

### Naphthaline for Agricultural and Therapeutical Uses.

That a coal tar product should find use among farmers and pharmacists, as well as in surgery and dyeing, seems at first somewhat remarkable. Although naphthaline is found in coal tar, it is formed in even greater quantity when naphtha is subjected to a high temperature, and hence is abundantly produced by the process employed in enriching water gas for illuminating purposes.

E. Fischer, of Strassburg, says, in the *Pharmaceutische Centralhalle* of Feb. 22, that one of the most striking characters of naphthaline is the fact that it is not injurious to man and the higher animals, whether breathed as gas or used in substance, externally or internally, while it has a very different action on the lower organisms, both vegetable and animal (fungi, insects, etc.), for they are not able to endure the action of the gas for any length of time.

These, however, are the very properties that a good antiseptic ought to possess. The most common impurity in naphthaline is phenol (carbolic acid), and this, of course, may make it dangerous to man.

To distinguish chemically pure naphthaline from that which contains phenol, a small quantity of it is mixed with very dilute caustic soda solution, boiled a short time, then cooled and filtered. If there was any phenol in the naphthaline it will be found in the filtrate, where it can be detected by acidifying slightly and adding bromine water. A white precipitate, or opalescence, due to bromophenol will be formed if this impurity is present.

Experiments were made on dogs by rubbing their coats with powdered naphthaline all over. The sides and floor of the cage were strewed with it, yet they remained healthy and lively for days. Many persons dislike the smell of naphthaline at first, and in some it causes headache, but they very soon become accustomed to it, as was found in the surgical clinic at Strassburg, where much naphthaline has been used within a few months. Besides, the unpleasant odor can be almost entirely concealed by adding a little oil of bergamot to the naphthaline powder.

The advantages offered by naphthaline as an antiseptic consist: 1. In the simplicity of its application. 2. In its absolute freedom from poisonous qualities, which is such a contrast to carbolic acid, iodoform, and other antiseptics. 3. In the low price, which must be taken into account in charity practice, in the country, and in the field. Ohlgard & Co., of Kehl on the Rhine, make chemically pure naphthaline, which sells for 1 mark per kilo., about 11 cents per pound.

Since naphthaline has been used in larger quantities in the surgical polyclinic at Strassburg, it has been observed that the annoyance from vermin has decreased in a remarkable degree, and now there is scarcely a trace to be found of the fleas that were once so numerous there. It has likewise been employed against the other vermin, head lice, body lice, and especially the itch maggots (*acaré*), and it was found that they, too, were destroyed by naphthaline.

If flies, mosquitoes, spiders, etc., are exposed to the action of naphthaline vapors, in a short time they become stupefied, and then die.

Naphthaline has been used for many years as a protection against moths, both in museums, especially in the insect collections, as well as by fur dealers and in domestic uses, and it might be employed in an analogous manner in summer against other insects.

Naphthaline is used successfully in garrisons to get the upper hand of insects, particularly bed bugs. It has been used with very good success as an antiseptic in the surgical clinics at Strassburg.

It seems to have a very energetic action upon the lower organisms of vegetable origin. It kills mould fungi; fruit and vegetables do not mould in an atmosphere of naphthaline. Since these vapors do not hurt men, even if breathed for a long time and in large quantities, it might be used for scarlet fever and diphtheria in children by strewing it abundantly over the floor of the sick room and through the beds of the patients. This precaution has no influence upon the course of the disease, except that it does not spread, as it very frequently did formerly.

Fischer made some very interesting experiments in France, Germany, and Spain upon the use of naphthaline for exterminating phylloxera. It is not necessary to use chemically pure naphthaline for this purpose, as the crude article answers as well. In the London market crude naphthaline costs about \$6.25 per ton (2,200 lb.), and in Cologne it is worth \$11.25 per ton packed in barrels. These prices permit of its use on a large scale. The first experiments were made April, 1882, upon a vineyard at Bordeaux which had been almost totally ruined by the phylloxera. They generally do their chief damage by destroying the tender rootlets of the vine. Hence the roots of the affected vines were first exposed by digging a ditch along them. The ditch was then partly filled either with naphthaline or a mixture of naphthaline and earth, and then covered with earth. The naphthaline which is in contact with the roots volatilizes slowly; its vapors are as destructive to the phylloxera as to other insects, while the plants themselves receive no injury worthy of mention. About 1 kilo. (2½ lb) of naphthaline was applied to each vine. As early as June following the vines that had been treated thus exhibited a good growth. In September they were taken up to examine the condition of the roots. All of the plants, about seventy-five in number, had already put forth new roots, which were perfectly free from phylloxera. The new roots were six or eight inches

long, had numerous fine fibers attached, and they were so numerous that it must be acknowledged that these vines had been rescued from the pest.

The roots of many other vines that had not received this treatment with naphthaline had absolutely no sound roots of this year's growth. On uncovering the roots to which it had been applied, a considerable quantity of naphthaline was found there yet in September, a proof that it volatilizes very slowly, and hence its action is very prolonged. It is probable that naphthaline will prove a means of entirely destroying the phylloxera.

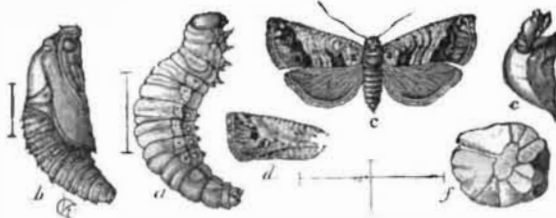
The best method of applying it is to dig a trench six or eight inches deep around the vine, about a hand's breadth distant from it, then put in about a kilo. of naphthaline, and cover it up, stamping it down well, which prevents rapid evaporation.

Naphthaline can also be employed as a prophylactic in regions threatened by phylloxera and also in transporting grape vines. Those which are merely threatened, but not yet attacked, would only require about one-fourth as much naphthaline, say one-half pound. For transporting vines, the tight vessels in which they have to be shipped can be disinfected by strewing naphthaline in them, which would destroy any phylloxera that might be present in the atmosphere.

### JUMPING SEEDS AND GALLS.

BY PROF. C. V. RILEY.

Having recently received some fresh specimens of so-called "Mexican jumping seeds," or "Devil's beans," as they are popularly called, I took occasion, while they were yet active, to exhibit them to the Biological Society of Washington, with some remarks, of which I herewith give the substance: These seeds are somewhat triangular, or of the shape of convolvulus seeds, there being two flat sides meeting at an obtuse triangle, and a convex one which has a medial carina. They not only roll from one side to another, but actually move by jerks and jumps, and will, when very active, jump at least a line from any object they may be resting on. The actual jumping power has been doubted by some writers, but I have often witnessed it.



*Carpocapsa saltitans*: a, larva; b, pupa; c, moth, enlarged, the natural lengths indicated in hair line; d, wing of a pale variety; e, a seed showing pupa skin protruding; f, a seed showing hole of exit of the moth—both natural size. (After Riley.)

To the uninitiated these movements of a hard seed seem little less than miraculous. They are induced by a plump, whitish lepidopterous larva, which occupies about one-fifth of the interior, the occupied seed being in fact but a hollow shell with an inner lining of silk which the larva has spun. The larva looks very much like the common apple worm, and belongs in fact to the same genus. It resembles that species further in remaining for a long time in the full grown larva state before transforming, so that the seeds will keep up their motion throughout most of the winter months. When about to transform, which is usually in the months of January and February, it cuts a neat circular hole in the convex side of its house, fills the same neatly with a plug of silk, spins a loose tube, and transforms to the pupa state, the moth soon afterward pushing its way out from the little door prepared for it.

The moth was first described in 1857 as *Carpocapsa saltitans*, by Prof. J. O. Westwood,\* and afterward as *Carpocapsa dehaissiana* by Mr. H. Lucas.†

In regard to the plant on which these seeds occur there is much yet to learn, and I quote what Mr. G. W. Barnes, President of the San Diego Society of Natural History, wrote me in 1874 concerning it, in the hope that some of the botanists present may recognize it: "Arrow-weed (*Yerba de flecha*).—This is the name the shrub bears that produces the triangular seeds that during six or eight months have a continual jumping movement. The shrub is small, from four to six feet in height, branchy, and in the months of June and July yields the seeds, a pod containing three to five seeds. These seeds have each a little worm inside. The leaf of the plant is very similar to that of the "Garambullo," the only difference being in the size, this being a little larger. It is half an inch in length and a quarter of an inch in width, a little more or less. The bark of the shrub is ash colored, and the leaf is perfectly green during all the seasons. By merely stirring coffee or any drink with a small branch of it, it acts as an active cathartic. Taken in large doses it is an active poison, speedily causing death unless counteracted by an antidote."

In a recent letter he states that he is informed that the

\* Proc. Ashmolean Soc. of Oxford, 1857, t. iii., pp. 137-8; then Trans. Lond. Ent. Soc., ser. 2, 1858, t. iv., p. 27; also Gard. Chron., 1859, Nov. 12, p. 909.

† "Note sur les grains d'une Euphorbiacee de Mexique sautant au dessus du sol par les vibrations d'une larve de l'ordre des Lepidopteres vivant en dedans."—Ann. Soc. Ent. de France, ser 3, t. vi.; Bull., pp. 10, 23, 44, 1859; t. vii., p. 561-6.

region of Mamos, in Sonora, is the only place where the plant grows; that the tree is about four feet high, and is a species of laurel with the leaves of a dark varnished green. "It bears the seeds only once in two years. The tree is called *Brincador* (jumper), and the seeds are called *Brincaderos*. The seeds are more quiet in fair weather, and lively on the approach of a storm."

Prof. Westwood mentions the fact that the plant is known by the Mexicans as "Colliguaja"; and Prof. E. T. Cox, formerly State Geologist of Indiana, now living on the Pacific Coast, informs me that the shrub has a wood something like hazel or wahoo; that the leaf is like a broad and short willow leaf. He confirms the statement as to its poisonous character: that a stick of the shrub when used by the natives to stir their "penola" (ground corn meal parched) purges; and that the shrub is used to poison arrow heads.

The plant is undoubtedly euphorbiaceous.

The peculiarity about this insect is that it is the only one of its order, so far as we know, which possesses this habit, and it is not easy to conceive of what benefit this habit can be other than the possible protection afforded by working into sheltered situations.

The true explanation of the movements of the larva by which the seed is made to jump was first given by me in the Transactions of the St. Louis Academy of Sciences, for December 6, 1875 (vol. iii., p. c. and ci.).

The jumping power exhibited in this "seed" is, however, trifling compared with that possessed in a little gall, and also caused by an insect. This gall, about the size of a mustard seed, and looking very much like a miniature acorn, is found in large numbers on the underside of the leaves of various oaks of the white oak group, and has been reported from Ohio, Indiana, Missouri, and California. It falls from a cavity in the leaves, very much as an acorn falls from its cup, and is sometimes so abundant that the ground beneath an infested tree is literally covered. It is produced by a little black cynipid, which was described as *Cynips sallatorius* by Mr. Henry Edwards. The bounding motion is doubtless caused by the larva which lies curved within the gall, and very much on the same principle that the common cheese skipper (*Piophilta casei*) is known to spring or skip. Dr. W. H. Mussey, of Cincinnati, in a communication to the Natural History Society of that city, December, 1875, states the fact that such is the case, though members of the California Academy who have written on the subject assert that the motion is made by the pupa, which I think very improbable. At all events, the bounding motion is great, as the little gall may be thrown two or three inches from the earth; and there are few things more curious than to witness, as I have done, a large number of these tiny galls in constant motion under a tree. They cause a noise upon the fallen leaves that may be likened to the pattering of rain.

### Various Items.

Prof. Lackie in a recent paper read before the Royal Society, London, maintains that the scientific method of acquiring languages is to learn them in the same way that a child learns, conversationally; and this method should be employed in teaching Latin, Greek, Hebrew, as well as the modern languages. We are under the impression that this idea has been heretofore suggested.—The Royal Swedish Geographical Society has granted its gold medal to Mr. Stanley for African discoveries.—The Dutch Academy has given its gold medal, valued at \$200, to M. De Heen, for a work in five sections, relating to the "Physical and Chemical Properties of Simple and Compound Bodies."—M. Marx, an observer in Russia, has found what is believed to be cosmical matter, consisting of iron, nickel, and cobalt, in his pluviometer. This deposit was found after a heavy gale accompanied by snow and rain. It was observed near the time of the November meteors.—Baron Nordenskiöld, the Arctic discoverer, is about to undertake an expedition to Greenland. He is to be accompanied by a complete scientific staff, and it is expected that his explorations will result in the acquisition of interesting knowledge. By the way, the Baron is reported to have applied to the Dutch Government, asking the payment to him of a reward of 25,000 gilders, equal to about \$10,000, which was offered by the Dutch, about three centuries ago, to whoever would discover a "Northeast passage." The Baron thinks that he has done so. He certainly succeeded in going through from the west to the east by way of the Arctic regions, but it took him two summers to accomplish the voyage. It is a question whether that can be considered a "Northeast passage," which requires the ship to be frozen up through a long Arctic winter, and has been made only in one direction. Furthermore, the reward was addressed to the people then living, and it is questionable whether it would pass to future generations. In some of the States of this country it only requires six years to outlaw a claim. Three hundred years after date seems a long time in which to file an application. We are inclined to think there is some question whether the Baron will ever get the reward.—Mt. Etna is again in active eruption, and is throwing up quantities of red-hot lava which at night time is very luminous. There has been one very violent earthquake shock. This mountain, it will be remembered, is in the Island of Sicily, is 10,835 feet high, and for the last twenty-five hundred years has been celebrated for frequent eruptions. It is a veritable fountain of fire.—In a paper read before the Paris Academy of Sciences, M. Dareste states that he has been enabled to produce monstrosities of poultry by violently shaking hens' eggs before hatching.