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State, Federal and Interstate Roles In Conservation

A condensation of a report prepared by S. V. Wantrup at the request of the Council of State Governments, and published in the journal, STATE GOVERNMENT.

Legislation formulating public conservation policies in the United States appears in many unrelated acts, treaties, compacts, and ordinances. Execution of these enactments is spread over international, federal, state, and local agencies.

Under the Constitution of the United States, the individual states hold much of the power to regulate utilization of natural resources, especially agricultural land, ranges, forests, water, wild life, and minerals.

Conservation does not necessarily connote efficiency. Neither does depletion mean waste. Both may be wasteful.

Waste of resources means that the net-value stream from utilization of natural resources is not maximized. Maximization must consider both private and public values.

Application of the maximization principle is not easy. Solutions can be found, making it possible to reach minimum goals, at least, of public conservation policies.

Intrastate Coordination

State machinery for legislative and executive coordination of conservation policies usually is less effective than federal.

Better intrastate articulation or interrelation of resource policies is an aid to better state-federal and interstate cooperation.

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Hybrid Vigor In Dairy Herds By Crossing in Breed

W. A. Regan

The generally accepted explanation of hybrid vigor or heterosis in dairy cattle is based on the fact that most of the desirable hereditary factors tend to be dominant, while those less desirable are often recessive or hidden.

Because the Guernsey breed has been developed along certain lines, it has definite factors governing desirable traits that are dominant. The Holstein, on the other hand, may have other dominant desirable genes. When the two breeds are crossed, the resulting hybrid heifer has the opportunity for and probably will carry more of these dominant desirable genes than were carried by either parent.

Fortunately the same things may be accomplished, even to a greater degree, by crossing between inbred families within a breed.

Inbred Jersey Purebreds

Over a quarter of a century ago we began the task of developing an inbred family of purebred Jerseys that would have a high order of transmitting ability for high milk and butterfat production and that, at the same time, would be free from simple recessive defects. In the main, these objectives have been attained.

An important phase of the work requires the use of the herds of co-operating dairymen in progeny testing of young bulls from the University of California experiment herd. Both purebred and high grade Jersey herds are used for this purpose.

Five of these herds which have used only University bred bulls for the

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Recommendations For Improving Quality of Grapes By Using Proper Cultural Operations on the Vines

A. J. Winkler

Grape crops from 1942 to 1945 were the largest in the history of California grape production. With emphasis solely on quantity, quality suffered.

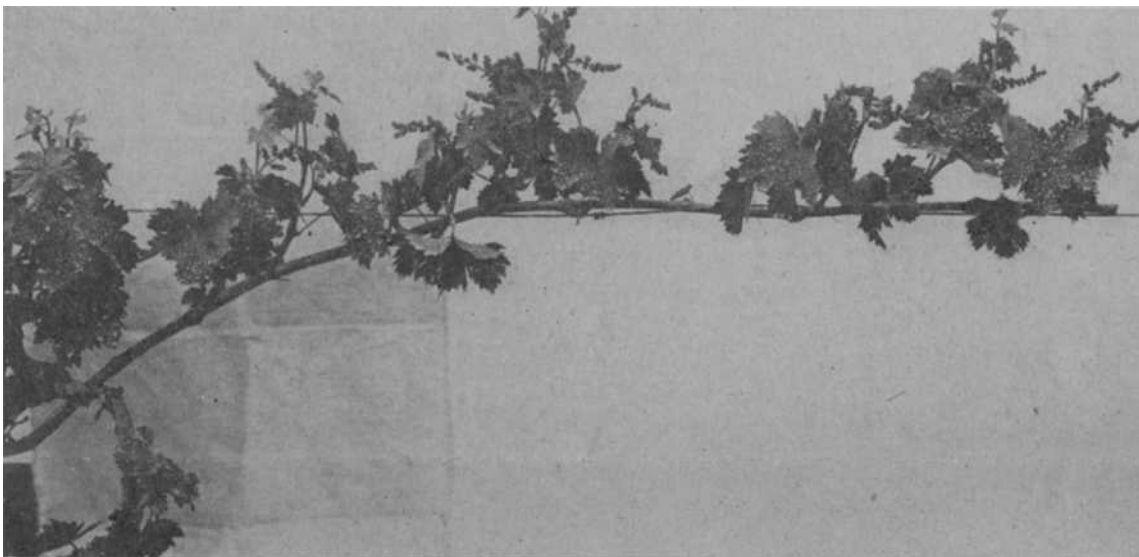
With fruits again moving freely in the normal channels of trade, buyers are becoming quality conscious. The demand for better quality was evident in all markets where fruits and grapes were sold during 1946.

pruning must be emphasized. It is the means of distributing the bearing wood over the vine, between the vines, and between years in accordance with the capacity of the spurs, canes, or vines in order to equalize production and secure good crops of high-quality grapes. It is the cheapest way to reduce the number of clusters and thus lessens the cost of

ment of color may be retarded.

For the purpose of improving the color, only leaves in the head of staked vines and those on the lower part of the north or east side of trellised vines should be removed.

The removal of one-eighth to one-fourth of the leaves will usually give the desired results. More drastic treatment will weaken the vines and



A single cane of a Muscat vine showing the proper stage of development for flower-cluster thinning.

The offering of grapes fell short of expectations at times during that season. Some difficulty was had with the conditions and maturing of a considerable volume of grapes, in particular, with girdled Thompson Seedless.

In most varieties the date at which the fruit reached the legal minimum degree Balling for shipment last season was late despite the fact that 1946 was average or above in heat summation in most producing areas.

A delay in maturing under such conditions very definitely indicates overloaded vines. In the case of Thompson Seedless, for instance, analyses of fruit in the range of 17° to 20° Balling showed the average acid content to be 33 per cent below that of fruit of this variety from the same areas and same range of maturity in prewar years. These figures reveal a situation of extreme overcropping of the vines from which the fruit was taken, since the grapes must hang beyond the normal date of maturing for a long time for the acidity to be depressed to this extent.

Improving Fruit Quality

Information at hand not only indicates the nature of the difficulties in 1946, but points the way to the avoidance of similar trouble in years to come. Overloaded vines cannot produce high-quality fruit.

Prior to the war, cultural operations were in common use, which, when properly applied, aided materially in the production of better grapes. The return to these practices is not only the simplest but probably the only means of insuring that the table grapes of 1947 will be of acceptable quality. These operations, in addition to good vineyard care are proper pruning, suckering, tendrill and leaf removals, thinning, and girdling.

Pruning

The pruning season is practically over, but the importance of careful

thinning in the regulation of the crop of table-grape vines.

Suckering

Suckering is intimately tied in with thinning. Valuable leaves should not be removed, but the fruit on the vines that are too bushy will not attain high quality. Judicious removal of excess shoots when they are still small makes for a normal coverage of foliage which favors the best development of the fruit and reduces both thinning and harvesting costs. A shoot should not be removed just because it happens not to have a cluster, for its leaves will nourish the clusters on other shoots.

Leaf Removal

Leaf removal if judiciously performed may be advantageous. Basal leaves that will rub the fruit, tendrils that will intertwine the clusters, and the lower lateral shoots where these form in profusion should be removed at the normal time for berry or cluster thinning. These operations may well be combined with the last thinning, especially in the case of Red Malaga and Ribier where only a few clusters have been left to be removed at this time. Only the leaves and laterals up to and opposite the clusters should be removed. All tendrils that might reach a cluster should be cut.

Opening for Color

The coloring for certain varieties can sometimes be facilitated by opening the vines to permit the air to move through them more freely. One means of doing this is to remove some of the leaves. If this removal is delayed until the fruit has attained the minimum sugar content desired, little or no harm will be done to either the vine or the fruit, and the coloring of the grapes may be improved.

Should many leaves be removed before the fruit reaches the minimum sugar content for harvesting, its maturing as well as the develop-

ment of color may be retarded.

Thinning

Thinning is the removal of flower clusters before blooming and of immature clusters or parts of clusters after the berries have set. Like pruning, it concentrates the activities of the vine into the parts retained. It offers possibilities in addition to good pruning in the improvement of quality and in the production of a full crop every year.

The fruiting habits and the setting of the fruit of different varieties necessitates different methods of thinning. Thus with flower-cluster thinning, quality is improved through the better setting of normal berries, with berry thinning through the removal of the parts of clusters that tend to become too compact and by better coloring, and with cluster thinning through greater uniformity of size and better coloring.

Girdling

Girdling—or ringling—consists in removing a complete ring of bark $\frac{1}{8}$ to $\frac{1}{4}$ inch wide from the trunk, arm, or cane below the fruit which it is intended to affect. As a result, the carbohydrates elaborated in the leaves will accumulate in the parts above the wound, including the fruit, and will influence its development.

The effects to be achieved determine the time of girdling. Thus, if the girdling is to increase size of berry it should be done just before or at the beginning of most rapid berry growth, which is soon after the berries set, and if it is to hasten coloring and maturing it must be done just before or at the beginning of the ripening period.

Properly timed and executed girdling accompanied by proper thinning has regularly increased the size of Thompson Seedless berries from 50 to 100 per cent.

The berry size of seeded varieties like Ribier, Malaga, etc., is influenced

Constant Research For the Control Of Citrus Thrips

W. H. Ewart

Citrus thrips are found in all citrus-growing areas of California but are a serious pest only in the inland valleys.

The most serious damage occurs in the Sacramento and San Joaquin Valleys in central California, in the San Fernando Valley, Foothill regions and the Coachella Valley in southern California. Limited numbers of thrips occur on citrus in the coastal areas but they have not caused enough damage to warrant general control measures.

Injury to Fruit and to New Growth

The fruit and the new growth of all varieties of citrus may be injured by thrips.

Nymphs which hatch in the early spring from overwintering eggs begin to feed on the new flush of growth on oranges and grapefruit and may cause considerable injury.

When the new growth hardens, which is about the time most of the petals have fallen, thrips move to the small fruits where their feeding causes the characteristic ring scarring. Fruits may be injured in this manner until they are about the size of a walnut.

During the early part of the summer the thrips feed on the surface of fruits and tender growth. In late summer the fall flush of growth may be so badly damaged by thrips feeding that very few new leaves develop. On lemons, injury to both fruit and new growth begins with the nymphs which hatch from overwintering

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Investigations in Poultry Disease Problems Reported

Attempts to develop an improved vaccine for pneumoencephalitis—known in all states except California as Newcastle disease—focused on studies of the effect which the addition of certain substances to the present vaccine might have on its immunizing property.

Laboratory tests of some of these experimental vaccines gave encouraging results.

One vaccine was subjected to field trials involving 37,400 pullets on five farms. Approximately 20 per cent were left unvaccinated for controls and the remainder were given two 0.5 cubic centimeters doses of vaccine. Part of the birds received their two doses of vaccine at four and twelve weeks of age and part at twelve and fourteen weeks of age. These flocks became infected with a mild type of the disease in three to five months after the second vaccination.

The egg yield of all groups was depressed but this effect was significantly less marked in the vaccinated than in the control group.

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relatively little. Although not so consistent as the influence on berry size, the coloring of Red Malaga and Ribier can often be hastened by girdling. The rate of ripening of most seeded varieties may be slightly accelerated.

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Second Growth Redwood Worthy of Good Management Practices To Obtain Perpetual Income

Emanuel Fritz

Once thought worthless, second growth redwood suddenly demonstrated value and there are now more than a dozen small mills cutting such growth solely.

The typical second growth redwood forest now being cut is a mixture of redwood sprout trees and seedling trees of several species, due to the cutting practices of the early loggers and to the accidental freedom from fires.

Present Logging Too Close

Most owners are selling off their second growth without stipulating in their contracts how the timber is to be logged. The stands are being logged too clean. The few trees left are badly injured by tractors. The slash often is piled against the trees so they will be destroyed when the debris is burned. Thus, few or no effective seed trees will be left as a seed source for natural reforestation.

The typical small logger takes all trees that will make boards or two-by-fours. He thus penalizes himself because he cuts some trees that are under the profit margin. He would be better off financially if he were to leave the under-sized trees—those under 18 inches, breast high.

If a second growth owner has it in mind to clear his land and create pasturage, he should give careful

The average annual growth rate in the better stands is between 500 to 750 board feet per acre, although it easily could be 1,000 board feet under good management. These figures refer only to average annual growth rate, which is the present day volume averaged over all the years of the stand.

When a stand is under 20 years old it is making only cubic feet and no board feet. When it has reached the age of the present stands it is growing at the rate of probably 2,000 to 3,000 board feet per acre per year. This is called periodic annual growth, the growth of the current year alone or the average for the last 5 or 10 years.

Some stands being cut today are growing in value at the rate of \$6.00 per acre per year, when stumpage is valued at \$2.00 per thousand board feet.

It is evident that some of the second growth stands are being cut just when they are making their best increment.

Recommended Practices

The above should not be construed to mean that the owner should refrain from cutting his timber. Young timber should have some cutting going on in it all the time after it has passed 20 to 30 years of age.



Second growth redwood 60-70 years old. A light thinning, made 10 years before the picture was taken, removed only deformed trees. As a result, the remaining trees are making more rapid growth and are producing more upper grade lumber. The 1937 cut should have been heavier to make the thinning operation pay better and to stimulate the residual stand to still greater acceleration in growth rate.

thought to the probable cost of clearing off all debris and seeding the land to grass and to the probable returns from the grass. It is not at all unlikely that he will find growing trees is more profitable and less troublesome than grazing cattle or sheep. Most of the second growth land is really absolute forest soil and will grow trees more profitably than grass. That is something that must be determined for each block of land.

If the second growth owner were to sell off only certain marked or otherwise indicated trees, and see to it that the remainder be not destroyed, he would have a nest egg of immature trees that could soon make enough growth to replace that which was removed—do it in less than the original time, and make better grades of lumber. The reserved trees at the same time would reseed the logged area for the third crop.

The immature trees have remarkable capacity for accelerated growth after thinning. They usually have such long clean slender trunks that subsequent growth should produce knot-free lumber.

Perpetual Income Possible

The 50- to 75-year-old timber being cut today could easily be managed on a perpetual yield or income basis. It requires only conscious application of simple rules of tree growth and of logging.

In many cases such timber has produced 50,000 board feet per acre in from 60 to 75 years. On the average, the growth is considerably less, not because the soil may be poor but because the area is not completely stocked.

The first products may be only fuel wood and posts. When their removal cannot be accomplished at an immediate profit, the cost may not be warranted for any but the stronger owners even though the effect on quantity, and particularly quality, growth is very beneficial.

Much can be done to obtain substantial immediate returns from the present stands, and to improve their future production.

Usually the bulk of the volume is in the larger trees, those over 20 inches, breast high. Of a given total number of trees one-third may be above 20 inches and contain three-quarters of the total volume.

If there are 150 trees per acre in a 75-year-old stand, 50 may be 12 inches and under, another 50 may be 12 to 20 inches, and 50 over 20 inches. The latter third, if removed carefully, will yield not only the bulk of the total volume but all that is economically merchantable.

The smaller trees cannot be cut, logged and milled at a profit. They will grow faster because they have more room. Because they have clean trunks, as a rule, they will produce a better grade of lumber. Instead of leaving cutover land that may be a liability, the owner will have a rapidly appreciating asset.

An owner who has a sufficiently large acreage can spread his cut over more years, and thus have less wait for future returns. Should he own or control 5,000 acres, he could cut 5,000,000 feet per year perpetually. At \$2.00 per thousand feet a 5,000-acre stand should gross \$10,000 per year for stumpage alone. Smaller

State, Federal and Interstate Roles In Conservation

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Four improvements are of special interest:

1. Many legislatures need reorganization to ensure fewer but more effective committees.

One or two legislative committees would seem sufficient for dealing with natural resources.

Two committees may be preferred because of the differences between the economic and social problems concerning renewable resources, such as agricultural land, forests, water, and wild life, and those concerning nonrenewable resources, such as oil, gas, and minerals.

2. Better provision of professional staffs for the legislatures should be made, especially for the two resource committees.

3. Planning divisions attached to the office of the chief executive—the governor—or to the office of his general manager—the chief budget officer—may aid in the coordination of executive agencies.

4. State planning boards would be helpful where plans of both branches of government and of organized industry, agriculture, labor, and the like could be studied and discussed independently from governmental functions.

State-Federal Cooperation

Much has been written lately about the alleged infringement of state rights by the federal government in the realm of natural resources, especially in agriculture.

Regardless of whether such infringement has taken place or not, state rights may be defended best if the states themselves shoulder and discharge effectively in the social interest the duties with which these rights are constitutionally associated.

Better intrastate coordination of resource policies is only one of the conditions which may facilitate more active participation of the states. Another condition is the better institutional machinery for coordinating resource policies between the states and the federal government.

Strictly intrafederal coordinating bodies—for example, the Pacific Coast Federal Regional Council—may facilitate state-federal cooperation by representing the federal government in state-federal bodies.

An illustration of this is the Pacific Coast Board of Intergovernmental Relations established in 1945, comprising California, Oregon, and Washington.

The membership consists of the field chiefs of federal agencies as selected by the Pacific Coast Federal Regional Council and representatives include the governor, the chairman of the State Commission on Interstate Cooperation, a representative of the official organization of cities and municipalities, and a representative of county supervisors or commissioners.

The principles of organization contain the provision that the membership from the federal government shall be less in number than the combined total of representatives of the other jurisdictions.

The purposes of the Board are for discussion and cooperation, and any conclusions are purely advisory. It has aided in the elimination of conflicts in the execution of existing local, state, and federal laws and regulations. It has helped in the pooling of facts and exchange of ideas for the planning of government action concerning some vital economic and social problems.

Interstate Cooperation

In the Commissions on Interstate Cooperation, the Council of State Governments already possesses an effective mechanism through which efforts toward better interstate co-

owners could space their yield in periods of five years or more.

Sales contracts should contain provisions for cutting only certain designated trees, protecting the remainder against damage, and for safe slash disposal.

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Results of Experiments with Sweet Sudan and Sudan 23 And Suggestions For Planting

Fred N. Briggs

Widespread interest in Sweet Sudan has been aroused among California growers of Sudan grass. This variety was developed by Dr. R. E. Karper and Dr. J. R. Quinby of the Texas Agricultural Experiment Station from a cross between Leoti, a sweet sorghum, and Common Sudan grass followed by backcrosses to Sudan.

The process of breeding resulted in a rapid return to the general characteristics of Common Sudan, but allowed the breeders to incorporate by selection the sweet juicy stalk, non-shattering seed habit, sienna glume color, and the resistance to Red Spot, a bacterial disease, characters from the Leoti parent.

A number of sweet juicy selections which showed high palatability and good productivity were bulked to

limiting factor. They were cut July 2, August 9, and September 26 at which time they were in the proper stage for making hay.

Yield of Hay—Lbs. per Acre

	Sweet Sudan	Sudan 23	Gain of 23 over Sweet
1st Cutting.....	3779.8	4306.1	13.9%
2nd Cutting.....	2268.9	2838.3	25.1%
3rd Cutting.....	3326.2	4472.2	34.4%
Total for Season.....	9374.9	11,616.6	23.9%

First of all you will note that the difference in yield between these two varieties for the first cutting was very similar to that obtained in 1944. Furthermore, the comparative performance of Sweet Sudan grew worse as the season progressed. The gain of Sudan 23 over Sweet for the season was nearly 24 per cent which represents 1.1 ton of hay.

Much of the Sudan grown in Cali-



Showing relative growth of Sudan 23, the taller grass on the right, and Sweet Sudan, on the left.

form foundation stock of the Sweet Sudan which has been used for experimental trials and commercial plantings.

Experimental Plantings

In March of 1944 Dr. Karper very kindly placed at our disposal a small packet of seed for experimental purposes and 3 ounces for foundation seed. Single strips 6x80 feet were sown to Sweet, Common, and 23 Sudan. A 40-inch strip was cut the full length of each plot at the proper stage of growth for making hay.

Their relative yield based on oven dry weight was: Sweet Sudan, 98.2%; Common Sudan, 100.0%; and Sudan 23, 113.5%. Because of lack of replications only a single cutting was made. Therefore, these data are of limited value except as they are confirmed in 1945.

In 1945 Sweet Sudan was compared with Sudan 23 in one-eighth acre plots replicated six times. These plots were planted April 25 and irrigated frequently so that water was never a

California is used for summer pasture. It is freely admitted that hay yields do not necessarily reflect exactly the relative pasture yields of the two varieties.

It was noted that Sweet Sudan grew slower in the seedling stage and was slower to recover after cutting. These facts suggest that, at Davis, pasture yields of Sweet Sudan very likely would be less than those of Sudan 23.

Suggested Planting

It is possible that Sweet Sudan might perform better in some other parts of the State. In view of the results obtained at Davis, I would like to suggest to growers, who are planning to grow Sweet Sudan, that they plant a part of one pasture, say one quarter to one half to Sudan 23. This will enable them to observe, first hand, their comparative value.

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operation in the resource field could be channeled.

Special committees have been set up to study resource problems in forestry, and in agriculture, for example.

The Council has aided in the establishment of state compacts, and the corresponding permanent interstate agencies.

Specific Resource Problems

In addition to the general problems of better interstate and state-federal coordination in resource policies, there are many specific resource problems suitable for study and recommendation by the Council, including:

1. Taxation, credit, and tenure of resources;
2. Integrated, multiple-use development of water resources;
3. State forestry legislation;
4. Conservation of wild life—fisheries, upland game, migratory birds;
5. Regulation of mining and drilling operations;
6. Administration of grants-in-aid, especially in soil conservation and including the relation between the state extension services and the fed-

eral Soil Conservation Service;

7. The function of special districts—for example, soil conservation, forestry, grazing, irrigation, fire protection—in resource conservation.

State compacts are not a necessary condition for better interstate cooperation in conservation politics, but they are helpful.

The experience gained in negotiation, concluding, and administering state compacts has resulted in a better integration of state policies, even for resources which were not directly affected.

In the past, use of state compacts has been confined largely to water, oil, and natural gas. In many cases, conservation of land, forests, grazing, minerals, and wild life can be aided by extending the use of state compacts to these resources.

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Alfalfa varieties and strain are being tested by the Division of Agronomy to determine the relative adaption, yield, disease resistance, and longevity.