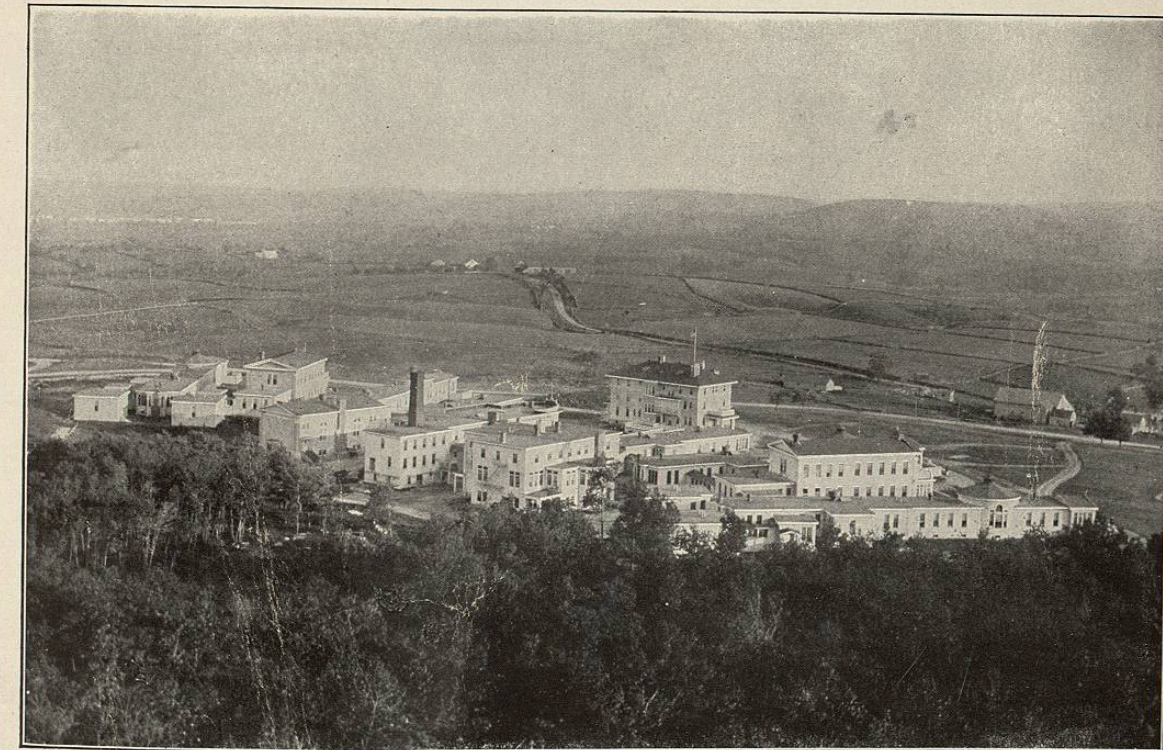
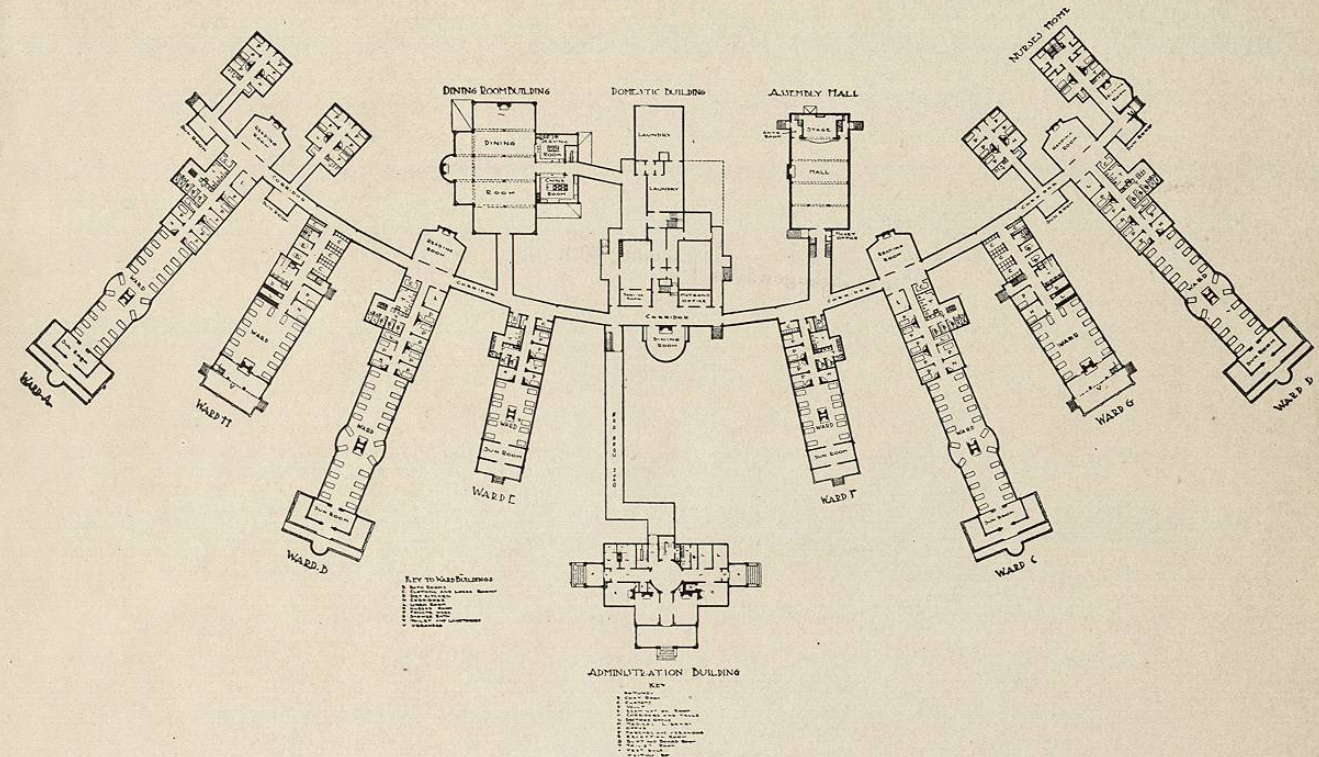
As to the results obtained, the last report, up to September 30th, 1902, shows 72 per cent. of the incipient cases for the previous year apparently cured or arrested, and 19 per cent. of the moderately advanced cases. Taking all stages of the disease, there were 48.83 per cent. apparently cured or arrested, and 43.49 per cent. improved. This for the previous year.

For a more extended consideration of the yearly results and of the subsequent histories of former patients, the reader is referred to the yearly reports of the trustees published by the State. For a more detailed description of the sanatorium and the treatment, one is referred to the article of Dr. V. Y. Bowditch, one of the visiting physicians, in the *Boston Medical and Surgical Journal* for February 8th, 1900; also to the yearly reports of the sanatorium.

Numerous boarding-houses and small sanatoria have sprung up in the vicinity, most of them conducted by former patients; they receive consumptives at a moderate rate, and carry out the "treatment" as learned in the sanatorium.

Edward O. Otis.

RYE. See *Starch*.



THE STATE SANATORIUM AT RUTLAND, MASSACHUSETTS



1030013951

