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Dates of Slogans in Daily Statesman

(In Twice-a-Week Statesman Following Day)

(With a few possible changes)
Loganberries, October 2
Prunes, October 9
Dairying, October 16
Flax, October 23
Filberts, October 30
Walnuts, November 6
Strawberries, November 13
Apples, November 20
Raspberries, November 27
Mint, December 4
Great Cows, Etc., December 11
Blackberries, December 18
Cherries, December 25
Pears, January 1, 1925
Gooseberries, January 8
Corn, January 15
Celery, January 22
Spinach, Etc., January 29
Onions, Etc., February 5
Potatoes, Etc., February 12
Bees, February 19
Poultry and Pet Stock, Feb. 26
City Beautiful, etc., March 5.
Beans, Etc., March 12
Paved Highways, March 19
Head Lettuce, March 26
Silos, Etc., April 2
Legumes, April 9
Asparagus, Etc., April 16
Grapes, Etc., April 23
Drug Garden, April 30
Sugar Beets, Sorghum, Etc., May 7
Water Powers, May 14
Irrigation, May 21
Mining, May 28
Land, Irrigation, Etc., June 4
Floriculture, June 11
Hops, Cabbage, Etc., June 18
Wholesaling and Jobbing, June 25
Cucumbers, Etc., July 2
Hogs, July 9
Goats, July 16.
Schools, Etc., July 23
Sheep, July 30
National Advertising, August 6
Seeds, Etc., August 13
Livestock, August 20
Grain and Grain Products, August 27
Manufacturing, September 3.
Automotive Industries, September 10
Woodworking, Etc., Sept. 17
Paper Mills, Etc., Sept. 24.

(Back copies of the Thursday editions of The Daily Oregon Statesman are on hand. They are for sale at 10 cents each, mailed to any address. Current copies 5c.)

THIS WEEK'S SLOGAN

DID YOU KNOW That the farmers of the Salem district are rapidly learning the uses of irrigation, especially in exceptionally dry years; that pumps for irrigation (the best for the purpose known and the longest lived and cheapest) are being made in large numbers in Salem; that irrigation districts are coming to life here, with many more to follow; that every farmer who has running water on his land where it can be made available or irrigation purposes has begun to realize that he has something better than a small gold mine; that, with some crops, water available for irrigation represents the difference between total loss and 100 per cent crops, in unusually dry summers; that the Oregon Agricultural college people are ready to give all help possible in the matter of irrigation information, and that preparation for irrigation must be made 100 per cent efficient here in due course, and that this ought to be soon? ....

SUPPLEMENTAL IRRIGATION FOR THE WILLAMETTE VALLEY; PROF. POWERS

Cost of a Small Pumping Plant—When and on What Kind of Land and for What Crops It Will Pay to Pump Water—Half a Million Acres in the Valley Will Give Large Returns for Proper Supplemental Irrigation—It Is Needed Where Rains Are Needed and Fail to Come

(The following is Station Circular 57 of the Oregon Agricultural college, issued in August, 1924, under the title of "Supplemental Irrigation for the Willamette Valley," by Prof. W. L. Powers, chief of the department of soils, in full excepting for a cut of a gasoline pumping plant and of a furrow irrigation of potatoes:)

Frequent recurrence of periods of drouth during the late summer has developed considerable interest in the possibility of supplemental irrigation in the Willamette valley. In 1907 the office of irrigation investigations, United States department of agriculture, began some irrigation tests at Corvallis and other points, to determine the value of irrigation water as a supplemental to the limited summer rainfall, as a means of increasing production and profit, particularly with the more intensive agriculture that was beginning to take the place of grain growing. Increases in yields of representative field crops ranged from 27 per cent to 186 per cent, indicating that supplementary irrigation wisely used with most late season crops would prove profitable on the naturally drained, free working soils of the valley where accessible to water.

In 1910 the experiments were extended to include soil moisture investigation; water variation trials, or duty-of-water experiments to determine how much irrigation would be needed; also to develop practices for securing highest efficiency and the greatest net profit from the pumped water. Water requirement studies were added and also observations of the effects of irrigation on soils and crops.

Soils best suited to supplemental irrigation in the Willamette valley are those that are free working, without being too heavy or sticky on the one hand or too coarse and sieve-like on the other hand. The sandy loam soils occurring along the Willamette and other stream bottoms, or soils belonging to the Newberg and Chehalis series, and the lighter types of soils on the valley floor, such as Willamette loam or silt loam, are suitable for irrigation. Soil surveys of two-thirds of this valley indicate that perhaps half a million acres, or about one-sixth of the improved land in the valley will give good response to supplemental irrigation.

Crops found to give best response to supplemental irrigation here are the truck crops, the crops grown for intensive dairying, such as late summer pasture and late cuttings of legume crops, or row crops that make their maximum growth late in the season, such as roots and corn. Potatoes and beans are cash crops which give large returns from irrigation and are likely to pay for proper irrigation.

Advantages of supplemental irrigation. The chief advantages of supplemental irrigation for free working, naturally drained Willamette valleys soils, are as follows: (1) Irrigation controls soils moisture, overcomes drouth; (2) provides green pasture and green feed late in the summer; (3) saves the clover stand and makes a cutting the first season; (4) makes double cropping possible—late crops after early crops; (5) aids the beneficial bacterial and chemical activities in soil; (6) aids control of crop pests and diseases; (7) increases efficiency of soil moisture during the best growing weather; (8) is an aid to deep or early plowing and intensive cropping; (9) softens clods and dissolves plant foods; (10) proper irrigation pays in increased yields, net profits, and productive values.

For supplemental irrigation to be highly profitable in the Willamette valley it must be used on the naturally drained, free working soils and applied to crops that respond to late season irrigation and that are of good value. The greatest profit is secured where water is efficiently used. The experiment station has sought to determine the minimum amount of water which, together with the best time and manner of use and cultivation, would yield crops of highest values and greatest returns upon the land and water employed. If the increase from irrigation is sufficient to pay for water when pumped a moderate lift and applied to staple field crops it would certainly pay to use gravity irrigation on the more intensive crops. The station experiments have been conducted with water pumped from a creek and discharged at a level 20 feet above the creek for use upon Willamette silty loam with staple field crops.

Water supply. The water available for irrigation in this valley is of good quality and a suitable supply will be found in the "underflow," which occurs in the gravel substratum under the river-bottom soils, or along the bottoms of other large streams. Water can also be pumped for irrigation from perennial streams entering the valley from the foothills. Some irrigable lands are suitable so that these waters can be applied by gravity. In the old valley filling, or valley floor above the first bottom, it is not probable that wells of moderate depth will develop sufficient water to give a continuous supply for centrifugal pumps in volumes sufficient for field use.

Cost of A Small Pumping Plant

The cost of installing a small pumping plant includes the following items of expense:

(a) First cost—engine, pump, flume, or pipes, and in some cases a well and shelter for machinery.

(b) Operating expense—labor, fuel, and lubricating oil.

(c) Maintenance charges—interest on the first cost, depreciation, and repairs.

(d) Total annual cost—"(b) operating expense" and "(c) maintenance charges."

The cost of pumped water increases with the amount of lift and is frequently expressed in cost per acre foot per foot of lift. The pumping plant employed by the experiment station is not operated to half its capacity, yet maximum charges have been used in calculation. The total annual cost runs 58 cents per acre foot per foot of lift. This is a total cost of a dollar per acre inch delivered at a 20 foot level. With a well designed pumping plant and a moderate lift, operating early to capacity, the cost should run from 15 to 40 cents per acre foot. The maximum figure of a dollar per acre inch, however, has been used in calculating the profits from irrigation on the experiment station.

The largest single item of expense is usually the motor or engine. The majority of farms are now equipped with some power machinery, which may be used to drive the irrigation pump. Where water can be pumped from a stream a moderate sized centrifugal pump, piping, and valves should cost from $150 to $300. The first cost of a pumping plant is frequently $25 per acre.

Wells. A dug well is not suitable for a water supply for continuous pumping with a centrifugal pump. In the river-bottom lands an open pit may be dug to the water-level and then a driven cased well put down, perhaps 30 feet below the water plane. The last 12 or 15 feet of this casing should be thoroughly perforated, or a strainer dropped in and the casing jacked up to expose the strainer to the water-bearing sand and gravel. The pump should set within 10 feet of the water-table, which is lowered a little in the vicinity of the well casing during pumping. Where necessary, large radius bends and suction and discharge pipes should be used. These pipes should be about one-third larger in diameter than the pump itself in order to lessen friction. It is necessary to provide a priming device for removing the air from a centrifugal pump. A check valve and straight-way ground gate valve should be provided in the discharge pipe immediately above the pump.

Every foot of lift represents additional cash outlay. The water should not be pumped with an imposing splash or fall above the necessary level for commanding the field to be irrigated. The water can be conveyed to the high part of the land by means of pipes directly connected with the discharge side of the pump. Black tin or water-tight concrete can be used for distribution pipe. If built on a slight grade, wood flumes can be used to carry the water by gravity from the point of discharge.

Pumps. The simple, horizontal, centrifugal pump will be suitable for most purposes in this valley. Any good standard make will supply the water needed. The number of a centrifugal pump refers to the inside diameter of inlet and outlet openings. A number four, or four-inch centrifugal pump, will discharge aboout a cubic foot per second or 450 gallons of water per minute. One cubic foot of water each second will amount to one inch deep over an acre in one hour, and is called an acre inch.

Motive power. An electric motor with direct connection with the pump is a most satisfactory source of power as it avoids in bolting and requires minimum attention. Any difference in cost between the use of distillate and electricity as a surce of energy is more than made up by the saving in attendance where the electric power can be employed. In fact, the saving in the labor may often amount to more than the total fuel bill with the electric plant.

Amount of water and power required. The average depth of water applied per season to field crops during the past fifteen years at the experiment station has been 6 inches per acre. This is the net amount applied to Willamette silty clay loam and it ranges from 4 to 5 inches for row crops to 8 to 12 inches for meadow crops. More water will be required for sandy soils. The amount will vary somewhat with the yield of dry matter and methods of irrigation practiced. The quantity of water required for alfalfa or clover is not likely to be less than 5 or 6 acres inches (equivalent too 5 or 6 inches rainfall) for each ton of increase secured by irrigation. In the station experiments each inch of water has made about 33 bushels more potatoes or 5 bushels more white beans.

The minimum depth that it is feasible to apply to row crops in one irrigation is usually 2 to 3 inches. Meadow crops will usually require 4 to 6 inches at each application. The pump capacity should be sufficient to cover the area served every 3 to 4 weeks. An irrigating stream of less than 225 gallons per minute, or a half a cubic foot per second, is not economical from a labor standpoint. It may be advisable to provide a small reservoir with a small pumping plant, especially for truck crops, so that some water will be available at any hour without pumping; or to enable more continuous operation by storing at night to provide a larger irrigation stream by day.

Calculation of power required. One horse-power will lift a cubic foot of water 8.8 feet per second and is called a water horse-power. To apparent vertical lift must be added the friction head for the length of pipe used for proposed discharge; also the friction due to bends into suction and discharge pipes. The friction value for pipes can be obtained from tables. Suppose the total head is found to be 26.4 feet, and 1 cubic foot per second is to be elevated continuously; by dividing 26.4 feet by the factor 8.8 it is found that three water horsepower would be required to operate this plant. Therefore, making the ordinary allowance for efficiency of machinery at 50 per cent, 6 horsepower should be provided.

Priming and operation. A pitcher pump connected by small gas pipe to the top of the centrifugal pump is a suitable means for removing the air in priming. This pipe must be provided with an air-tight valve to close it up tightly after priming. All pipe connections should be flanged and gasketed so that they fit airtight. Centrifugal pumps are designed for different lifts and for every given lift there is an economic speed. When ordering a pump to go with an engine already on hand or vice versa, give diameter of pulley and revolutions per minute, so that the pump will run to the rated economic speed. Flexible couplings should be provided between the pump motor in a direct-connected unit. Where water is secured from an open stream a screen should be provided in the intake channel. The pump should be set in a concrete base, carefully leveled by supporting nuts placed on the anchor bolts. When true to level, rich cement should be run in around these bolts and the pump bolted down by means of other nuts run on from above the pump base.

Economical use of pumped water necessary. Careful use of pumped water is necessary if the greatest profit is too be realized. Excessive use of water may injure the quality of soil and crops to the point of unprofitable production, even in arid climates. The water, therefore, should be carefully measured and skillfully applied. The land should be leveled to a uniform slope and laterals should be as near water-tight as practicable. Frequently it is desirable to use underground coonerete or wood pipe for laterals. To distribute water hydants along this pipe, portable canvas or slip-joint, black, tin pipe may be used.

Small furrows or corrugations for distributing water on the field will save water as compared to flooding where the stream is small. A soil that is of medium texture is needed. The furrows may be 3 to 4 feet apart, 220 to 240 feet long, being shorter on sandy soil. As soon as possible after irrigation or when the soil is dry enough to crumble, cultivation of row crops should be given in order to restore tilth, kill seedling weeds, and check evaporation.

Fourteen Years' Results on Supplemental Irrigation in the Willamette Valley

Table I shows result of fourteen years of irrigation on Willamette silty clay loam at the experiment station. This does not include data for the present growing season or for 1923, although experiments are being continued. The main experiment includes a rotation of grain, clover, potatoes, and corn. One-tenth acre of each crop is dry farmed, one-tenth acre receives a light irrigation, a third tenth receives a medium amount of water, and a fourth portion a large amount of irrigation. Where winter grain is used no water is supplied to that crop. The amount of water that has given the maximum net profit or best amount of irrigatin for all crops is averaged in table I and amounts to 6 inches depth per acre. Nearly a two-ton increase in the yield of hay crops has been secured. This increase in growth comes in the late cuttings. It frequently happens that irrigation saves a stand of clover or provides green feed or pasture late in the season. The average increase from irrigation of potatoes is 83 bushels per acre, or 21 bushels per acre inch, or per dollar total annual irrigation cost. Beans have received an average depth of 3 inches supplied in a single irrigation, and have given an increase of practically 5 bushels per acre.

Table I. Summary of Fourteen Year's Experiment Showing Best Amount of Irrigation and Value of Silty Clay Loam

Oregon Agricultural College Experiment Station—Depart. of Soil

	Years in trial	Depth of irrigation	—Yield per acre— Irrigation Bu. or T.	Dry Bu.orT.	—Increase from Irrigation— Per acre Bu.orT.	Per inch Bu.orT.	Net dollars per acre
		in					
Potatoes	14	4.00	210 bu.	133.00	83.00	21.00	$35.10
Clover	11	7.65	528 T.	3.47	1.81	.24	10.05
Alfalfa	11	10.00	5.05 T.	2.81	2.14	.21	10.90
Corn	9	5.31	9.15 T.	6.18	2.97	.56	8.79
Beans	10	3.00	17.28 bu.	12.38	4.90	1.63	11.55
Carrots	1	3.00	23.42 T.	13.02	10.40	3.46	36.00
Beets	8	5.40	18.66 T.	11.84	6.82	1.26	20.18
Kale	3	4.00	15.67 T.	13.74	1,93	.48	4.18
Garss*	7	9.33	3.97 T.	3.66	1.17	.10	2.07
Average 6 inches							$12.09

*Pastured some.

The net increase from irrigation in dollars per acre has been obtained by charging a dollar per acre inch, plus a small charge for harvesting the amount of the increase, for crops valued at a moderate, average price; namely, 50c per bushel for potatoes, $3.00 per bushel for beans, and $10 per ton for hay. Three cents per bushel and 25c per ton was charged for harvesting the increase. Increase in crop value for all crops from the average application of 6 inches has been slightly more than $12 per acre.

Value of Rotation and Manuring In Connection with Irrigation

In the early years of this experiment it became very evident that rotation which permitted plowing down legume sod, and turning under manure in each crop rotation, was of great value in increasing efficiency of the water provided. An experiment was therefore arranged to measure the value of crop rotation and manure for increasing the return per unit of water employed. Four plots each of grain, Alsike clover, and white beans were grown each year, and the crops rotated in the order named. One plot of each crop was dry farmed, the second was dry farmed and manured, the third was irrigated, and the fourth was irrigated and manured. Two additional plots, one irrigated and one dry farmed, were provided adjacent to these rotations, and were cropped to beans continuously. One of these was dry farmed and the other irrigated.

The results secured from the nine years of this experiment covering 3 rotations are given in Table II.

Table II. Value of Rotation, Irrigation, Manured — Nine-Year Average

Treatment	Average yearly yield Acre	Acre inch	—Average net profit— Acre	Gain from rotation of manure	Acre inch	Water requirement (lbs. per lb. dry matter)
		in.			in.	
Beans:						
Continuous	9.24	....	11.55	....	....	2,909
Rotated	10.13	....	20.37	8.82	....	2,349
Rotated and manured...	12.91	....	21.26	9.71	....	1,900
Irrigat. continuous	9.85	3.82	15.37	....	5.12	2,622
Irrigated & rotat.	15.74	6.10	29.46	14.09	9.82	1,794
Irrigated, rotated and manured ..	18.29	7.14	38.39	23.02	12.80	1,425

At the beginning of this experiment the average yield of all plots was about 12 bushels of beans per acre. The plots cropped continuously were on slightly better soil than those of the rotation. The land is "half-white land" of Amity silty clay loam. At the end of this experiment we found the continuously cropped plots produced about 6 bushels per acre, and the plots which received irrigation rotation and manure yielded about 20 bushels per acre. As a nine-year average the yields were practically doubled, due to irrigation, rotation, and manure once each crop rotation. As a result of these treatments, the yield per acre inch was more than doubled and the average net profit was greatly increased by rotation and by the use of manure in each rotation. The profit per acre inch of water employed also showed a marked increase from these treatments. The last column in Table II shows the water requirement as to pounds of dry matter produced, which is the ration of the number of pounds of dry matter produced to the pounds of soil, rain, and irrigation water consumed.

It was found that the water requirement had been cut in two, or that the water efficiency had been doubled by irrigation, rotation, and manure. Rotation is especially important on our rather heavy soils, and is likewise important in building up sandy land under irrigation.

IRRIGATION IN THE WEST STAYTON AND TURNER SECTIONS GOES FORWARD

After Serious Experiences and Many Discouragements, the Project of the Willamette Irrigation Land Company Is Getting Under Headway So as to Give Real Service, and Did Much Good Last Year—15,000 Acres to Come Under Irrigation There

Editor Statesman:

Your letter of the 14th was received. As I have been out of the city for three days, I was not able to give you the information until today.

The Willamette Valley Irrigation Land company has passed through a very serious experince. When the company was organized, about thirteen years ago, the projects were extremely favorable for the successful development of the district between West Stayton, Turner, and Marion. A group of citizens of Portland invested about $125,000 in good faith and purchased lands after a careful investigation made by one of the best irrigation engineers available. The state's engineer approved the plan. The Oregon Agricultural college lent their support and indorsement.

A canal was constructed from West Stayton on toward Turner. Approximately 4,000 acres were either purchased or taken under option, and withal approximately a quarter of a million dollars was invested within the first two years. Then came the World war. Sales had been made to people who were not experienced in irrigation. The very neighborhood seemed antagonistic, and one thing after another developed and caused the company to go into the hands of a receiver. Finally the greater of the stock company lost interest, in addition to losing their original investment.

Look More Favorable

After thirteen years of struggles, conditions now seem to be more favorable. The last few years there has been a growing sentiment in favor of irrigation. In 1924 the land was so dry that it fairly cried out for water.

The late T. B. Wilcox had been one of the strongest advocates of irrigation, and before his death had urged the writer to join with him and save the property and the project, if possible, and recommended that the underlying mortgages, delinquent taxes, and the old judgments against the project be bought in to avoid the entire remaining assets from going into the hands of outside parties.

Since purchasing these mortgage, we have endevored to reorganize the project and have engaged Mr. Peter Thomasson to look after the physical properties, and have associated with us Mr. Percy Cupper of Salem, who aids us in the engineering matters.

Of Real Service

This year we hope to be of real service to the community and provide irrigation for those that are in position to make good use of it. The flax grown in that locality last year under irrigation, showed the great value of irrigation. The soil seems to be especially suited to irrigation. A growth of flax on the same land under dry farming methods and under irrigation proves the great value of water properly applied.

We are now going forward with our work vigorously, developing and extending our laterals, and cleaning out the canals, and we feel that our original faith is soon to be justified. There has been a wonderful change in the sentiment of the community. The farmers no longer feel antagonistic, but rather are encouraging our efforts, and giving us their support.

This season a considerable increase of acreage will be under irrigation, and we believe there will follow an era of increased prosperity and largely increased crops in the district near West Stayton and toward Turner, and as these demonstrations prove for themselves the value of water, it is only a question of time until practically the entire acreage, approximating over 15,000 acres, will be under irrigation, handled by farmers who will become experienced in the proper use of water. We look forward to a time when the district will become a garden of flowers, as well as producing profitable crops. While some years irrigation may not be as necessary, irrigation on the land will act as a crop life insurance to be used when most needed.

Yours truly,
E. L. THOMPSON
Portland, May 18, 1925.

LIFE INSURANCE FOR CROPS GOOD

George W. Shand of the Salem Iron works was too busy to give the Slogan editor much time yesterday—

Too busy making irrigation pumps.

On the point of the benefits of irrigation for the Salem district, he said that the whole subject may be covered by the statement that, in dry years, on some lands, with some crops, irrigation will make the difference between a good crop and no crop at all. Irrigation here is life insurance for crops.

Mr. Shand proceeded to illustrate the point by a concrete example of his own. He had a six acre potato patch in 1922. That was a dry year, in the summer season. His potatoes were getting thirsty, so he turned the water onto them, and he harvested 1100 sacks of potatoes from his six acres.

Prunes, Walnuts, Filberts, Etc.

Mr. Shand, while his main occupation is with his foundry and machine shops, the Salem Iron Works, is something of a farmer. He has a 170-acre farm about five miles south of Salem, out on the Jefferson road. He raises sheep and other things; has 60 acres of bearing prune trees, 15 acres in walnuts, and six acres in filberts, the filberts being young trees.

He will have a good crop of prunes this year, comparatively. It will be about a 50 per cent crop from present indications. He is also growing eight acres of flax this year.

While he makes pumps, he does not need to use a pump on his own farm. He irrigates from a creek, by gravity. He just runs the creek down hill and spreads the water over the land where and when it is needed.

Makes Good Pumps

Mr. Shand makes good pumps. His pump is the Shand centrifugal pump, and he thinks it is the best pump made; that it will deliver more water in a given time at less cost than any other pump ever made; that it is the cheapest of all pumps, and will wear longer than any other—that there is very little about the pump to wear.

Mr. Shand has been selling a lot of his pumps; many of them in the Salem district for irrigation purposes. He thinks there should be more of these used by our farmers.

Crop Life Insurance

The present season is such, with abundant rainfall, that perhaps not much irrigation will be needed in the Salem district. T. A. Livesley & Co., Salem, who have the best equipped hop yards in the whole world, and are prepared at one of their largest yards for irrigation, are planning to get along this year without even starting their pumps. They are cultivating in such a way as to conserve the present moist conditions. But they needed irrigation in that yard badly last year, and used it, and increased their yield there by at least 25 per cent. That is what irrigation here means, as stated above. It means life insurance for crops. If it is needed at all, it is needed badly. It will pay most farmers in the Willamette valley, with any of the crops needing intense cultivation, to be prepared to irrigate; to supply the moisture that a long dry time in the summer season makes impossible to secure otherwise, or to conserve from earlier rains.

Keeping Them Jumping

The making of pumps for irrigation and for all other purposes is keeping the Salem Iron Works forces jumping. They have to work far into the night, some nights. Last year they made for the Livesley people for irrigating their hops two pumps with a capacity of 4000 gallons an hour each, and made pumps for many irrigation projects, and for the canneries and others.

They supplied some of the pumps to the state highway department last year, and they worked so economically that this department ordered 18 new ones this year, for road work in different parts of the state. These are all 2½ inch pumps, giving a capacity of 3000 gallons a minute each.

They have just sent two pumps of this size to a cannery at Puyallup, Wash., two to the cannery at Hillsboro, one for Pearcy Bros., nurserymen and orchard experts, Salem, and many others. The making of pumps, in addition to all their other work, keeps them more than busy.

But Mr. Shand thinks this irrigation movement for the Salem district is not being pushed as hard as it should be pushed, for the good of the individual growers, and for the good of all our people.