Emulsions of Petroleum and their Value as Insecticides.

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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. The 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. Jos. 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 20 parts soap, 10 parts water, 30 parts kerosene, and 1 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 2 parts of refined kerosene to 1 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 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.—*Proc. Amer. Assoc.*

Spontaneous Combustion.

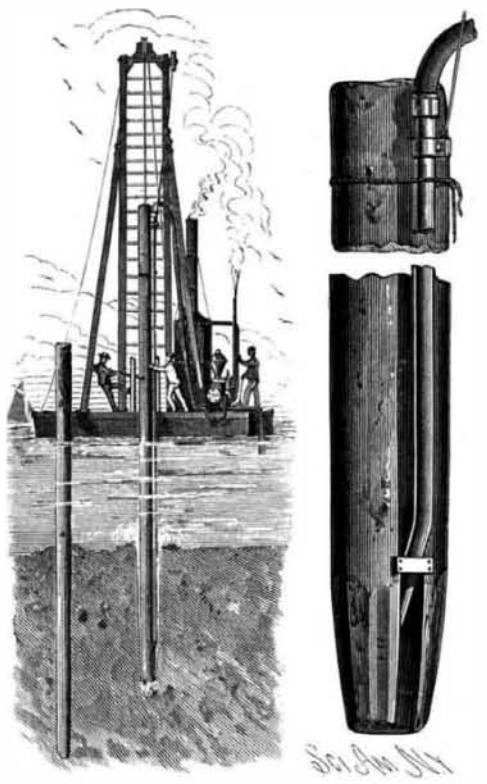
A correspondent of the *Textile Record* says: A fire occurred in a cotton mill at Chester under the following circumstances: A pile of dyed warps was put on the floor of the size house directly after being taken from the drying cylinders. The warps were still warm. Toward morning the watchman noticed smoke issuing from this pile, and upon close examination the warps were found to be on fire. The fire was easily extinguished, but some $300 worth of warps were found to be ruined. The writer visited the mill to study the cause of this fire, and he learned from the superintendent that the heap of warps consisted principally of blue warps with some sized white warps and two bundles of brown warps, the latter being at the bottom of the pile. The superintendent stated that he uses very little tallow in the size for the white and blue warps, but a much larger quantity in the size for the brown warps. He further said that a fire occurred some time ago under similar circumstances in the same place. This former fire was attributed to carelessness of the watchman. We incline to believe that the cause of both the above fires was the combination of tallow and water on the brown warps together with the heat in the warps taken directly from the cylinders, and the pressure of the warps piled on top of the bundles of brown warp. To substantiate this, on examination it was found the brown warps at the bottom of the pile were much more burned than the rest, and that the scorching diminished toward the outside of the pile. Moral: "Never pile up sized warps where taken from the drying cylinder before they have become perfectly cold and dry."

Water Test.

A French periodical, *La Culture*, gives the following simple method for testing the purity of water. In an ordinary quart bottle three parts filled with water dissolve a spoonful of pure white sugar, cork it well, and put it in a warm place. If at the end of forty-eight hours the water becomes turbid and milky, there can be no doubt of its impurity; but if it remain limpid, it may be considered safely drinkable.

HYDRAULIC PILE DRIVER.

The lower end of the pile is provided with a longitudinal groove, which gradually increases in depth toward its lower end, and terminates at the end of the pile. A pipe is so bent that it fits closely against the side of the pile and the bottom of the groove, and its lower end is flush with the bottom of the pile. The pipe is held in place by a block nailed on the pile and across the pipe at its bend, and a rope is passed around the upper end of the pipe and the pile. On the upper end of the pipe is a screw collar, on which a hose coupling can be screwed. Just below the collar is a band having a ring to which is attached a rope passing to a windlass or



HYDRAULIC PILE DRIVER.

other hoisting device. When water is forced through the pipe, the earth is washed away from the end and the pile sinks. After it has been sunk to the proper depth the pipe is pulled up by means of the rope, and is then used with another pile. Driving piles by this plan is easily effected, rapid, and gives satisfactory results.

This invention has been patented by Messrs. J. W. Surprenant and J. E. Ferguson, of Astoria, Oregon.

A NOVEL RUSSIAN BOAT.

Our engraving, which is reproduced from a Russian illustrated paper, represents a peculiar form of boat similar in some respects to the catamaran. It consists of two independent hulls, in the center of each of which is an opening in which the traveler thrusts his feet. When standing, he propels himself by the aid of a long two-bladed paddle, and

A NOVEL RUSSIAN BOAT.

regulates the distance between the two boats by manipulating the ropes which lead from each bow to the middle of the paddle. When tired he brings the boats alongside one another, places the cross bars in position, elevates his umbrella for a sail, and thus skims swiftly over the water.

THE herring fisheries of Scotland employ nearly 500,000 people, one-seventh of the population. The boats represent a money value of $3,600,000. The annual yield of cured fish has risen from 99,000 barrels early in the century to 1,290,000, and has trebled in fifty years, while in the same period the value of the nets has increased 75 per cent.

Suggestions to Inventors.

One of our subscribers, a lady, residing in a "thriving portion of the rural West," where the population largely patronize the reaper, sewing machine, and barbed wire manufacturers, sends us the following suggestions:

Practical needle women need another improvement in the sewing machine. The family sewing machine of to-day gives only the two thread stitch; the cheap sewing machines of twenty years ago gave only the one thread, or chain, stitch. Now, the chain stitch is desirable in some cases as an ornamental stitch; it is useful also in cases in which the seamstress expects the seam to be only temporary, and finds the two thread stitch too difficult to rip. We therefore want a machine which can be made to form the lock stitch and the chain stitch, alternately. The most difficult point about the invention will lie in the simplicity of the means used to bring about the change in the stitch. If it could be as easy to cause the machine to change from two thread stitch to one thread stitch as it is to put a hemmer or a ruffler on the machine, the invention would be practical and therefore successful.

A Western farmer asks why a horse hedge trimmer has not yet been invented. If an ordinary mower could be made into a hedge cutter by changing detachable parts, it would be widely used. Thousands of farms on the Illinois prairies are inclosed by Osage orange hedges, which are yearly trimmed with shears.

The Pulse of Animals.

The health of animals as well as that of human beings may often be guessed at very shrewdly by simply feeling their pulse. In a horse a good and strong but quiet pulse beats forty times a minute, in an ox fifty to fifty-five, in sheep and pigs not less than seventy nor more than eighty for ordinary health. It may be felt wherever a large artery crosses a bone. In the horse it is generally felt on the cord which crosses over the bone of the lower jaw in front of its curved position, or in the bony ridge above the eye; and in cattle over the middle of the first rib. In sheep it is, perhaps, easiest to place the hand on the left side, where the beating of the heart may be felt. A rapid, hard, and full pulse in stock points to inflammation and high fever; a rapid, small, and weak pulse also to fever, but to fever accompanied by a poor and weak state of the subject. A very slow pulse in stock will often be found to indicate brain disease, while a jumping and irregular pulse shows something wrong with the heart.—*London Graphic.*

The Java Earthquake and the Telephone.

It has been before observed that earthquakes and volcanic eruptions have a disturbing effect on telegraph lines, setting up powerful earth currents in them, and rendering communication difficult. Recent advices from Mr. Weaver, the Superintendent of the Oriental Telephone Company at Singapore, also announce the fact that during the recent earthquake of Java and eruptions of the volcano of Krakatoa, the telephone lines in Singapore were unworkable, owing to a deafening roar which drowned the voice. Only shouting could be heard on the lines because of the noise, which resembled that of a distant waterfall. On one line, in which a small subaqueous cable about a mile in length, from Singapore to Ishore, formed part of the circuit, the roar was mingled with occasional reports like that of a pistol. The volcano of Krakatoa is situated on the island of that name in the Staits of Sunda, between the southern end of Sumatra and the northern end of Java. It is about 500 miles south of Singapore, with a corner of Sumatra intervening. The noises in question were heard during the eruption on August 27 last, but can hardly be considered, says *Engineering*, as due to acoustical effects, notwithstanding the violence of the eruption. The cause is perhaps rather to be sought in the disturbance of the terrestrial magnetic field or in the electric state of the atmosphere by the terrific explosion. The first signs of the eruption were noticed on August 25, when shocks or earthquakes were felt as far as Batavia, and a fine ash began to fall, intermingled with redhot stones. The waters of the straits then began to boil, their temperature rising some 20° C., and great blocks of lava fell on the neighboring coasts of Java and Sumatra. On the 26th the earthquakes became more pronounced, and at noon the Maka-Meru, the largest of the craters, began to break forth into flame. The Goumang-Gunter and the smaller craters then joined in, until forty-five neighboring craters were in action. Torrents of sulphurous mud and lava burst out, and at intervals tremendous explosions were heard, followed by showers of stone and ashes. The clouds were heavily charged with electricity, and lightnings played vividly. Next day the shocks and eruptions increased, accompanied by tidal waves. The island of Krakatoa, a cut of which we gave in the SCIENTIFIC AMERICAN last week, disappeared, and the destruction was frightful

WITHIN three years the number of sawmills in Arkansas has increased from 319 to over 1,200.