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The Future of Democracy Editor Courier—As Republican editors are making all kinds of predictions as to the future of the democracy, it may not be amiss for one of the party to help out in the matter.

The principal feature of rejoicing among republicans seems to be the fact that Mr. Bryan has been defeated three times. The principles involved seem to be of little concern. They seem to lose sight of the fact that Jesus Christ has been an unpopular candidate for nearly two thousand years, but is still a candidate, and will be until the principles for which he lived and died are established in the hearts and lives of the entire human race. W. J. Bryan may not be nominated again for president, but the principles for which he has so faithfully and honestly contended will live as long as honesty remains a virtue and men are found who esteem human happiness greater than sordid commercialism.

Yes, a majority of those who went to the polls and voted have said that Mr. Bryan should not be president, but let us remember that this has been the fate of almost every truly great man that has ever lived. W. J. Bryan stands before the world to day as its greatest living statesman. He will be known in history as the man who did more to elevate American manhood than any other man of his time. My posterity will always point with pride to the fact that their paternal ancestor stood by the great Commoner in his valiant fight for the natural and constitutional rights of American citizens, as against the oppressions of corporation wealth. No one of the next generation will ever feel glad that his father voted for Mr. Taft.

We democrats are going to give President Taft our loyal support in the execution of his official duties, but we want it understood that we make no sacrifice of principle. We believe that this government should be run in the interest of all the people, and not in the interest of the Rockefeller, Morgans, Hills and Harrimans. We have been fighting for that which everyone of well balanced mind knows to be right and we expect to live and die in the good work. We know that we are in the best of company. The solid South, the home of true Americanism, is democratic to the core, and will remain so until the final triumph of right over might.

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INVESTIGATIONS TO AVOID FROST DAMAGE

Suggestions Which May Soon Be of Great Practical Value to Fruit Men.

The United States Weather Bureau is making investigations of various methods to protect fruit and other crops from frost. The following article, considerable of which relates to California, may suggest some good ideas to Josephine County fruit growers:

The problem of protection from frost may be considered under four sections, as follows:

- 1. The issuance of adequate frost warnings. 2. A discussion of the physical process operative in the formation and dissipation of frost. 3. The construction of devices and apparatus based upon the principles enumerated in No. 2. 4. The intelligent use of these devices so that a maximum efficiency may be obtained at the critical hour.

In California frosts are found to occur under certain pressure conditions. A period of strong north winds followed by clear skies is a period of danger. Frost is essentially a problem in air drainage and some knowledge of the movement of the air over the ground, or in other words, the local air circulation is essential for successful frost forecasting. The chief cause of cooling is undoubtedly radiation, and this is controlled to a large degree by the relative purity and stillness of the air. When, therefore, the lower air strata are quiet and dust free, also vapor free, conditions are favorable for intense radiation, and consequently rapid cooling of both vegetable fibre and the soil. All fruit growers should carefully study the weather conditions preceding frost in their localities. The district forecaster at San Francisco and observers at any Weather Bureau station will gladly receive suggestions in the matter of local air drainage and frost formation and will, so far as their time permits, investigate and report upon local features.

Under the second heading, discussion of the physical processes involved in frost formation, we would call attention to the following ways of preventing the fall in temperature:

- 1. Adding heat. 2. Adding water vapor. 3. Adding both heat and water vapor. 4. Ventilation, or mixing of the air. 5. Irrigation, or use of water. 6. Use of heated water. 7. Use of screens or covers, preventing loss of heat by radiation. 8. Spraying.

All of the above processes can be found explained in detail in publications of the Weather Bureau. The action of water in any of its forms; whether solid, as ice or frost fluid, as water or gaseous, as water vapor, protective. Large amounts of heat are given off in the change from vapor and from liquid to solid. Theoretically, it is possible by the application of sufficient water to prevent injury by frost. As the plant cools, owing to radiation and an in-draft of cold air, the vapor present condenses, giving free a large quantity of heat, something like 600 calories; and if the water turns to frost, more heat is set free, about 800 calories. If, for example, in an ordinary rain gauge enough frost has formed to weigh, when melted, about an ounce, then the latent heat of condensation is approximately 998 times 680, or 677,440 calories, enough to raise the temperature of the air at freezing 4 degrees over a space of 10 feet square and to considerable height.

Note also that the water plays an important part when the sun rises and the warming of the vegetable fiber begins. Here the water retards the heating, and is thus very beneficial. Chilled plants sprayed with cold water about sunrise are less liable to injury. The latent heat of evaporation and fusion now comes into action in an opposite direction, the heat being utilized in hanging the frost into water or the water into vapor. This, in the writer's opinion, is the critical period, and he believes that more injury results from the too rapid warming of plant fiber after it has been chilled than from the chilling itself. He has known of cases where delicate flowers have been incased in ice and yet no injury resulted, largely because the thawing out was gradual. In examining many orchards it has been ascertained that the portion next exposed to the sun's heat in the morning is, other things being equal, the portion of greatest injury.

Up to the present time the chief effort in frost protection has been to prevent loss of heat by radiation from the ground; and protective methods have been rightly based upon the possible saving and storage of heat. But

it may be none the less profitable to study the problem from a later stage, namely, the period of the chilled fiber. While it is not definitely known what action during frost causes the death of the cell tissues, whether it be a rupture of cell walls or a separation and withdrawal of water content, it would seem that we could not err in guarding the plant fiber from any strain due to rapid and unequal heating when in a chilled condition. Beginning before sunrise, some screen or covering should be interposed between the fruit and the sun's rays. For the reasons given above it is also advisable to apply water. It may interest fruit growers to point out to them that the actual temperature of the air is probably of less importance in frost formation than the cooling of the plant surface due to radiation. Nearly all fruit growers now understand that after sunset, if there be no clouds present and but little motion of the air (though it is well to test this by watching the flow of smoke near the ground) the plant surface emits heat rapidly into space. The under surface of the foliage, of course, intercepts heat from the ground, and so we seldom find frost forming under a tree. The convective currents of the air are generally sluggish and there is, as a rule, little mixing of the air strata, or no thorough circulation at such times. Helmholtz has shown that layers of air of different temperatures may lie close to one another without mixing, and indeed this is known to be the case, not only near the ground but even in free air. Doubtless here lies the explanation of the streakiness of frost. We have examined orchards which were apparently level; and yet upon close inspection it was found that although there was no noticeable slope of the ground, there were certain channels of air motion and certain stagnant zones. The frost streaks were found to coincide with the stagnant areas. Much, however, depends upon the nature of the radiating surface.

The warming or the chilling of the ground has not much effect upon the air at a distance of 10 or 12 feet. That is to say, the rate of heat conduction from one layer to another is very slow. Therefore it is not unusual on frosty nights to obtain readings of 32 degrees F. at the ground, while at six to 10 feet above the ground, the temperature may be 35 degrees or 38 degrees F.

Under the third head, viz., the construction of devices and apparatus for use in orchards, vineyards, gardens, etc., we believe that each local forecaster can contribute materially to successful work by examining in situ any device brought to his notice. It is suggested that he read up the history of the wire coal baskets, first used by Edward Copely at Riverside, Cal., the use of oil by Evert at Arlington; the application of hot water, first used by Meacham; the smudge-machines of Hall, Hammond and others; the oil pots and the small, cheap, sheet iron stoves in which briquettes are burned and which are now on the market. The methods of protection by covering, whether cloth or lath, should be looked into. The question of expense will determine the availability of the method. In California the diversity of interest is so great that no general recommendation, can be given, and in each locality the local forecaster should fit the method to the fruit. In the Riverside, Redlands, Colton section the orange naturally claims first attention; at San Diego, both lemons and oranges; in the foothills of the San Joaquin, oranges; in the valleys, the raisin vines in the spring; in the Sacramento valley, the garden truck; in the bay valleys, the almonds against the late spring frosts; and in Northern California, the deciduous fruits. In all directions there is room for improvement. And not only in the construction of apparatus, but in the manner of application. Particularly valuable are cases where apparently effective devices fail to accomplish the desired protection. Such cases should be studied and the reason for the failure ascertained. This constitutes progress. Under the fourth heading—the use of our knowledge so that a maximum good may result—much of what has been said above is applicable. As an illustration, we may instance the case of a large number of fruit growers in a certain section working together. The result was success, where individual effort previously had not been altogether successful. Study your community, as well as the physical problem or the efficiency of the machine.

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