the smaller dose, which produced catharsis within about four hours, the movements continuing for two days at about the rate of two or three per day.

Although lack of sufficient material has prevented us at the present time from making an extensive chemical study of this resin, similar to the investigations by Power and Rogerson of the other convolvulaceous resins noted above, we have deemed the facts thus far obtained to be worthy of record, inasmuch as they may serve to bring to the attention of the pharmaceutical and medical professions in this country a source of a new cathartic convolvulaceous resin of promising usefulness.

BORAX AND BORIC ACID.*

BY H. L. HARRIS.

The early history of borax is vague and uncertain. The word is of Arabic origin, and, as far as known, dates back only to the seventh century. Borax first came from the East. It is believed by many that it was brought by caravan from beyond China by way of Babylon and Palmyra to the Mediterranean ports, before the Christain era.

Sir Edward Bulwer Lytton, in "The Last Days of Pompeii," bears testimony to the value of borax in the days of the Republic. "Borax," says Sir Edward, "was largely used by Nero and his slaves nearly 2,000 years ago and Pansa deeply regretted that he was not rich enough to buy borax to cover the arena after the death of the combatants in the fight between Lydon and Tetraides."

It is only within the last three centuries that the chemical nature of borax has been understood. The green flame imparted to alcohol by free boric acid was first noticed by Geoffroy, a celebrated chemist, in 1732. In 1748 Baron discovered that borax was a sedative salt and soda. In 1818 Count Larderel discovered how to prepare boric acid from the lagoons of Tuscany and made a princely fortune by it. This boric acid was shipped to England and France and converted into refined borax by boiling in large pans and crystallizing in vats. About fifty years ago borate of lime was discovered in Chile, which also found its way to England. As far as is known, borax is found only in three States of the U. S., California, Nevada and Oregon.

The borax deposits in California are adjacent to the portion of the Mojave Desert called Death Valley. The history of Death Valley is found only in tradition.

In the year 1850 the number of parties of emigrants bound for California from the Eastern States was so great that their trains of wagons formed almost a continuous procession from the Missouri River to Salt Lake City, some going on the route which was afterward followed by the Central Pacific Railroad, while the rest struck down through Utah, Nevada and Southern California, through the Cajon Pass, for the regions of which Los Angeles was then, and is now, the metropolis. On reaching Salt Lake they struck off to the south, because the northern, or Truckee River, route had been traveled so much that feed and fuel (the land being a desert) were scarcer than to the south. There was nothing unusual about

---

* Parts of a paper read before Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

the move, however, for a good many parties did the same thing, traveling along the trails leading near the west bank of the Colorado River for a few hundred miles, and then striking across the Desert, by way of several well-known springs, to the Mojave River, that sinks in the sands of the Mojave Desert.

Article after article of household furniture and everything not necessary for immediate use was cast aside to lighten the load and the women, as well as the men, walked beside the wagons rather than burden the worn-out cattle. Many of these pioneer prospectors lost their lives in the Mojave Desert, which is the reason it is called by the gruesome name "Death Valley."

The U. S. Weather Bureau on July 10, 1915, reported as follows:

"The mercury in Death Valley stood at 134 degrees in the shade. This is the hottest shade temperature ever recorded in the open air with standard instruments and according to improved methods of exposure in any part of the world."

This distinction as the hottest place on earth officially and unofficially corroborates the words of daring prospectors. Death Valley is one of the mysterious spots on the outside of this little planet.

In California, borax was first found in what was called "cotton ball" deposits. Depressions in the ground at some time had been filled with water containing borax in solution. When this water evaporated there were formed little balls of earthy impurities and borax. These so-called "cotton balls" were gathered and refined. Such deposits, however, were soon exhausted and scientists realizing the fact that the borax in the water came from the hills, prospected them and located well-defined veins of borate material.

As there were no railroads in Death Valley at the time of the discovery of borate material some method for transporting the ore to the railroad station had to be found. It was then that the now famous 20-Mule-Team was absolutely essential. The huge wagons drawn by these mules would hold a car load, and in the early days it took three weeks to make a round trip. Later, however, when nearer deposits were located, the trip could be made in a day.

The ore as found in California is colemanite, a crystalline borate of lime, found in volcanic deposits on the east side of the Calico Mountains at the edge of the Mojave Desert, California. The boric acid content of colemanite varies. The deposits are in two principal beds, each about 5 feet thick and 50 feet apart. These beds have been mined to a depth of 500 feet. After mining the colemanite is transported over land to Bayonne, N. J., where it is refined ready for market.

Borax is made by heating the pulverized colemanite with a solution of sodium carbonate, forming a soluble sodium borate which crystallizes. This solution is run into large tanks in which are suspended iron rods. As the solution cools the borax crystals form upon the rods. It is then run through a scalper. Large crystals are sold as such and small crystals are ground into powdered or granulated forms.