

Lime-Sulphur--Its Use as a Fungicide and an Insecticide

By Prof. P. J. O'Gara, Pathologist. Written especially for the Medford Mail Tribune. (Copyright, 1911, by Medford Printing Company.)

THIRTEENTH INSTALLMENT Summary

1. The use of lime-sulphur as an insecticide dates from the year 1854, and was first proposed by John Ruthford, New South Wales, Australia. Its first use was that of sheep dip, and for a number of years was used throughout the sheep growing districts of the world for eradicating the sheep scab.

2. Lime-sulphur was first used as an insecticide on fruit trees in 1886 by Mr. F. Dusey, of Fresno, California who experimented with a sheep dip prepared by a Mr. A. T. Covell. The San Jose scale was the insect which it was attempted to eradicate. This spray was not used in the eastern states until about 1894; its use, however, as a scaleicide, generally used over the country, dates about 1900, although it had been successfully used on the Pacific Coast almost from the date of its discovery as an insecticide.

3. Sulphur in combination with lime was known to have fungicidal properties as early as 1833. It was recommended by Dr. William Kenrick at this early date as a remedy for mildew of the grape. In 1885, William Saunders also recommended lime-sulphur as a fungicide, but his recommendations, as well as earlier ones, were forgotten until about 1901 when Mr. W. M. Scott, of the department of agriculture, took it up as a remedy for the brown rot of the peach. In 1904, Mr. M. B. Waite, also of the department of agriculture, recommended it as a preventive treatment for the peach blight or shot hole disease of the peach, apricot, almond and plum. The use of lime-sulphur as a general fungicide for dormant and summer spraying dates from the year 1907, when its value was demonstrated by Mr. W. M. Scott, of the department of agriculture, and Prof. A. B. Cordley, of the Oregon agricultural college. During the past two years, combinations of lime-sulphur with other compounds for the treatment of various fungous diseases have been worked out by a large number of experimenters. Among these combinations are the lime-sulphur iron sulphate, lime-sulphur copper sulphate, and others.

4. A study of the chemistry of lime-sulphur dates from the year 1902 when the United States department of agriculture and the Washington agricultural college determined the nature of the compounds formed by adding sulphur to lime and boiling the mixture. They also determined the chemical reactions which take place after the lime sulphur is sprayed upon the trees. 5. When sulphur and lime are boiled together in water, the calcium of the lime and the sulphur combine forming polysulphides of calcium, viz Calcium tetrasulphide (CaS4) and calcium pentasulphide (CaS5). Another compound is formed by the breaking down of the higher sulphides above named, namely, calcium thiosulphate (CaS2O3). This latter compound on boiling changes into calcium sulphite (CaSO3), and free sulphur is precipitated. The calcium sulphite when exposed to the air takes up oxygen and calcium sulphate (CaSO4) is formed. 6. In making the lime-sulphur, either commercially or home-made, the best results are obtained by using half as much sulphur, by weight, as lime and boiling the mixture until the sulphur is dissolved. This is usually accomplished within an hour by the use of steam under pressure or by a brisk fire under a cooker, after the mixture comes to a boil. 7. The use of too large an amount of lime prevents the formation of the highest sulphide (CaS5) which is the compound most desired. 8. The effect of adding lime to diluted lime-sulphur solution so as to make the spray show on the trees, is bad practice since it causes a precipitation of the sulphur and decreases the amount of sulphide sulphur, and increases the calcium thiosulphate (CaS2O3). This decreases the insecticidal power of the mixture. 9. Only good lime should be used in making lime-sulphur. A magnesium lime does not form sulphides when boiled with sulphur. A certain combination takes place in which hydrogen sulphide gas (H2S) is produced and which passes off causing an actual loss of sulphur. Hydrogen sulphide gas is poisonous and should not be inhaled. 10. An important fungicide, principally for preventing mildew of apples, roses and other plants, is made by combining lime sulphur and iron sulphate (FeSO4), or copperas. The formula is known as the 10-10-100 which means 10 quarts lime-sulphur, (32 degree test Beaume), 10 pounds iron sulphate (copperas) and 100 gallons of water. This formula may be used as a dormant spray combined with the regular lime sulphur solution for apple mildew and scale

spraying. It may be also used alone or mixed with tobacco black leaf or arsenate of lead for spraying during the summer to control simultaneously the mildew, green apple aphid and codling moth. For those who may wish to use it in small amounts for spraying roses, 10 gallons may be made up by combining 1 quart of commercial lime-sulphur, 1 pound iron sulphate (copperas) and 10 gallons of water. 11. The self-boiled lime-sulphur should be considered a summer spray for plants having delicate foliage, such as the peach and Japanese plum. This spray may be used to control the peach fruit spot disease. For small quantities the formula is. 8 pounds unslaked lime, 8 pounds flour or flowers of sulphur, 50 gallons of water. For large quantities the formula should read: 32 pounds unslaked lime, 32 pounds flour or flowers of sulphur, 200 gallons of water. The heat of the slaking lime should be allowed to boil the mixture for about ten minutes, when the whole should be strained into the spray tank, diluted to the proper proportions and applied to the trees. The lime and sulphur should not be boiled, nor should it be allowed to self-cook too long, or too much sulphide of calcium will be formed. 12. In using concentrated commercial lime-sulphur as well as the home boiled wash (not self-boiled), a hydrometer for determining the concentration of the spray should be used. The Beaume hydrometer is the one in general use, but to be able to dilute properly, a dilution table as found in this bulletin should be used. There should be no guess work in diluting. A standard dilution should be obtained no matter how much the concentrate may vary. 13. The hydrometer will not detect impurities in the lime-sulphur, this can only be determined by chemical analyses. If there is much sediment in the concentrate, especially the home-boiled mixture, allowance should be made for it. The temperature for testing the density of the concentrate should be that for which the instrument has been designed. A home-boiled mixture should always be allowed to cool and settle before testing.

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Parisian Sage Puts Luster into Dull, Faded Hair. Every woman reader of the Mail Tribune who desires radiant hair that everyone admires should go to Chas. Strang today and get a large 50 cent bottle of Parisian Sage.

It is not only a delightful and refreshing hair dressing and beautifier, but it is sold under a rigid guarantee to banish dandruff, stop falling hair and itching scalp, or money back. "Parisian Sage is the best hair tonic I have ever known. I find it the only one that will cure dandruff, cleanse the scalp, and make the hair grow long and beautiful."—Miss Signa Ahl, 2 Farwell St., Worcester, Mass., June 8, 1910.

POLK'S OREGON AND WASHINGTON State Gazetteer and Business Directory. Just issued for 1911-12, is the most complete work of the kind ever published. It contains an accurate business directory of every city, town and village in Oregon and Washington, and the names and addresses of country merchants and professional men, lumbermen, etc., who are located adjacent to villages; also lists of government and county officers, commissioners of deeds, state boards, statutory provisions, terms of courts, names of postmasters, postoffices, express, telephones and telegraph offices, justices of the peace, hotels, daily and weekly newspapers, besides much other information useful to all classes of business and professional men. A descriptive sketch of each place is given, embracing various items of interest, such as the location, population, distances to different points, the most convenient shipping stations, the products that are marketed, stage communication, trade statistics, the nearest bank location, mineral interests, churches, schools, libraries and societies. An important feature is the classified directory, giving every business arranged under its special heading, thus enabling subscribers to obtain at a glance a list of all houses manufacturing or dealing in any particular line of goods. The work generally is compiled to meet the wants of the business community and is so thorough as to deserve their liberal patronage. Price \$9. R. L. POLK & CO. Seattle, Wash. Haskins for Health.

EARLY GREENS NOT YET HERE

Produce Men Expect Local Market Will Show Early Greens Within the Next Month--Eggs Now 25 Cents; Meats Remain High in Price.

With the recent decline in the retail price of eggs to 25 cents per dozen the market in that line has struck a price at which it will probably remain well into the season. Among the fruits and vegetables, few earlier are to be seen, the local spring produce not yet having shown itself. California lettuce, at 10 cents the head; and green onions and radishes, at 5 cents per bunch or 50 cents per dozen bunches are the only new produce shown. The local produce will probably be on the stands within the coming month.

MEDFORD MARKETS.

Retail Prices. VEGETABLES. Potatoes--\$2@2.25 per cwt. Cabbage--3c. Squash--85c@1\$. Parsnips--2 1/2c. California lettuce--10c head. Carrots--2c. Beets--2c. Onions--3c. Celery--75c and \$1 doz. Cauliflower--10@15c head. Turnips--2 1/2c. Radishes--6c bunch. Onions--Green, 5c bunch.

FRUIT. Cocoanuts--10c each. Tangerines--15c doz. Prunes, dried--6c lb. Lemons--30c doz. Oranges--25@35c doz. Grapefruit--75c@1 doz. Bananas--20@30c doz.

BUTTER, EGGS AND POULTRY. Butter, fresh ranch (roll)--65c; creamery, 75c. Eggs, fresh ranch--25c doz. Poultry--Hens, dressed, 25c; live, 15c; springs, dressed, 30c; live, 20c. Turkeys--28@30c, dressed.

HAY AND FEED. Hay--Timothy, \$16; alfalfa, \$11; grass, \$14; grain hay, \$16. Grain--Wheat, \$1.20 bushel; oats, \$35 ton; barley, \$31 ton.

MEATS. Beef--Cows, 10 to 20c; steers 12 1/2 to 25c. Pork--20@22c. Veal--Dressed, 15@25c. Mutton--12 1/2@20c; lambs, 15@25c.

ROCK SPRINGS COAL. Two cars of the famous Rock Springs coal arrived this morning. Phone W. J. Burbidge, the drayman, and get some of this. The best coal in the west, heating, cooking, or for furnace. Demand has exceeded the supply. But we have two cars on the track today.

NOTICE. Beginning April 1st, 1911, the union scale for painters will be \$4 per day. On that date the initiation fee into local union, No. 643, Brotherhood of Painters & Decorators of America, will be raised. The union meets every Thursday night at 8 p. m. in Angle hall. C. W. HARRINGTON, Secretary, 405 North Bartlett St. Phone 427 J. Ashland, Oregon.

Rev. Geo. Moseley

will lecture at the Natatorium at Medford, March 7th, 8 o'clock, on the "Power and the Elevation of Christian Womanhood," also the "Cause of the Downfall of Young Women of the Present Day." Mr. Moseley is one of the best platform orators, Bible student and minister of the gospel. He has traveled through Europe, on the seas and in many parts of the United States lecturing and preaching the gospel. He was a student of the Great British school of arts. He has been master machinist of one of the largest engine works in Pittsburgh, Pa., having full charge of setting on and discharging and setting the scale of wages. He was superintendent of one of the best engine works at Cleveland, O. Mr. Moseley was platform orator in the east in 1893-94 and won the victory in some of the great strikes. He also is a fine fluter and piccolo player and tenor singer. He comes from the best of homes. Come and hear him. Seats on sale at Haskins' drug store. Lecture 50 cents. Haskins for health.

Best Pear Land in Valley, Per Acre \$40.00

The Best 60-Acre Tract of Pear Land in Rogue River Valley For the Money, only \$40.00 per Acre, for the Next Ten Days.

The superintendent of the Burrell Orchard of Medford endorses this tract of deep, free soil as exceptionally good for pears. 1 1/2 miles from Merlin, adjoining a large tract now being developed by an experienced fruit man from North Yakima. Elegant business corner lot, 75x100, close in \$5000. Elegant business corner, lot 50x100, close in \$7500. Another business corner, lot, 50x100, close in \$6000. THESE PRICES FOR A QUICK TURN.

A. N. PARSONS REAL ESTATE GRANTS PASS, ORE.

References: First National Bank, Grants Pass Banking & Trust Co.

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OWNER, POSTOFFICE BOX 812.

TALENT Real Estate FOR SALE

A fine tract, quarter of a mile from Talent, 8-room house, good barn; 200 trees. Price \$4,000; terms given.

Good business opportunities and locations, all paying.

A 66-acre tract, 5-room house and large barn, 3 miles from Talent, partly cleared and lots of good wood on place; must be sold soon; will go for \$1100.

A 60-acre tract, water to irrigate same; has a 5-room house and barn to hold 6 head of horses, implements to run the place, and a wagon. This place put up 30 tons of hay last year, and no water was used. Price, \$3000, half down.

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