Emulsions of Petroleum and their Value as Insecticides.

BY C. V. RILEY, OF WASHINGTON, D. C.

The value of petroleum for the destruction of insects has long been recognized, and I have for years been endeavoring to solve the question of its safe and ready use for this purpose without injury to plants. This paper contains the results of extended experiments carried on under my direction by several of my assistants, and particularly by Prof. W. S. Barnard, Mr. Joseph Voyle, of Gainesville, Fla., Mr. Clifford Richardson, assistant chemist of the Department of Agriculture, and Mr. H. G. Hubbard, who has for over a year been devoting his time to practical tests in orange groves at Crescent City, Fla.

Passing over the ordinary methods of oil emulsions by phosphates, lactophosphates, and hypophosphites of lime, and various mucilaginous substances, experience shows that, for the ordinary practical purposes of the farmer and fruit grower, soap and milk are among the most available substances for the production of petroleum emulsions.

Ordinary bar soap scraped and rubbed into paste at the rate of twenty parts soap, ten parts water, thirty parts kerosene, and one part of fir balsam will make, when diluted with water, an emulsion stable enough for practical purposes, as the slight cream which in time rises to the surface, or the flakiness that often follows, is easily dissipated by a little shaking. Soap emulsions are, however, less satisfactory and efficient than those made with milk. Emulsions with milk may be made of varying strength; but one of the most satisfactory proportions is two parts of refined kerosene to one part of sour milk. This must be thoroughly churned (not merely shaken) until a butter is formed, which is thoroughly stable and will keep indefinitely in closed vessels, and may be diluted *ad libitum* with water when needed for use. The time required to bring the butter varies with the temperature, and both soap and milk emulsions are facilitated by heating the ingredients. Ordinary condensed milk may also be used by thoroughly stirring and beating it in an equal or varying quantity of kerosene.

The diluted emulsion, when prepared for use, should be finely sprayed upon the insects to be killed, its strength varying for different insects or plants, and its effect is enhanced when brought forcibly in contact with the insects.

Of mucilaginous substances, that obtained from the root of *Zamia integrifolia* (a plant quite common in parts of Florida, and from the stems of which the Florida arrowroot is obtained) has proved useful as an emulsifier.

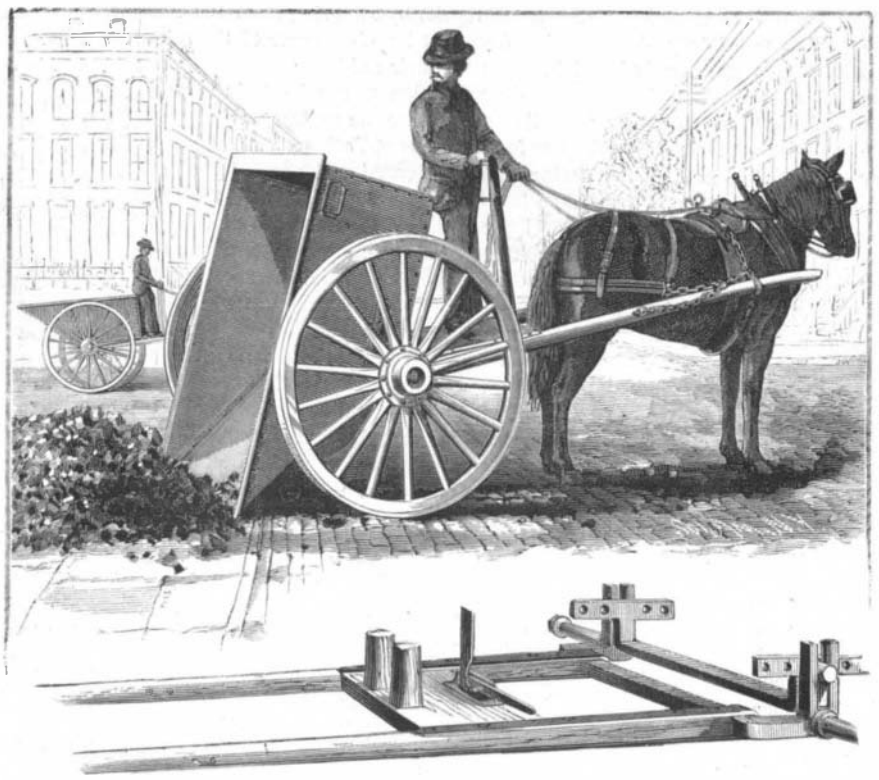
These petroleum emulsions have been used with success by Dr. J. C. Neal, of Archer, Fla., against the cotton worm, without injury to the plant; but their chief value depends on their efficacy against the different scale insects which affect citrus plants. Experience so far shows that such plants do not suffer from its judicious use, but that it must be applied with much more care to most deciduous fruit trees in order not to injure them.

IMPROVED RAPID DUMPING CART.

The dumping cart herewith illustrated is very simple in construction and at the same time durable and comparatively cheap. There is no tailboard to remove in order to dump, or replace after dumping; hence, time and labor are saved. The axle is made of one piece of iron or steel, with cranked parts that extend forward at right angles to the journals a suitable distance to give space in which the body may have room to swing when it dumps. The body is hung upon trunnions or pivots fitted in guide grooves rising vertically from the axle just back of the journals, and so adjusted that the bottom of the body will be at such distance below the trunnions that it will swing back easily to the upright position after being dumped. Springs may also be attached to the axle to relieve the force of the dump and to assist in recovering the body to its proper position. The construction of the axle is clearly shown in the lower engraving.

The shafts are attached to the axle, and are connected together by a cross bar in front of the axle. On the cross bar is secured a socket plate which carries a fastening latch engaging with a hasp which is rigidly attached to the front end of the body, so that when the latch is raised at its outer end it will swing clear of the point of the hasp and release the body for dumping; when the body falls back it will be fastened automatically. The latch lever is arranged along the connecting bar at the front of the body, so that the driver may raise it with the toe of his boot, while standing on the shafts or sitting on the edge of the box, without letting go of the reins.

This invention has been patented by Mr. Thomas Hill, whose address is Nos. 48 and 50 Railroad Avenue, Jersey City, N. J.



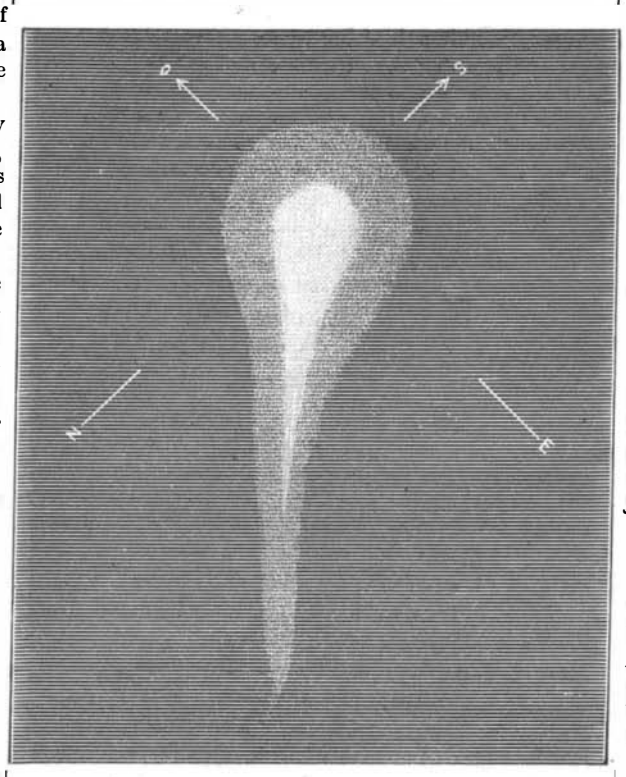
HILL'S RAPID DUMPING CART.

WE learn from a foreign contemporary, what we have never heard of at home, that "in dull seasons in America it is not an unusual thing for several manufacturers to combine, charter a steamer, and take a cargo of their goods to some of the South American and other ports, and realize very often at whatever price the goods will fetch."

THE PONS-BROOK COMET.*

On the 17th of December, at 6 h. 3 m., Marseilles mean time, I made an observation of the comet of 1812, by means of a telescope of 156 mm. aperture, provided with an eye piece that magnified 85 times. The sky was not very clear, and the observation was interrupted several times by the thick vapors by which the comet was obscured.

The comet was easily visible by the naked eye, and appeared more brilliant than the stellar mass of Hercules,



THE PONS-BROOKS COMET AS OBSERVED AT MARSEILLES.

which it resembled; only there was seen shining at times through its nebulosity a vague spark, that indicated that it possessed a tail. Seen in the telescope, the comet exhibited a nucleus, a coma, and a tail. The nucleus had the brilliancy of a star of the sixth magnitude, although its diffuse contours rendered it quite difficult to make an exact comparison with the stars. It possessed a very appreciable diameter, and was not circular, but slightly elongated in a direction nearly perpendicular to the axis of the tail.

The coma, which was very brilliant, had a diameter of about 10′, but it faded out so gradually in the heavens that it was impossible to recognize its exact limits. At first sight it resembled a globular nebula strongly condensed around a central nucleus, but, regarded attentively, it appeared as if it were double and formed of two semicircular parts that were turned toward the sun, and that were prolonged behind to form the tail. The interior portion, which was much more brilliant than the exterior, surrounded the nucleus, which latter was not, however, in the center of its curve, but was nearer to it on the side toward the sun. In extending back, this internal coma formed of itself nearly the entire tail. The external coma, which was much less luminous, was much longer, too, and it likewise was prolonged behind to form the tail; but it became invisible at a short distance, thus giving the tail a pyramidal aspect.

The tail, although it was not very brilliant, was distinguishable at first sight, and terminated in a point at a distance of 25′ from the nucleus. Like those of the coma, its edges dissolved away gradually in the sky and were lost to sight. The tail had a northwest direction—one that pointed away from the sun.

The accompanying figure is a reproduction of the drawing that I made during this observation, and represents the comet as it then appeared.—*La Nature.*

* By E. L. Trouvelot.

Politeness by Telephone.

A Mexican correspondent says: "There is a considerable variety of tongues among the messages going over the telephone wires in Mexico; many persons who cannot speak each other's language wishing frequently to be put in communication, so the offices usually have an attendant interpreter. The peremptory American method of making telephone calls—'Hello!' 'Hello?' 'Give me 1,299!' etc.—would never do in the polished Castilian tongue. Courtesy of intercourse must be preserved even between invisible communicants, and the unseeming vexatiousness and petulance which the telephone seems to provoke in Saxon moods is never allowed to obtain utterance here. The regular response from the central office to a telephone call is 'Mande usted!' which is equivalent to 'At your command!' Then preliminaries are gone through something as follows: 'Good morning, senorita; how do you do?' 'Very well, I thank you; what service may I render you?' 'Will you kindly do me the favor of enabling me to speak with Don So-and-so, No. 777?' 'With much pleasure!' etc., etc., and when the connection is made, the usual polite introductories are gone through before proceeding to the business in hand."

Growing Basket Willow.

There are many little by-productions, or what are generally so considered in relation to larger interests, that often bring to those engaged therein very substantial proceeds. A correspondent of the *Prairie Farmer* classes the growing of basket willow as at present furnishing an example of this kind. The prices have been such as to afford good profit, and the cultivation is very simple.

The cuttings, about 9 inches long, are stuck down in the soft earth in a slanting position, leaving about 2 inches above ground. There is no danger of their failing to grow. After this, the cultivation is no more than for corn. They will grow on any land. They are grown on land so wet that it could not be plowed or cultivated, but dry ground is better. At present there is not enough grown in this country for consumption, and $500,000 worth is imported each year. Peeled willow is now about $100 per ton.

Why does Flour Spoil?

Balland discusses the changes of flour in a paper contributed to *Comptes Rendus*. He says that grain contains a germ which seems to be situated near the germ. This ferment is insoluble, and has the properties of an organized ferment. It is able to endure a temperature of 212° Fahr. when dry, but is destroyed by boiling water. Both warmth and moisture are absolutely essential to its development and growth; a damp heat of 77° Fahr. is the most favorable. It acts upon the gluten liquefying.

In a properly constructed mill the greater portion of the ferment remains in the bran, and the better the flour is bolted the less of the ferment it will contain. If the mill grinds too hard or runs too fast more of it passes into the flour, hence the changes noticed in what is called flour that has heated.

The acid noticed in old flour is not the cause of the gluten decreasing, but the result of it.

Investigations upon gluten have not yet cleared up its mysteries. It seems to contain variable quantities of water, and there are certain substances, like common salt, which prevent its balling together; while others, like dilute acetic acid, directly favor it.

The gluten in flour heated to steam heat retains its properties The action of this ferment is retarded, but not prevented, by lack of water; as soon as water and heat are applied, it recovers its original properties.

The following conditions must be observed in making flour to have it keep well: It must be sound flour from hard, dry grain, which must be well hulled in properly constructed mills and thoroughly bolted. It must be kept in a place that is completely protected from heat and moisture. The French war department use air-tight metallic boxes for keeping flour in fortresses. Only flour from dry grain and the first grinding is used.

While engaged in this investigation the author has satisfied himself that the French military use the finest flour, to which, however, is added 12 to 18 per cent from the second grinding, which corresponds to the legal requirements. This latter is a source of change, and yet we cannot entirely avoid making use of the second milling, for it is in the second grinding that the very nutritious portion of the grain is separated from the bran. But we can provide against this change by storing the two different qualities *separately*, instead of mixing them. The fine flour alone keeps well, and the other, which does not keep so well, is always used fresh, and the two mixed when used.—*Chem. Zeitung.*

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